CORNET BAY MARINA

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MODEL TOXIC CONTROL ACT (MTCA) CLEANUP

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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1 INTRODUCTION

Grette Associates, LLC was under contract with Kennedy/Jenks Consultants, Inc. to prepare a wetland delineation and analysis report for the Cornet Bay Marina Model Toxic Control Act (MTCA) cleanup. The Cornet Bay Marina is located at 200 Cornet Bay Drive (Island County Parcels R13436-488-2260, R13436-506-2420, and R13436-517-2500) and is located in Section 36, Township 34 North, Range 1 East, W.M. in Oak Harbor, Washington (Figure 1).

Figure 1. Site Vicinity Map

Grette Associates, LLC prepared a Wetland Delineation and Analysis Report for the Cornet Bay Marina MTCA Cleanup (Grette Associates 2013). For a complete description of the wetlands discussed herein, please refer to this report.

This Compensatory Mitigation Plan (Plan) has been prepared in compliance with the requirements of the Island County Code (ICC) Chapter 17.02A.070 – Critical Area Mitigation, the Washington State Department of Ecology's requirements under Chapter 90.48 RCW and Section 401 of the Federal Clean Water Act (CWA), and the U.S. Army

Corps of Engineers (Corps) requirements under Section 404 of the CWA. This Plan was also prepared using the guidance from *Wetland Mitigation in Washington State* (Ecology, Corps, and EPA 2006).

2 PROJECT DESCRIPTION

2.1 Current Use

The Cornet Bay Marina provides moorage and refueling for private and small commercial vessels. In addition, the marina property consists of a gravel and paved parking lot and small general store for marina users. The property to the northeast of the marina is Deception Pass State Park, owned and managed by Washington State.

2.2 Existing Structures

The existing timber bulkhead at the Cornet Bay Marina was constructed with creosote timber pile in 1960. The current condition of the bulkhead is showing signs of decay. Existing structures waterward of the bulkhead consists of two fixed piers that provide access to dock floats.

In addition, there are several above-ground structures and underground structures associated with the Cornet Bay Marina that are landward of the existing bulkhead. The existing above-ground structures consist of a main building functioning as a storefront and reception area and a small storage shed to the west. The underground structures include a concrete vault that contains two fuel tanks.

2.3 Proposed Actions

In 1989, underground fuel tanks in the marina parking lot leaked an unknown quantity of gas and/or diesel products. Because the tanks were isolated from Cornet Bay by a timber bulkhead, the leak was not identified until a sheen was observed on the water. After the leak was discovered, the underground tanks and pipes were replaced with a concrete vault containing a two compartment, 12,000 gallon tank with connecting lines to the marina's fuel dock; however, the contaminated area was not remediated.

In 1992, the Washington State Department of Ecology (Ecology) entered into a Consent Decree with the property owner for MTCA cleanup of the property, as "the actions to be taken pursuant to [the] Decree are necessary to protect the public health, welfare, and the environment." From 1995 through 2011, Ecology performed site investigations to characterize the distribution of soil and groundwater contamination on the property. Proposed remediation activities will remove hydrocarbon-contained soils and groundwater.

Cleanup activities onsite will involve removal of all petroleum affected soils associated with the release. In addition, the shoreward portions of the two timber docks will be demolished to make room for the installation of a new sheet pile bulkhead. The timber dock portions shoreward of the first pile bent will be removed temporarily during construction. Then a new 330 linear foot steel sheet "Z pile" bulkhead will be installed approximately 3 horizontal feet waterward and as close as possible to the existing timber bulkhead. The sheet pile bulkhead will extend 35 to 50 feet below grade. Installation of

the sheet pile will occur using a land-based crane with vibratory hammer attachment. The existing timber bulkhead will be cut off at the mud line or deeper, dependent upon the depth of planned remediation efforts. Timbers extending below the cutoff depth will remain in place. A temporary floating dock will be placed between the existing docks to allow access to the boats during construction.

Once the new bulkhead has been installed and the dock–to-shore access ways replaced in-kind, remediation of the contaminated soils will commence. This portion of the project will involve excavation and disposal of contaminated material, hauling of contaminated material to an approved upland site, import of clean material, back filling, and compacting of the excavation site. During all remediation activities, a silt boom with an oil boom inside its perimeter will be in place waterward of the bulkhead.

Construction dewatering may be necessary during deeper excavations to facilitate excavations and reduce the water content of excavated soils. Construction water or ground water will be collected and discharged to a series of holding tanks for solids settling, filtration, and treatment. Following treatment, water will be discharged directly into Cornet Bay (pending permit requirements). Discharged water will be monitored to assure that it meets water quality standards established by Ecology for the site.

During the excavation of the contaminated material, the existing marina building and ancillary facilities will be moved off their original foundations and placed in an approved area onsite. Once the buildings have been relocated, the old foundation of the building, septic tank, and utilities will be demolished as required for cleanup. Water and electricity will be temporarily re-routed. The fuel line will be temporarily shut down during construction. After remediation is complete, the marina building will be moved back to a new foundation placed on its original location. At this time utilities will be restored, a new guardrail erected, a 6 foot wide concrete cap will be constructed along the bulkhead for safety and stability, and all marina infrastructures will be replaced as appropriate.

2.4 Regulatory Summary

The Critical Area features described in this report and in the Wetland Delineation and Analysis Report (Grette Associates 2013) are regulated by four agencies: Island County, the Washington State Department of Ecology (Ecology), the U.S. Army Corps of Engineers – Seattle District (Corps), and the Washington State Department Fish and Wildlife (WDFW).

3 IMPACT ANALYSIS

The proposed cleanup project will result in unavoidable impacts to critical areas at the Cornet Bay Marina property. These impacts are described in detail below. The impacts addressed in this Plan include those impacts to the aquatic area below the Ordinary High Water Mark (OHWM) and the estuarine intertidal wetlands onsite. Affected Critical Areas by type are summarized below in Table 1.

Table 1. Proposed Critical Area Impact Summary by Type.

Impact Area	Square Feet	Duration
Aquatic	990	Permanent
Wetland Buffer	1750	6-9 months
Total	2740	

3.1 Aquatic Impacts

As discussed above in Section 2.3, the proposed cleanup will extend the new steel sheet pile wall approximately 3 horizontal feet waterward of the existing timber bulkhead. The total length of the sheet pile wall is 330 linear feet and will permanently remove approximately 990 square feet of aquatic habitat.

Pursuant to the Magnuson-Stevenson Fishery Conservation Management Act (MSFCMA) and the 1996 Sustainable Fisheries Act, an evaluation of impacts of the Cornet Bay Marina MTCA cleanup project on Essential Fish Habitat (EFH) is necessary. EFH is defined by MSFCMA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." (50 CFR 600.905-930). An Essential Fish Habitat Assessment (Grette Associates 2013b) was completed for the Cornet Bay Marina MTCA cleanup and is attached in Appendix B.

3.2 Wetland Buffer Impacts

Activities associated with the cleanup project will occur in a wetland buffer; however, the existing wetland buffer does not currently provide quality buffer function due to the land use and development of the area. Activities proposed within the wetland buffer are temporary impacts associated with the excavation of contaminated soils on site and will occur over a 3-6 month duration.

3.3 Affected Functions and Values

3.3.1 Aquatic Functions and Values

The proposed actions to occur during the project will temporarily alter or remove aquatic area. The function most affected by the proposed project is Essential Fish Habitat (EFH). The Pacific Fisheries Management Council (PEMC) has designated EFH for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fishes (NOAA 1999, PFMC 1999). The EFH for these species extend from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the Exclusive Economic Zone (EEZ) off the Washington coast (PFMC 1999). The existing nearshore intertidal habitat to be removed or temporarily altered would occur in an already modified shoreline area with low substrate complexity and habitat value. Based on the EFH Assessment (Grette Associates 2013b), the proposed project will not adversely affect EFH for Pacific salmon, ground fish, or coastal pelagic fishes.

3.3.2 Wetland Buffer Functions and Values

As discussed above in Section 3.2, the wetland buffer impacts proposed are temporary and will not result in a net loss of wetland buffer area. The existing wetland buffer does

not provide much, if any buffer function since vegetation is limited within the buffer and the existing land development.

4 MITIGATION APPROACH

The proposed Cornet Bay Marina cleanup project was designed and configured to avoid and then minimize impacts to the critical areas within the project area. Unavoidable impacts to aquatic habitat will be mitigated through the creation of aquatic habitat from uplands. These actions will be accompanied by the enhancement of wetland and wetland buffer to protect the functions of the mitigation of aquatic habitat and associated wetland.

4.1 Mitigation Sequencing

As required by ICC 17.02A.70, this section describes the efforts to apply mitigation sequencing to the proposed project. Mitigation sequencing is a set of steps designed to prevent unavoidable impacts to the environment, and then to rectify those impacts that cannot be avoided. The steps considered during the planning of this project are discussed below.

1. *Avoidance*
   The Washington State Department of Ecology (Ecology) entered into a Consent Decree with the property owner for MTCA cleanup of the property, as "the actions to be taken pursuant to [the] Decree are necessary to protect the public health, welfare, and the environment;" therefore, the environmental impacts associated with the cleanup are unavoidable.

2. *Reduction*
   In order to completely remove the contaminated soils and materials at the Cornet Bay Marina, the reduction of the project area to avoid environmental impacts is not feasible. The contamination onsite extends to the existing creosote-treated timber pile bulkhead, which is also proposed to be removed; thus a mechanism was needed to contain the contaminants during construction and replace the existing bulkhead. The current design extends the new bulkhead approximately 3 feet waterward of the existing bulkhead, which is the minimum requirements needed to successfully remove the contamination.

3. *Restoration*
   Due to the requirements needed to successfully remove all contaminants within the project area, restoration of the impacted area is not feasible. The construction process will require extending the proposed bulkhead approximately 3 feet waterward, which will permanently remove 990 square feet of aquatic area.

4. *Compensation*
   The functions of the affected aquatic area will be replaced through creation of an aquatic area and enhancing existing wetland. In addition, the associated wetland buffer will be enhanced to protect the functions of the mitigation of aquatic habitat and associated wetland. This site is located onsite between the southwest corner of the existing parking lot and the existing infiltration basin.

4.2 Goals and Objectives

The overall goal of the Mitigation Plan is to compensate for lost aquatic area resulting from project construction. More specific mitigation goals include:

- Provide equivalent aquatic area;
- Provide structurally diverse, native vegetation;
- Provide enhanced wildlife habitat functions;
- Provide enhanced upland vegetation diversity.

Specific Functional objectives of the Plan include:

1. Create 1,300 square feet (0.03 acres) of intertidal aquatic habitat;
2. Enhance 1,720 square feet (0.04 acres) of wetland vegetation;
3. Enhance 1,750 square feet (0.04 acres) of upland vegetation.

4.3 Mitigation Site Selection

Site selection for the mitigation site to be used was conducted by looking at adjacent areas owned by Cornet Bay Marina that would best replace the functions lost due to the proposed project. The chosen location within the site offers the potential to replace the aquatic acreage that will be lost to the project. In addition the site will likely offer the potential to increase the functional value of the created habitat beyond what is present in the impact area.

4.3.1 Functional Potential

The mitigation area is adjacent to the infiltration basin, which is inundated daily by high tides within Cornet Bay, and a saltwater tidal fringe wetland (Wetland W). The vegetation within the lower elevations of the infiltration basin is dominated by pickleweed (*Salicornia virgincia*). Currently, the infiltration basin likely provides foraging and refuge habitat for juvenile salmonids that enter the wetland during high tides. The increased function of the area will offset the functions and area affected by the proposed project.

4.4 Background Information

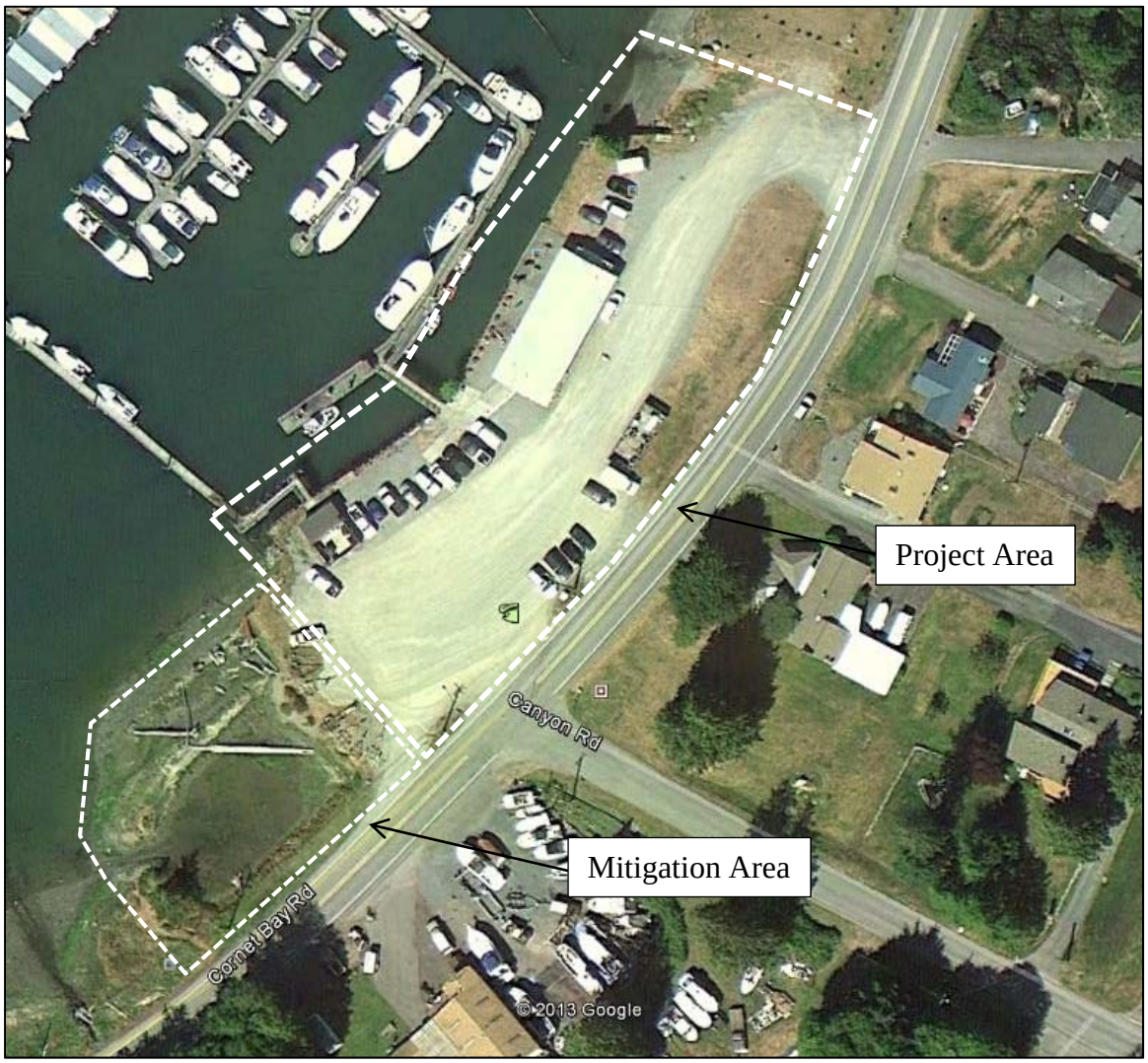
4.4.1 Wetland W

Wetland W, the wetland to be enhanced, is an Estuarine Intertidal Regularly Flooded Emergent wetland and is hydrogeomorphically classified as a saltwater tidal fringe wetland. The wetland is located along the infiltration basin and extends southwest outside of the project area. The wetland consists of emergent species that are dominated by pickleweed, Pacific silverweed (*Potentilla anserine*), and Baltic rush (*Juncus balticus*). The pickleweed is limited to the lower elevations of the wetland where daily inundation of saltwater occurs. For additional information on this wetland refer to the Cornet Bay Wetland Delineation and Analysis Report for the Cornet Bay Marina Cleanup (Grette Associates 2013) in Appendix A.

5 COMPENSATORY MITIGATION PLAN

Compensatory mitigation will occur on the Cornet Bay Marina property (Figure 2). Actions proposed at the site include creating 1,300 square feet of aquatic area, 1,720 square feet of wetland vegetation enhancement, and 1,750 square feet of wetland buffer enhancement.

Figure 2. Proposed Mitigation Area.



The proposed mitigation ratios for the Cornet Bay MTCA cleanup were determined based on the existing aquatic habitat functions, the functional lift that is likely at the mitigation site, and conversations with the Department of Ecology's northwest representative. The impact area, approximately 990 square feet in size, consists of an area that is approximately 3 feet waterward of the existing wooden bulkhead. This area is un-vegetated, and the substrate consists of silty sand. The proposed mitigation ratio for the aquatic area lost due to the cleanup project is 1.44:1 (area of mitigation : area of impact).

5.1 Target Functions

5.1.1 Aquatic Functions

The mitigation aquatic area created will possess a greater total functional value than that of the impact area. The geomorphic location of the proposed aquatic area will be in a low wave energy environment compared to the existing impact area. Low energy environments provide greater opportunity for aquatic vegetation to establish within the created area. Based on the existing vegetation along the shoreline, the aquatic area will likely be naturally vegetated by pickleweed, which will provide foraging and refuge habitat for juvenile salmon during high tides.

5.1.2 Wetland Functions

The targeted functional lift proposed in Wetland W will provide greater vegetation complexity to increase habitat value to the wetland. Vegetation within the wetland is dominated by emergent species consisting of Baltic rush, Pacific silverweed, and pickleweed. Establishing a native shrub community within the wetland will outperform existing habitat functions by adding vegetation strata diversity and shading to the wetland and aquatic area. These enhancements will provide greater foraging and refuge opportunities to marine and wildlife.

The enhancement of the wetland buffer will possess a greater functional value than what currently exists in the buffer area. Currently the wetland buffer provides very little protection to the wetland due to the land uses and lack of vegetation complexity in the area. The mitigation wetland buffer area will establish greater vegetation complexity by establishing a native shrub community to the buffer area. The shrub community will provide greater buffer function to Wetland W by providing additional shelter protection to the wetland and habitat value.

5.2 Mitigation Design

The intent of the compensatory mitigation actions at the Cornet Bay Marina is to offset the permanent loss of function of aquatic area within the site. Mitigation actions include removing non-native vegetation along the southwest portion of upland area adjacent to the northeast portion of Wetland W, excavation of the shoreline, and enhancing the existing wetland and wetland buffer areas with native vegetation.

5.2.1 Grading Plan

Initially, the extent of the proposed grading will be clearly marked, and silt fencing will be installed along the outer grading extents. All the vegetation within the areas proposed for excavation and grading will be mechanically removed and disposed of at an approved off-site location.

During excavation and grading, Best Management Practices (BMPs) will be employed to minimize erosion of disturbed surface soils and to prevent sediment-laden runoff from entering Cornet Bay. BMPs to be employed during construction may include (but are not limited to) silt fencing and/or straw bales around the perimeter of the clearing and grading areas, mulching area immediately after completion of grading, and installation of plant material as soon as practical after grading.

Once the vegetation is removed, grading (not including the upland planting areas) will be conducted using bull dozers, excavators, dump trucks and other like equipment as needed to complete the work. The existing shoreline areas will be left intact to prevent the flooding of the excavation areas. Once work within the excavated areas has been completed, the shoreline areas to be graded will be graded down to the design elevation.

The interior of the mitigation aquatic area will be graded down to approximately 7-8 feet (NAVD 88). This elevation will be refined upon topographic surveying and an analysis of the hydrologic conditions along the shoreline. The new mitigation area will be graded such that the new shoreline edges will be wavy and irregular.

Upon completion of excavation, large woody debris (LWD) structures will be installed within the aquatic area. A total of three (3) LWD structures will be installed once the final grade is achieved. A typical LWD structure will include the entire tree, including root wad and branches. LWD can be salvaged onsite only if the LWD is located along the shoreline to be excavated.

It is anticipated that the cleanup project will not need to import amended soils within the aquatic area. If necessary, the topsoil will be amended into surface soils after installation of woody debris but before planting. After grading is complete, the project biologist will determine if topsoil amendments area necessary for volunteer recruitment of intertidal vegetation and survival of the planted and seeded vegetation.

5.2.2 Construction Inspections

Construction monitoring will involve close coordination between the construction contractor, project engineer, landscaping personnel and agency regulators in order to ensure that the proposed mitigation actions are installed in an appropriate manner, as outlined in the approved plan. A pre-construction meeting involving all of the above parties will be held to discuss the mitigation design. The purpose of the meeting will be to discuss the primary intent of the mitigation plan, the requirements in all of the applicable permits, establish communication lines between the involved parties, and address any questions or problems.

During construction, the project engineer will monitor site construction to ensure the approved plan is implemented. This includes proper grading of the site, installation of the various habitat features, appropriate use and maintenance of required BMPs, and installation of the plant materials according to the approved plans. Final acceptance of site grading and hardscape (landscape) work will be at the biologist's discretion.

5.2.3 Planting Plan

Planting installation will be performed in accordance with the specifications outlined in this plan. Any alterations to the planting plan due to site conditions will require approval from the project biologist and appropriate regulatory agencies prior to installation. The Cornet Bay Marina cleanup is only proposing planting within the Wetland W and Wetland W buffer area. It is anticipated that the mitigation aquatic area will naturally

establish a community of pickle weed that is representative to the undisturbed shoreline adjacent to the created aquatic area.

The intent of the wetland enhancement and buffer enhancement planting plan is to create a shrub community intermixed within the existing vegetation community. Shrub species will be planted in clusters among the emergent vegetation at 4 to 6 foot centers and will include Hooker's willow (*Salix hookeriana*) and Pacific wax-myrtle (*Myrica californica*) within the wetland and Nootka rose (*Rosa nutkana*), Scouler's willow (*Salix scouleriana*), and oceanspray (*Holodiscus discolor*) within the wetland buffer area.

5.2.4 Planting Schedule

The proposed planting schedule for the Cornet Bay Marina mitigation areas is presented below in Table 2. The specific quantities of each species will be calculated during final design of the mitigation action. In order to reduce mortality, a late fall planting installation (October – November) schedule is preferred. Plants should not be installed during or immediately before freezing weather.

Table 2. Proposed Planting Schedule

Common Name	*Species Name*	Quantity	Size	Spacing (O.C)
Wetland Enhancement				
Hooker's willow	*Salix hookeriana*	40	2 gallon	4'
Pacific wax-myrtle	*Myrica californica*	25	2 gallon	6'
Wetland Buffer Enhancement				
Nootka rose	*Rosa nutkana*	16	2 gallon	6'
Scouler's willow	*Salix scouleriana*	25	2 gallon	4'
Oceanspray	*Holodiscus discolor*	16	2 gallon	6'

Plant installation will be performed in accordance with the specifications outlined in this Plan. Any alterations to the planting plan due to site conditions will require prior approval from the project biologist and/or land architect.

All plant materials to be used on the site will be native to Western Washington and will consist of nursery grown stock from a reputable, local dealer. Only native species specified in the approved plant schedule are to be used; no hybrids will be allowed. Plant substitutions must be approved by the project biologist if specified species are not commercially available.

Plant material provided will be typical of their species or variety; they will exhibit normal, densely-developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects and all forms of infestation.

Willow cuttings must be alive with any side branches cleanly removed and bark intact. The butt ends should be cleanly cut at an angle for easy insertion into the soil. The top should be cut square or blunt. The cuttings should be 1/2 inch to 1-1/2 inch in diameter and 24 inches to 42 inches long. Cuttings must be fresh and must be kept moist after they have been cut to the appropriate lengths. They must be prepared and installed within a 48-hour period.

5.2.5 Preparation and Installation of Planting Materials

The landscape contractor shall verify the location of all elements of the landscape plan prior to installation. The project biologist may adjust the locations of landscape elements during the installation period as necessary.

Circular plant pits with vertical sides will be excavated for all container stock. The pits should be at least twice the diameter of the root system, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of 4 inches, and the pit should be thoroughly wetted prior to plant insertion to prevent capillary stress. The planting hole shall be amended with a mixture of topsoil and organic material if necessary to provide appropriate rooting media.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plants thoroughly midway through backfilling and add Agriform tablets. Water pits again upon completion of backfilling. No filling should occur around stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 2-1/2 inch layer of mulch around the base of each container plant.

6 MONITORING PLAN

6.1 Duration and Frequency

The following sections describe the monitoring program for the installation of the Cornet Bay Marina mitigation project. As described below, the monitoring plan extends up to a total of 10 years, with monitoring events occurring in years 1-3, 5, 7, and 10, post – construction. For clarification, the year within which construction of the site is complete (including plant installation) will be considered to be Monitoring Year 0. However, the full monitoring plan may not need to be implemented: if the Performance Standards are met at the end of Year 3, the Corps will be consulted regarding closing out the site monitoring as no additional measures of site success would need to be met. The site will remain protected as a compensatory mitigation site.

6.1.1 Post-Installation Inspection and Monitoring

Compliance monitoring will consist of evaluating the plantings immediately after construction to confirm the plan was followed and plants were installed appropriately. A walk-through survey will be conducted with regulatory staff to verify that installation conforms to the approved plan. Fixed points will be established within the mitigation site, with each point to be used as a transect end point for physical monitoring of site elevations, vegetation monitoring, and photo-point documentation during long-term monitoring.

Compliance monitoring will be conducted by a qualified biologist after completion of the walk – through survey using evaluation standards and criteria discussed below. Coverage and abundance of the vegetation within the wetland and wetland buffer areas will be

recorded along permanent transects, and will constitute baseline conditions for comparison during long – term monitoring.

Following completion of the compliance inspection and baseline monitoring, a monitoring report will be prepared by a qualified biologist presenting the baseline data and verifying that all design features have been correctly implemented. Any changes to the planting plan will also be discussed in the compliance memorandum. The memorandum will be submitted to the appropriate regulatory staff within 60 days following completion of all compensatory mitigation actions.

6.1.2 Long-Term Monitoring

Long-term monitoring will be conducted over a ten (10) year period with observations conducted during years 1, 2, 3, 5, 7 and 10 (Table 3). The purpose of the long-term monitoring program will be to evaluate the establishment and maintenance of the plant communities within the wetland and wetland buffer areas, and to determine if the goals and objectives of the mitigation plan have been met. The transects established during the post-construction inspections will be utilized for monitoring development of the mitigation site over the course of the long-term monitoring period. Photographs will be taken at each transect end-point to document the development of the vegetation communities at the site.

6.2 Performance Standards

Performance standards provide a clear means of evaluating the success of a mitigation action. The following performance standards have been developed to reflect the goals and functional objectives detailed in Section 4.1 of this document. Guidance from *Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Version 1)* was used to develop many of the performance standards used in this document.

Table 3. Cornet Bay Marina Mitigation Area Performance Standards

Mitigation Goal	Functional Objective	Performance Standard	Parameter Measured	Year Inspected[1]	Sampling Method
Provide equivalent aquatic area	1. Create 1,300 square feet (0.03 acres) of intertidal aquatic habitat	1a. A minimum of 1,300 square feet of aquatic area will be created by the end of the Cornet Bay cleanup	Aquatic Habitat Acreage	As-Built	Traditional land survey
Provide enhanced wetland vegetation complexity and wildlife habitat	2. Enhance 1,700 square feet (0.04 acres) of wetland vegetation	2a. A minimum of two (2) species of native shrubs will be present by the end of the monitoring period	Species composition	0, 1, 2, 3, 5, 7, 10	Visual walk through
		2b. A minimum of 80% survival of planted shrubs species each monitoring year[2]	Species health	0, 1, 2, 3, 5, 7, 10	Visual walk through
		2c. . Minimum of 10% aerial coverage of native shrub species[3] in planted areas after year 1, 20% after year 2 and 30% after year 3 through the end of the monitoring period.	Aerial coverage and Species composition	0, 1, 2, 3, 5, 7, 10	Line intercept
Provide enhanced upland buffer	Enhance 1,750 square feet (0.04 acres) of upland vegetation	3a. A minimum of two (2) species of native shrubs will be present by the end of the monitoring period	Species composition	0, 1, 2, 3, 5, 7, 10	Visual walk through

Mitigation Goal	Functional Objective	Performance Standard	Parameter Measured	Year Inspected[1]	Sampling Method
		3b. A minimum of 80% survival of planted shrubs species each monitoring year[2]	Species health	0, 1, 2, 3, 5, 7, 10	Visual walk through
		2c. . Minimum of 10% aerial coverage of native shrub species[3] in planted areas planted after year 1, 20% after year 2 and 30% after year 3 through the end of the monitoring period.	Aerial coverage and Species composition	0, 1, 2, 3, 5, 7, 10	Line intercept

[1] Vegetative monitoring conducted during Year 0 is being done to provide a baseline for comparison during later monitoring years, and will not be compared to performance standards.
[2] Monitoring Year 0 will have 100% survival of planted stock.
[3] Native volunteer species will be an acceptable component of this performance standard.

6.3 Monitoring Methods

6.3.1 Vegetation Monitoring

Vegetation surveys will be conducted in accordance with the monitoring schedule to compare results against the Performance Standards described above. Inspection of the planted material to determine health and vigor of the installation will occur during each monitoring visit.

Vegetation monitoring will include collection of quantitative data during each monitoring visit. Shrubs planted within the mitigation will be assessed using the line – intercept method. The line – intercept method is described in the *Guide for Wetland Mitigation Project Monitoring* (Horner and Raedeke 1989). The line – intercept method is designed for the efficient and consistent collection of information, so that the data can be compared among monitoring years to identify changes through time.

Permanent transects will be established within the mitigation site according to the methods in Horner and Raedeke (1989) to provide consistency of data between monitoring years. These transects will be established during the as-built survey, and will include transects within the graded mitigation area as well as the enhanced riparian/upland zone. The transect end-points, which also will serve as the permanent photo-points, will be permanently marked with capped rebar and surveyed during the as-built survey.

All shrub species planted in Year 0 will be counted each monitoring year to assess mortality. Survival monitoring will include walking the entire site and documenting the health of each species planted in Year 0.

6.3.2 Photographic Documentation

As described above, permanent photo-points will be established during the as-built survey in order to obtain representative photographs of the mitigation site. Photo-points will be established at the ends of each permanent monitoring transect to document wetland and buffer vegetation success and development over time. Photographs will be taken from the same locations (and facing the same direction) yearly to document the project's appearance and progress.

6.4 Monitoring Reports

As part of the monitoring program, regular reports will be prepared to describe the results of the mitigation site monitoring and comparisons to the performance standards.

6.4.1 As-Built Report

Within 60 days of completion of mitigation site construction, an as-built report will be prepared and submitted to the permitting agencies. This report will document the implementation of the mitigation actions and describe any deviations from the original Plan. The report will also describe any potential problems identified during installation and any recommended remedies to be proposed to the permitting agencies. The as-built report must also include a survey drawing prepared by a licensed land surveyor

documenting the physical conditions on the site after implementation. The survey must include all appropriate habitat features and 1-ft contour intervals. Photographs will be taken at the established photo-points to further document the baseline conditions within the mitigation site. The report will also contain the results of the baseline vegetation monitoring (Year 0).

6.4.2 Annual Monitoring Report

An annual monitoring report will be submitted by December 31 to the permitting agencies detailing the results of that year's monitoring activities. The report will document site conditions, provide a summary of the maintenance actions conducted on the site, and describe any deviations from the monitoring protocols prescribed in this plan. The report will also describe any potential problems observed and recommend changes to the maintenance or monitoring protocols.

6.4.3 Monitoring Schedule

Baseline monitoring will be conducted after completion of construction (Year 0). Long-term monitoring of the mitigation site will be conducted in years 1, 2, 3, 5, 7 and 10, post-construction. Unless otherwise noted in Table 3, monitoring activities are to be conducted in late summer (July through August). Monitoring reports will be submitted to the regulatory agency no later than December 31 in the year monitoring activities were conducted.

7 MAINTENANCE AND CONTINGENCY PLANS

The sections below describe the maintenance activities to be conducted within the mitigation areas, as well as the contingency planning process to be followed for the duration of the mitigation monitoring.

7.1 Maintenance Plan

Maintenance of the mitigation action area will be performed for the duration of the monitoring period. During each site visit, all litter including paper, plastic, bottles, construction debris, yard debris, etc., will be documented, as will all non-native, invasive and noxious[1] vegetation. Any litter or invasive vegetation that is observed during site visits will be removed for the duration of the 10 – year monitoring period. Work to be completed during the monitoring period in the planted mitigation areas includes replacement of dead or failed plant materials with plantings of the same species, size and location as original plantings. While the native species selected for mitigation are hardy and typically thrive in the on-site conditions, some individuals within the planted areas might perish due to dry conditions. Replacement plantings, if required, are to be installed during the dormant period.

7.2 Contingency Plan

The contingency plan provides a framework for taking action if the mitigation actions fail to meet the performance standards described above. The contingency actions will vary

[1] Class A, B and C-listed species in the most current Washington State Noxious Weed List (as issued by the Washington State Noxious Weed Control Board.

depending on whether physical or biological processes are responsible for non-attainment of performance standards, and the degree of shortfall. If the Project fails one or more performance standards, but the permitting agencies agree the shortfall is minor, then additional monitoring prior to undertaking more intense corrective actions may be proposed.

7.2.1 Contingency Actions

This contingency plan identifies a planning process for selecting appropriate actions to address failure of specific performance standards. In order to maintain the flexibility needed to respond effectively and appropriately to biological and/or physical conditions, this plan does not present a specific list of actions that will be taken to remedy all specific types of failures at the mitigation area.

Site-specific contingency options do exist for the mitigation area, and sample options are outlined below. The list of sample corrective actions is not exclusive, nor is it a commitment to undertake a specific action. It is expected that any shortfall in mitigation performance can be remedied within the confines of the mitigation area through adaptive management techniques.

Failure of biological components of the mitigation actions are more difficult to predict and specific responses are impossible to present in detail. However, the following general approaches are anticipated:

- If the vegetation planted in the mitigation areas fails to meet the performance standards, additional planting may occur.

- If a specific species that was originally planted continues to have a high mortality rate over time then an approved substitute may be planted.

7.2.2 Contingency Planning Procedures

The problem recognition process is an integral part of the monitoring program. As monitoring data are collected, they will be examined and interpreted relative to the performance standards. The purpose of the process is to determine if there is a problem and if so, the nature and extent of the problem. Good faith will be met and best efforts will be used to reach consensus regarding an appropriate response. In the event that consensus cannot be reached, the permitting agencies will determine if modified or continued monitoring is adequate.

Contingency Planning and Response Process

The purpose of the contingency planning process is to develop contingency actions that may be appropriate, depending on the results of the monitoring program and problem recognition step. If modified or continued monitoring is not an adequate response, a contingency proposal will be submitted for permitting agency review.

The contingency planning process could result in the implementation of an approved response action. Alternatively, it could result in agreement on an approach or set of criteria for taking further action, depending on the results of future monitoring. The

permitting agencies will make a final determination on an appropriate response, based on available information and scientifically and economically feasible recommendations. Resource agencies might be invited into contingency planning and response discussions. No contingency action will be undertaken until the permitting agencies give approval in writing. Potential responses include, but are not limited to, one or more of the following:

- Concluding that the situation does not require further action.
- Expanding or modifying the monitoring program.
- Developing more specific criteria to evaluate the data during future monitoring.
- Initiating a corrective action.

8 BIOLOGIST QUALIFICATIONS

8.1 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecology restoration. Chad also has professional experience in stream and fish restoration, marine monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecology restoration and wetland science.

For a list of representative projects, please contact him at Grette Associates.

8.2 Scott Maharry

Scott Maharry is a Biologist with over 13 years of professional experience and extensive training in wetland science as well as fisheries and wildlife ecology. Scott also has extensive experience in wetland and marine aquatic permitting, mitigation planning and implementation, and fish and wildlife assessments.

Scott earned a Bachelor's of Science degree in Biology from Central Washington University. In addition, he has attended numerous State and Federal wetland delineation protocol trainings and workshops throughout his career. He has also attended several wetland trainings offered through the Washington Department of Ecology's Coastal Training Program.

Scott is a certified wetlands delineator, and he is also a Pierce, Kitsap, and Thurston County Qualified Wetland Specialist. He holds similar qualifications from other jurisdictions as well.

For a list of representative projects, please contact him at Grette Associates.

9 REFERENCES

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. March 2006. Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Version 1). Washington State Department of Ecology Publication #06-06-011b. Olympia, WA.

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Pacific Fishery Management Council (PFMC). 1999. Apendix A. Indentification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council, Portland, Oregon.

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CORNET BAY MARINA MITIGATION PLAN
APPENDIX A: WETLAND DELINEATION AND ANALYSIS REPORT

KENNEDY/JENKS CONSULTANTS, INC.

CORNET BAY MARINA REMEDIAL ACTION
WETLAND DELINEATION AND ANALYSIS REPORT

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

KENNEDY/JENKS CONSULTANTS, INC.

CORNET BAY MARINA REMEDIAL ACTION WETLAND DELINEATION AND ANALYSIS REPORT

PREPARED FOR:

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JULY 3, 2013

CHAD WALLIN
BIOLOGIST

DATE

JULY 1, 2013

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DATE

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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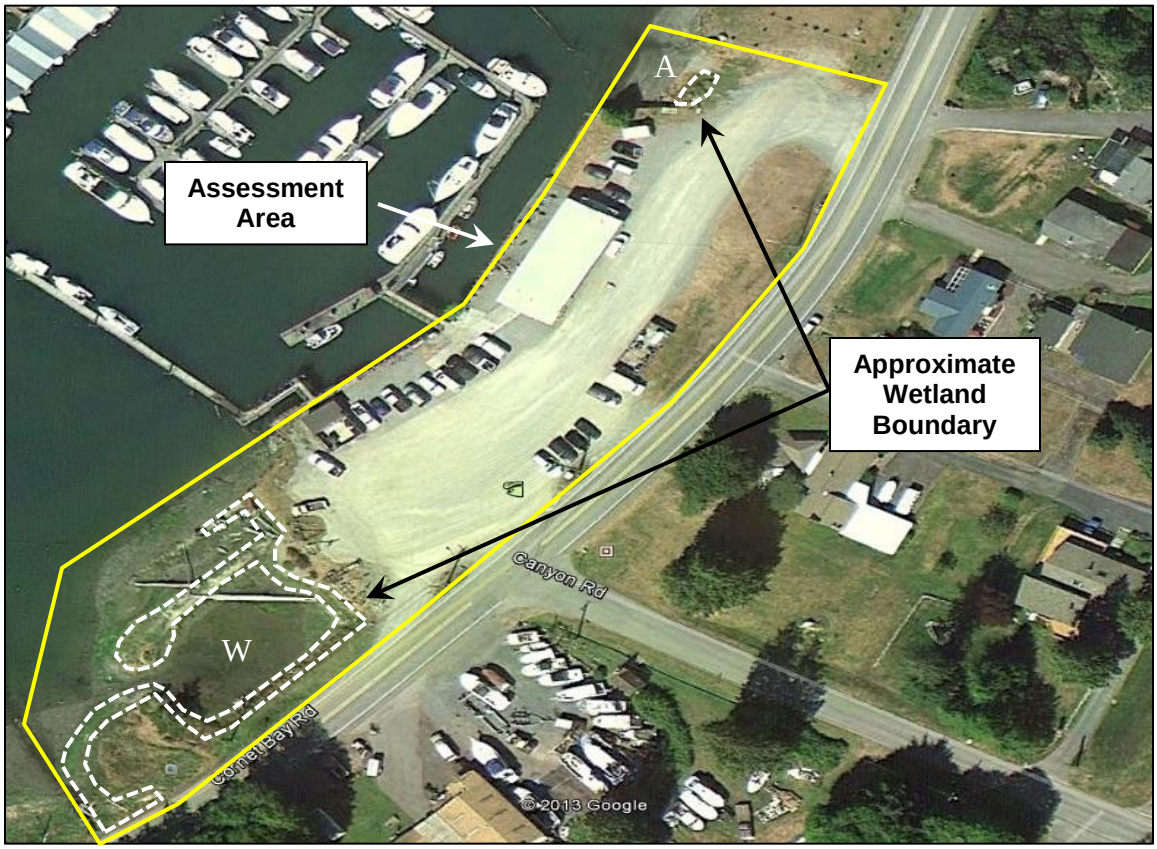
1 INTRODUCTION

Grette Associates, LLC is under contract with Kennedy/Jenks Consultants, Inc. to prepare a wetland delineation and analysis report for the Cornet Bay Marina Model Toxic Control Act (MTCA) cleanup. The Cornet Bay Marina is located at 200 Cornet Bay Drive (Island County Parcels R13436-488-2260, R13436-506-2420, and R13436-517-2500) and is located in Section 36, Township 34 North, Range 1 East, W.M. in Oak Harbor, Washington (Figure 1).

Figure 1. Site Vicinity Map

A Grette Associates wetland specialist visited Cornet Bay Marina (Project Site) on June 5, 2013. During the site visit, two wetlands were identified within the study area that contained indicators of all three wetland criteria. Both of the wetlands are within the tidally influenced portion of the shoreline. The portions of the wetlands within the study area were delineated. Field datasheets are attached for reference in Appendix A. Data plots and wetland boundary flags were recorded using a differential global positioning system (dGPS) and the wetland delineation map is presented in Appendix B.

Figure 2. Cornet Bay Marina study area and approximate wetland boundary



2 FEATURE SUMMARY

Grette Associates collected data and delineated two (2) separate wetlands at the Cornet Bay Marina site on June 5, 2013. Six data plots were sampled to determine the location of upland and wetland areas. Boundary flags and sample plot locations were marked with survey flagging or pin flags, except for areas regularly exposed to wave action, and recorded using a differential global positioning system (dGPS).

During the site assessment, two estuarine wetlands were identified. According to Island County's wetland inventory, the southwest portion of the study area is mapped as estuarine wetland (corresponding with a portion of Wetland W). Further, there is one additional wetland area mapped within 300 feet of the study area, which is located south of Wetland W and across Cornet Bay Rd (Island County 2013).

Wetland W is classified as an Estuarine Intertidal Emergent Regularly Flooded wetland by the U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI). Wetland A is not mapped by NWI or Island County. Island County does not use the Washington State Department of Ecology's (Ecology) *Washington State Wetland Rating System for Western WA - Revised* (Hruby 2006) to rate wetlands; therefore, Island County's *Wetland Classification System* was used (ICC 17.02A.090E). Based on this system, both estuarine wetlands are considered high priority wetlands and categorized as

C Wetlands. However, Island County does not regulate C wetlands that are less than 1,000 square feet in size unless the wetland meets specific criteria (ICC 17.02A.090A2). Therefore, Wetland A, approximately 170 square feet in size, is not regulated by Island County. Having a high intensity land use, Wetland W requires a 90 foot buffer width (ICC 17.02A.090F Table 1). In addition to Island County's categorization, the Washington Department of Fish and Wildlife considers Puget Sound nearshore as priority habitat due to the likely use of the habitat by listed salmonid species and other species of high importance.

A summary of the wetlands are provided below in Table 1. A delineation map is provided in Appendix B.

Table 1. Cornet Bay Marina wetland delineation summary

Feature	Size[1] (Approximate)	Cowardin Class	Hydrology Modifier	HGM Class	Wetland Category	Buffer Width
W	5,048 sq. ft.	EIEM	Regularly Flooded	Salt Water Tidal Fringe	C	90 ft.
A[2]	170 sq. ft.	EIEM	Regularly Flooded	Salt Water Tidal Fringe	C	N/A

[1] Size only includes acreage within the Assessment Area.

[2] Wetland A is not regulated by Island County based on its size (ICC 17.02A.090A2)

3 Existing Site Conditions

Wetland W is the larger of the two wetlands identified within the study area. Wetland W is approximately 5,048 square feet (0.12 ac) in size. The wetland is located along the shoreline of Cornet Bay within the southwest portion of the study area and is regularly flooded by the daily tide cycles (Figure 2). Wetland W is dominated by pickleweed (*Salicornia viginica*), Baltic rush (*Juncus balticus*), and Pacific silverweed (*Potentilla anserine*). Hydrologic support to the wetland is primarily provided by tide levels and high groundwater.

Wetland A is approximately 170 square feet in size and is located along the shoreline of Cornet Bay within the northern portion of the study area (Figure 2). The wetland is dominated by Baltic rush and Pacific silverweed. Hydrologic support to the wetland is primarily provided by tide levels. Although Wetland A is not regulated by Island County, Wetland A may be defined as "Waters of the United States" and/or "Waters of State" and may be regulated at the federal and state levels.

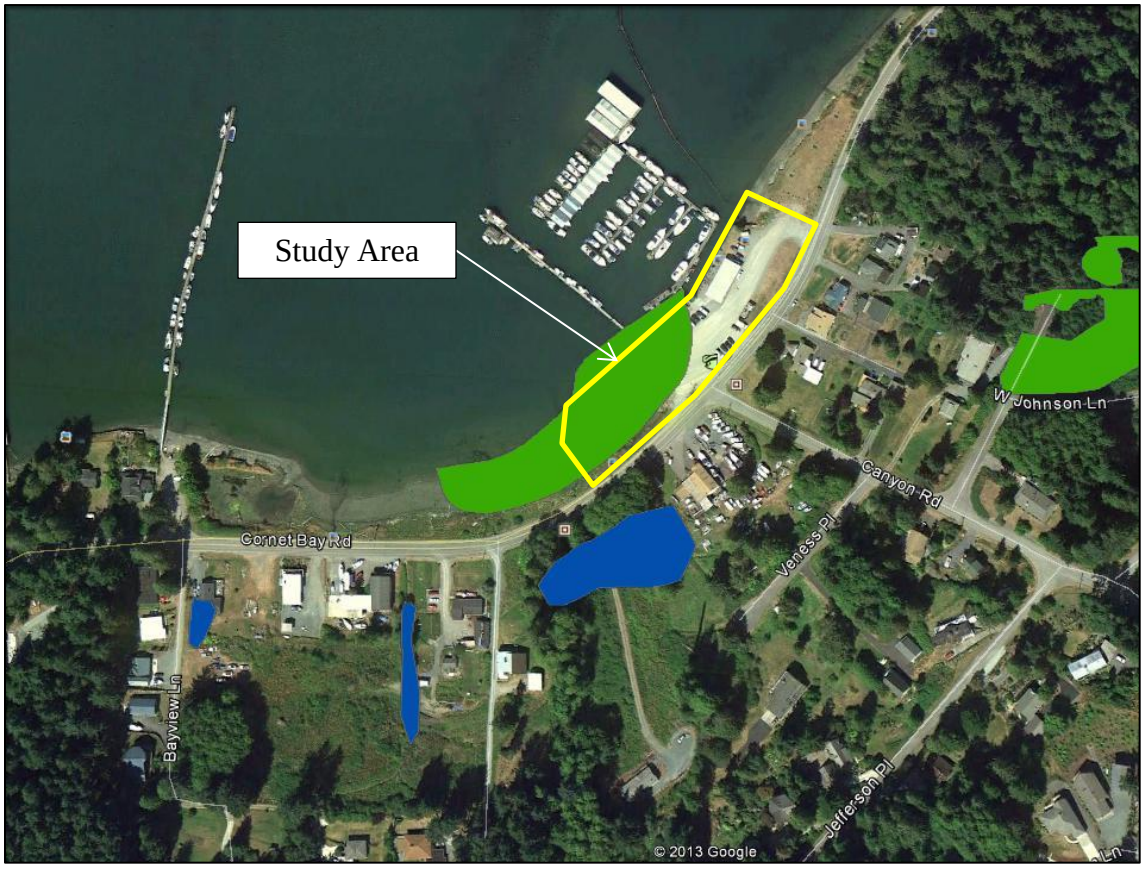
3.1 Local Critical Areas Inventory

A review of Island County's Wetland inventory data (Island County 2013) revealed one wetland within the assessment area. The mapped area incorporates all of Wetland W and extends into the developed portions of Cornet Bay Marina (Figure 3).

One additional wetland feature is mapped within 300 feet of the study and is located immediately south of Wetland W and across Cornet Bay Road. This wetland is separated

from the project area by Cornet Bay Road, and the functions of this wetland and its buffer will not be affected by the project.

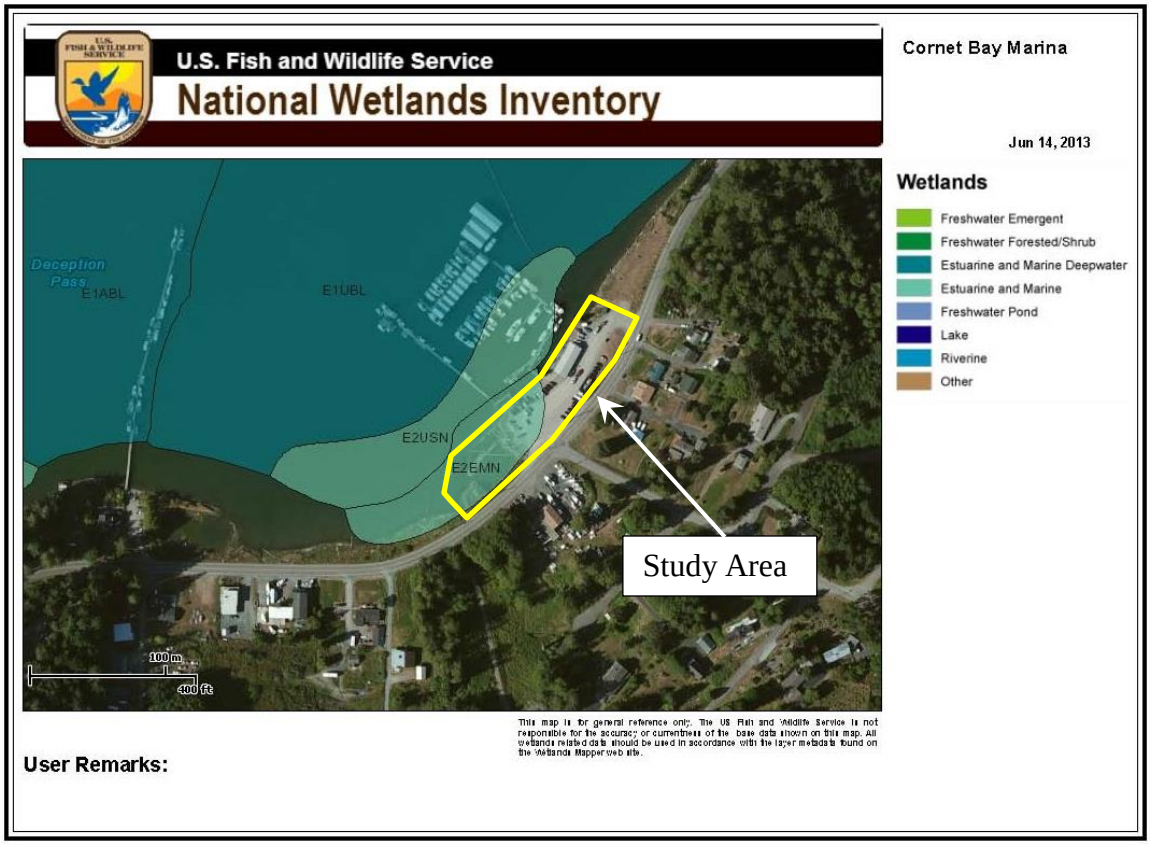
Figure 3. Island County Wetland Inventory - wetland map



3.2 National Wetlands Inventory

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) was queried to determine if previously-identified wetlands are present on or near the study area (USFWS 2013). According to the NWI Interactive Online Mapper, there are two wetlands mapped in or adjacent to the study area (Figure 4). These two features are mapped as Estuarine Intertidal wetlands. Based on conditions observed during the site visit, the mapped wetland waterward of the study area is not regularly exposed during low tides and no emergent or aquatic vegetation was observed.

Figure 4. National Wetland Inventory Map



3.3 Sensitive Wildlife and Plants

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) database on-line mapper was queried to determine if state or federally listed fish or wildlife species occur on or near the study area (WDFW 2013). According to the PHS database, the study area is mapped as providing habitat for Pinto abalone (*Haliotis kamtschatkana*).

The Washington Department of Natural Resources' (WDNR) Natural Heritage Information System was queried to determine if the subject properties occur in a location reported to contain high quality natural heritage wetland occurrences or occurrences of natural heritage features commonly associated with wetlands. According to WDNR data dated March 1, 2013, there are no records of rare plants or high quality native ecosystems occurring on or in the vicinity of the subject properties.

3.4 Soil Information

Based on the NRCS Web Soil Survey (NRCS 2013), the study area consists of Sholander, cool-Limepoint complex (1020) and Beaches – Endoaquents, tidal – Xerorthents association (1025) (Figure 5). Sholander soils are typically a gravelly sandy loam that is somewhat poorly drained located at elevations between 0 to 500 feet. Endoaquents soils typically consist of a stratified sand and gravel that is very poorly drained and located at

elevations between 0 to 20 feet. Both mapped soils are listed as partially hydric (NRCS 2013).

Figure 5. NRCS soil map

Table 2. NRCS hydric soil rating

Hydric Rating by Map Unit— Summary by Map Unit — Island County, Washington (WA029)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1020	Sholander, cool-Limepoint complex, 0 to 8 percent slopes	Partially Hydric	1.9	82.8%
1025	Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes	Partially Hydric	0.2	10.5%
Subtotals for Soil Survey Area			**2.2**	**93.3%**
Totals for Area of Interest			**2.3**	**100.0%**

3.5 Hydrology

Generally, the hydrologic support for the two wetlands is primarily provided by daily inundation of salt water and a high groundwater table. During rain events, Wetland W likely receives stormwater runoff from the adjacent parking area associated with the

Cornet Bay Marina and Cornet Bay Road. However, Wetland A likely does not receive this additional hydrologic support due to being located adjacent to the Cornet Bay Marina's existing bulkhead and the topography of the parking area. Further, there is a culvert beneath Cornet Bay Road that discharges surface water to Cornet Bay which likely provides some hydrology to Wetland W during low tides when the wetland is not inundated by saltwater.

4 METHODS

The study area was traversed and data was collected to confirm critical area/wetland boundaries. Wetland W and Wetland A were delineated according to the procedures described in the U.S. Army Corps of Engineers (Corps') *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010) and Island County Code. (ICC 17.02A.090C). Paired data plots and soil test pits were excavated to evaluate wetland and upland conditions. Guidance from the Corps' *Regional Supplement* was used to evaluate the data at each data point.

The boundary of the wetlands were established based on changes in vegetation, field indicators of hydric soils, water levels at or above 12 inches from the soil surface, topographic changes, and best professional judgment. Data plots were established in and adjacent to the wetland. The location of the wetland boundaries were defined by placement of florescent orange pin flags. The location of each data plot was defined by the placement of orange pin flags. The wetland boundary flagging was labeled alpha-numerically (i.e. A-2), where the letter designates the wetland and the number designates the specific flag angle point. The wetland boundaries were recorded using a differential global positioning system (dGPS). No pin flags were placed along the waterward boundary of the wetlands due to the likelihood of them being removed by wave action.

Plants were determined to be more or less associated with wetlands based on their wetland indicator (FAC) status. The percent dominance for each plant strata was determined using the 50-20 Rule.

4.1 Hydrophytic Vegetation

The U.S. Fish and Wildlife Service (USFWS) and the NWI have established a rating system that has been applied to commonly occurring plant species on the basis of their frequency of occurrence in wetlands (Table 7). Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL) (Table 3). The hydrophytic vegetation criterion for wetland determination is met when ***more than*** 50 percent of the dominant species in the plant community are FAC or wetter. The Corps' *National Wetland Plant List* (Lichvar 2012) was used to determine vegetation indicator status.

Table 3. Definitions for USFWS plant indicator status

Plant Indicator Status Category	Indicator Status Abbreviation	Definition (Estimated Probability of Occurrence)
Obligate Upland	UPL	Occur rarely (<1 percent) in wetlands, and almost always (>99 percent) in uplands
Facultative Upland	FACU	Occur sometimes (1 percent to <33 percent) in wetlands, but occur more often (>67 percent to 99 percent) in uplands
Facultative	FAC	Similar likelihood (33 percent to 67 percent) of occurring in both wetlands and uplands
Facultative Wetland	FACW	Occur usually in wetlands (>67 percent to 99 percent), but also occur in uplands (1 percent to 33 percent)
Obligate Wetland	OBL	Occur almost always (>99 percent) in wetlands, but rarely occur in uplands (<1 percent)
Not Listed	NL	Not listed due to insufficient information to determine status

4.2 Wetland Hydrology

Evidence of permanent or periodic inundation (water marks, drift lines, drainage patterns), or soil saturation to the surface for 12 consecutive days or more during the growing season meets the hydrology criterion. Oxidized root channels in the top 12 inches, high water table, and water marks are primary indicators and local soil survey data are secondary indicators of wetland hydrology.

4.3 Hydric Soils

Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons are considered hydric soils. Field indicators include histosols, the presence of a histic epipedon, a sulfidic odor, depleted matrix, and gleying (in sandy soils). Soil conditions were compared to the Field Indicators of Hydric Soils detailed in the Corps' *Regional Supplement* (Corps 2010).

5 RESULTS

The site assessment identified two wetlands (Wetland W and Wetland A) within the study area. Indicators of wetland hydrology, hydric soil characteristics, and dominant hydrophytic vegetation observed within the wetland are summarized in Table 3 below.

Table 4. Wetland indicator summary

Feature ID	Hydric Soil Indicators	Wetland Hydrology Indicators	Hydrophytic Vegetation	Dominant Plant Communities
W	depleted matrix, loamy mucky mineral	high groundwater table, regular inundation, saturation to the surface, oxidized rhizospheres, FAC Neutral test	pickleweed (OBL) Pacific silverweed (OBL) soft rush (FACW) *Agrostis spp.* (FAC) dunegrass (FACU)	Emergent

Feature ID	Hydric Soil Indicators	Wetland Hydrology Indicators	Hydrophytic Vegetation	Dominant Plant Communities
A	Problematic hydric soil[1]	geomorphic position, saturation visible on aerial imagery, FAC Neutral test	soft rush (FACW) Pacific silverweed (OBL)	Emergent

[1] Soils within Wetland A do not exhibit hydric soil indicators due to the low of iron and manganese content.

5.1 Wetland W

Wetland W is an Estuarine Intertidal Regularly Flooded Emergent wetland approximately 5,048 square feet in size (Appendix B). Wetland W is hydrogeomorphically classified as a saltwater tidal fringe wetland.

5.1.1 Vegetation

Vegetation within Wetland W consists of emergent species that are dominated by pickleweed (*Salicornia virgincia*), Pacific silverweed (*Potentilla anserine*), and Baltic rush (*Juncus balticus*). The pickleweed is limited to the lower elevations of the wetland where daily inundation of saltwater occurs.

5.1.2 Hydrology

Hydrologic support of Wetland W is provided primarily by daily inundation of saltwater from Cornet Bay. These daily tides flood a large portion of the wetland which also elevates the groundwater table and soil saturation. Additional hydrologic support to Wetland W likely consists of stormwater runoff during rain events. This wetland is adjacent to Cornet Bay Road and the Cornet Bay Marina which likely direct surface water towards the wetland. No stormwater ditch along the north end Cornet Bay Road was observed that would intercept stormwater from entering the wetland. Primary indicators of wetland hydrology observed within Wetland W include a high water table and saturation to the surface. Secondary indicators include inundation visible on aerial imagery, geomorphic position, and passing the FAC Neutral test.

5.1.3 Hydric Soils

Soils within the study area are mapped by the NRCS as Sholander, cool-Limepoint complex and Beaches – Endoaquents, tidal – Xerorthents association. Soil test pits were examined to a depth of up to 22 inches. During the soil investigation two distinct soils were observed. In the southwest corner of the wetland there is an area that consists of a loamy mucky mineral soil. In a typical soil profile, the upper soil layer (0-18 inches) consists of a black (10YR2/1) (Munsell 2000) mucky clay loam. Within this layer, partially decomposed organic material was observed. Below this layer (18-22 inches) is a layer of very dark greyish brown (10YR3/2) sand with no redox features. The other soil profile documented within the wetland consisted of an upper soil layer (0-4 inches) of a very dark greyish brown (10YR3/2) silt. Beneath this upper layer (4-20 inches) is grey (7.5YR 5/1) clayey silty sand with prominent strong brown (7.5YR4/6) redox features.

Hydric soil indicators observed within Wetland W include a loamy mucky mineral and a depleted matrix.

5.2 Wetland A

Wetland A is an Estuarine Intertidal Regularly Flooded wetland. Within this wetland, hydric soil indicators are absent due to the landscape position of the wetland and the coarse textured soils. Wetland A is approximately 170 square feet in size and is hydrogeomorphically classified as a saltwater tidal fringe wetland.

5.2.1 Vegetation

Vegetation within Wetland A consists of emergent vegetation that is dominated by Pacific silverweed and Baltic rush. These two species are very dense and likely do not allow for other species to establish. No other rooted vegetation was observed within the wetland.

5.2.2 Hydrology

Hydrologic support of Wetland A is provided primarily by daily inundation of saltwater from Cornet Bay. These daily tides likely flood portions of the wetland which also elevates the groundwater table and soil saturation. During the site assessment, no primary wetland hydrology indicators were observed, however, based on the wetland's geomorphic position, saturation visible on aerial imagery, and passing the FAC Neutral test the wetland meets the hydrology criteria defined in the Corps *Regional Supplement* (2010).

5.2.3 Hydric Soils

Soils within Wetland A are mapped by the NRCS as Sholander, cool-Limepoint complex and Beaches – Endoaquents, tidal – Xerorthents association. Soil test pit depths in both upland and wetland were limited due to restrictive layers. In a typical wetland soil pit, the upper layer (0-10 inches) is a dark greyish brown (10YR4/2) sand with no redox features. Below this layer is a layer of a very compact dark greyish brown (10YR4/2) sandy hardpan.

Although the soils within Wetland A did not meet any hydric soil field indicators defined in the Corps *Regional Supplement* (2010), the soils meet the definition of a hydric soil. Having indicators of hydrophytic vegetation and wetland hydrology, the procedures described in Chapter 5 of the Corps *Regional Supplement* (2010) were used. Based on the course soil texture and geomorphic position, the soils meet the criteria of a problematic soil situation. Further, the daily inundation by saltwater has likely leached the iron and manganese out of soils. Therefore, the accumulation of iron or manganese cannot form in these soil conditions and exhibit a typical hydric soil indicator (i.e. redoximorphic features).

In such situations where hydric soil indicators are lacking due to the physical properties of the soil, the relative strength of the hydrophytic vegetation and hydrology indicators must be taken into consideration. As the dominant vegetation in the wetland is very hydrophytic (FACW and OBL) and the wetland is inundated by tidal waters at least twice

per day, it is reasonable to conclude (based on the guidance in the *Regional Supplement*) that the soils within the wetland meet the definition of a hydric soil.

5.3 Wetland Determination

At the time of the site assessment, the area identified as wetland exhibited sufficient indicators of the required parameters for the presence of wetland conditions. These parameters include a predominance of hydrophytic vegetation, presence of wetland hydrology, and indicators of hydric soils. Soils within Wetland A are problem hydric soils that lack typical hydric soils indicators, however, this area was determined to be a wetland based on the guidance in the Corps *Regional Supplement* (2010) and best professional judgment. The wetland boundary location was determined based on these indicators, the general topographic relief at the site, and best professional judgment. Prior to any formal site planning, this document should be reviewed and the wetland boundary verified by the appropriate regulatory agencies.

6 DISCUSSION

6.1 Wetland Categorization

To determine the categorization of the wetland within the study area based on function, the Island County *Wetland Classification System* was used. Based on ICC 17.02A.090E, estuarine wetlands are considered high priority wetlands and categorized as C Wetlands (Table 5). Having a high intensity land use, the wetlands within the study area receive a 90 foot buffer width (ICC 17.02A.090F Table 1).

Although Island County does not incorporate the Washington State Department of Ecology's (Ecology) *Washington State Wetland Rating System for Western WA - Revised* (Hruby 2006) to rate wetlands, Ecology's system was used to evaluate the wetlands within the study area for the purposes of federal and state permitting requirements. Based on Ecology's rating system, all saltwater tidal fringe wetlands are categorized based on special characteristics because no rapid methods have been developed to characterize the water quality, hydrology, and habitat functions of estuarine wetlands. Ecology's rating system rates Wetland W and Wetland A as a Category II wetlands based on the relative quality of their buffers (Hurby 2006).

Table 5. Wetland categorization summary

Feature	Size[1] (Approximate)	Cowardin Class	Hydrology Modifier	HGM Class	ICC Category	Ecology's Category	Buffer Width[2]
W	5,048 sq. ft.	EIEM	Regularly Flooded	Salt Water Tidal Fringe	C	II	90 ft.
A[3]	170 sq. ft.	EIEM	Regularly Flooded	Salt Water Tidal Fringe	C	II	N/A.

[1] Size only includes wetland within the Assessment Area.
[2] ICC 17.02A.090F Table 1
[3] Wetland A is not regulated by Island County (ICC 17.02A.090A2) due to its small size.

6.2 Functions and Values

Wetland W provides several functions, such a water quality enhancement, stormwater collection, and aquatic habitat. The wetland likely filters out sediments and toxins from stormwater runoff, preventing it from entering Cornet Bay. The wetland likely provides limited wildlife functions which include small mammal foraging and passerine and waterfowl foraging and nesting. Wetland W also likely provides foraging and refuge habitat for juvenile salmonids that enter the wetland during high tides.

Wetland A likely provides very limited wetland functions due to its geomorphic position and adjacent landscape. The wetland is located next to an existing wood bulkhead and at the base of a small shoreline ledge; therefore, the wetland has minimal opportunity to provide water quality and hydrologic enhancement. Limited wildlife functions include small mammal foraging and passerine and waterfowl foraging. Wetland A likely does not provide any habitat for aquatic species due to the vegetation and elevation within the wetland.

6.3 Regulatory Considerations

As mentioned above, wetlands are regulated by agencies at the local, state and federal levels. At the local level, wetlands above the OHWM are regulated under Island County's Critical Areas Ordinance (Chapter 17.02A ICC), or if within 200 feet of the marine shoreline, Island County's Shoreline Master Program (Chapter 17.05). The County does not, however, regulate "Category A, B, C, and D wetlands that are less than 1,000 square feet in size and Category E wetlands less than 5,000 square feet in size" (ICC 17.02A.090) Therefore, Wetland A should be exempt from local regulation.

At the state level, wetlands are regulated by the Washington State Department of Ecology through the State Clean Water Act (Section 401). The requirement for a Water Quality Certification from Ecology for wetland impacts is triggered by an applicant's applying for a federal Clean Water Act Section 404 permit from the Corps. In addition, in counties bordering the Puget Sound or Pacific Ocean, Ecology manages activities within wetlands through the Coastal Zone Management program. Ecology may also issue an Administrative Order, allowing them wetland regulatory authority without a federal nexus.

At the federal level, impacts (specifically dredging or filling) to aquatic features are regulated by the Environmental Protection Agency through the US Army Corps of Engineers. The Corps administers the federal Clean Water Act (Section 404) for projects involving dredging or filling in Waters of the US (lakes, streams, marine waters, and most non-isolated wetlands). The Corps also regulates activities in tributaries to Waters of the US, including ditches, swales and canals with an established hydrologic connection.

While it is the regulatory agencies that make the final determination regarding jurisdictional status, project proponents can infer jurisdiction using the guidance provided by each agency or local government. This inference can be used to design a project based on the anticipated regulatory constraints within the project area. However, it is the

project proponent's responsibility to contact each potential regulating agency and confirm their regulatory status and requirements.

6.4 Disclaimer

The findings and conclusions documented in this report have been prepared for specific application to this proposed project site. They have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Wetland boundaries are based on conditions present at the time of the site visit and are considered preliminary until the flagged wetland and/or drainage boundaries are validated by the appropriate jurisdictional agencies. Validation of the boundaries by the regulating agencies provide a certification, typically in writing, that the wetland boundaries verified are the boundaries that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulating agencies can provide this certification.

Since wetlands are dynamic communities affected by both natural and human activities, changes in wetland boundaries may be expected. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

7 BIOLOGIST QUALIFICATIONS

7.1 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecology restoration. Chad also has professional experience in stream and fish restoration, marine monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecology restoration and wetland science.

For a list of representative projects, please contact him at Grette Associates.

7.2 Scott Maharry

Scott Maharry is a Biologist with over 13 years of professional experience and extensive training in wetland science as well as fisheries and wildlife ecology. Scott also has

extensive experience in wetland and marine aquatic permitting, mitigation planning and implementation, and fish and wildlife assessments.

Scott earned a Bachelor's of Science degree in Biology from Central Washington University. In addition, he has attended numerous State and Federal wetland delineation protocol trainings and workshops throughout his career. He has also attended several wetland trainings offered through the Washington Department of Ecology's Coastal Training Program.

Scott is a certified wetlands delineator, and he is also a Pierce, Kitsap, and Thurston County Qualified Wetland Specialist. He holds similar qualifications from other jurisdictions as well.

For a list of representative projects, please contact him at Grette Associates.

8 REFERENCES

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CORNET BAY MARINA REMEDIAL ACTION

WETLAND DELINEATION AND ANALYSIS REPORT
APPENDIX A: WETLAND DELINEATION DATA SHEETS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Cornet Bay Marina City/County: Island Sampling Date: 6/5/13
Applicant/Owner: State: WA Sampling Point: SP1W
Investigator(s): Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): ____ Slope (%): ____
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?**	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		

Remarks: Low tide approx. @ 10:20am

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
50% = ____, 20% = ____		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Potentilla anserina	20%	Y	OBL
2. Juncus balticus	5%	N	FACW
3. Elymus mollis	5%	N	FACU
4. Agrostis sp.	70%	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 50%, 20% = 70%		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
50% = ____, 20% = ____		= Total Cover	
% Bare Ground in Herb Stratum ____			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: ____

Sampling Point: ____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18"	10YR2/1	100%	____	____	____	____	Mucky clay silt	
18-22"	10YR3/2	100%	____	____	____	____	sand	mixed w/ upper layer material
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____
____	____	____	____	____	____	____	____	____

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Between 16"-18" larger size of organic debris

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ____

Water Table Present? Yes ☒ No ☐ Depth (inches): 16"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

area is highly influenced by tides. Elevation flat in reference to the active beach

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Cornet Bay City/County: / Sampling Date: 6/5/13
Applicant/Owner: State: ___ Sampling Point: SP2U
Investigator(s): Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): ___ Slope (%): ___
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% = ___		= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% = ___		= Total Cover	
Herb Stratum (Plot size: ___)			
1. Elymus mollis	5%	N	FACU
2. Aquatis sp.	85%	Y	FAC
3. Holcus lanatus	2%	N	FAC
4. Heracleum lanatum	2%	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ___, 20% = ___		= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1. Rubus ursinus	5%		
2.			
50% = ___, 20% = ___		= Total Cover	
% Bare Ground in Herb Stratum ___			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x1 =	___
FACW species	___	x2 =	___
FAC species	___	x3 =	___
FACU species	___	x4 =	___
UPL species	___	x5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: _____

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR3/2	100%					gravelly sand	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

soils dry

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Carnet Bay City/County: Island Sampling Date: 6/5/13
Applicant/Owner: State: WA Sampling Point: SP3W
Investigator(s): Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
50% = ____, 20% = ____		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Salicornia virginica	100%	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
50% = ____, 20% = ____		= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x1 = ____
FACW species ____	x2 = ____
FAC species ____	x3 = ____
FACU species ____	x4 = ____
UPL species ____	x5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: _____

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4"	7.5YR3/2	100%					Silt	
4-20"	7.5YR5/1	90%	7.5YR4/6	10%	C	M	silty sand	a little clay

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): Surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Inundated daily due to tides

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: _____ City/County: ____/____ Sampling Date: 6/5/13

Applicant/Owner: _____ State: ____ Sampling Point: SP4U

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): ____ Slope (%): ____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☐	**Is the Sampled Area within a Wetland?**	**Yes** ☐ **No** ☒
Hydric Soil Present?	Yes ☐ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☐		

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	____	____	____
2. _____	____	____	____
3. _____	____	____	____
4. _____	____	____	____
50% = ____, 20% = ____	____	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. _____	____	____	____
2. _____	____	____	____
3. _____	____	____	____
4. _____	____	____	____
5. _____	____	____	____
50% = ____, 20% = ____	____	= Total Cover	
Herb Stratum (Plot size: ____)			
1. gumweed	5%	____	FACW
2. Scotts brown	10%	Y	FAC
3. Quackgrass	40%	Y	FACU
4. _____	____	____	____
5. _____	____	____	____
6. _____	____	____	____
7. _____	____	____	____
8. _____	____	____	____
9. _____	____	____	____
10. _____	____	____	____
11. _____	____	____	____
50% = 25% 20% = 10	____	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. _____	____	____	____
2. _____	____	____	____
50% = ____, 20% = ____	____	= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

Project Site: _____

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR6/2	100%					gravelly sand	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: sand

Depth (inches): below approx. 12" soil pit caves in

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Soils very dry

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

A aven

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Comet Bay City/County: / Sampling Date: 6/5/13
Applicant/Owner: State: Sampling Point: SP1W
Investigator(s): Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☒ No ☐**
Hydric Soil Present?	Yes ☐ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☐		

Remarks: Area located NE corner of property

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
50% = ____, 20% = ____		= Total Cover	
Herb Stratum (Plot size: ____)			
1. arctic rush	50%	Y	FACW
2. Pac. silverweed	50%	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
50% = ____, 20% = ____		= Total Cover	

% Bare Ground in Herb Stratum ____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: _____

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR4/2	100%					sand	
10"+	very compacted sand							

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☒ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: compacted sand/hardpan

Depth (inches): 10"

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Soils moist

other: area is inundated or saturated daily due to tides.

A-typical

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches): _____
Water Table Present?	Yes	☐	No	☒	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The area is inundated or saturated daily due to tides.

A area

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Cornet Bay City/County: / Sampling Date: 6/5/13
Applicant/Owner: State: Sampling Point: SP2U
Investigator(s): Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☐		

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ____, 20% = ____		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus discolor	60%	Y	FACU
2.			
3.			
4.			
5.			
50% = ____, 20% = ____		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Plantago lanceolata	5%		FACU
2. UN-grass (mowed)	95%	Y	FAC?
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = ____, 20% = ____		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
50% = ____, 20% = ____		= Total Cover	
% Bare Ground in Herb Stratum ____			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

Project Site: ____

Sampling Point: ____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: compact gravel/sand

Depth (inches): surface

Hydric Soils Present? Yes ☐ No ☒

Remarks:

soils are compacted gravelly sand

area of pit is approx. 4' higher than SPLW due to incremental increase in topo. Possibly an area where a bulkhead used to exist.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches): ____

Water Table Present? Yes ☐ No ☐ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ☐ No ☐ Depth (inches): ____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

CORNET BAY MARINA REMEDIAL ACTION

WETLAND DELINEATION AND ANALYSIS REPORT
APPENDIX B: WETLAND DELINEATION MAP

LEGEND

WETLAND W
5,048 SQ SF (APPROX.)

—MHHW— MEAN HIGHER HIGH WATER
11.02 FT. (APPROX.)

C. NO. 91001920.

CORNET BAY MARINA FACILITIES

BULKHEAD
TIMBERS
METAL SHED
WOOD
WOOD DECK
GATE
SUBMERGED AT HIGH TIDE
ALL VEH MUST REV
EDGE OF GRAVEL AND PAVEMENT
PARCELS D, E, &
CT112
TELR
GP
STREET
DUCT
CORNET BAY RD

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
2102 North 30th Street, Suite A
TACOMA, WA 98403
(253) 573-9300
grettesassociates.com

PROJECT #:304.003 | DATE:05.14.13
DESIGNED BY:CW | DATE:05.14.13
CHECKED BY: MB | DATE:05.14.13

CLIENT:
Cornet Bay Marina

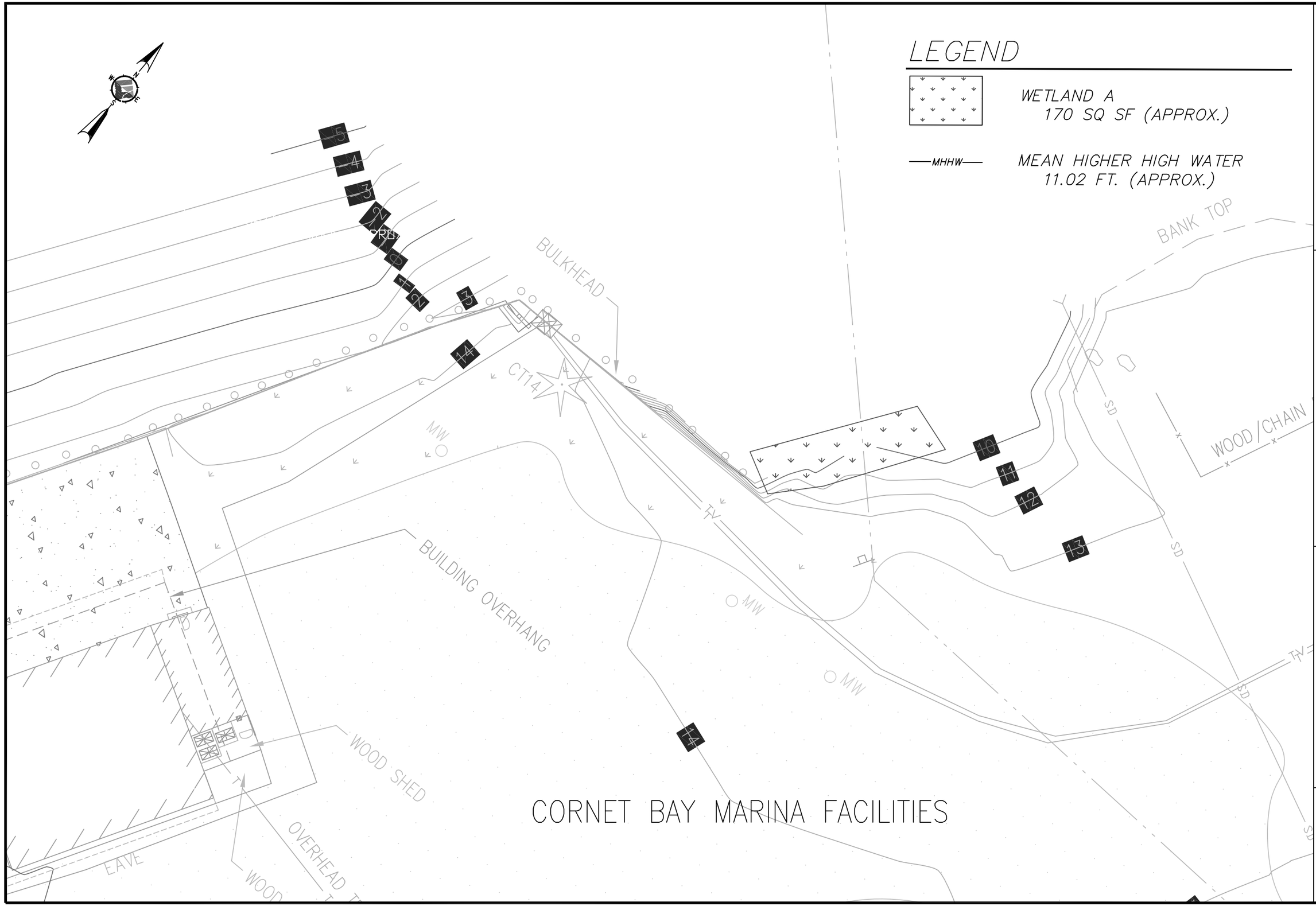
CORNET BAY
WETLAND DELINEATION AND ANALYSIS REPORT

SITE ADDRESS: Island County, WA

DRAWING SCALE: 1/2"=1'0"

WETLAND W AREA MAP

SHEET 1 OF 2



Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
2102 North 30th Street, Suite A
TACOMA, WA 98403
(253) 573-9300
grettesociates.com

CLIENT: Cornet Bay Marina

PROJECT #:304.003 DATE:07.02.13
DESIGNED BY:CW DATE:07.02.13
CHECKED BY: MB

CORNET BAY WETLAND DELINEATION AND ANALYSIS REPORT

SITE ADDRESS: Island County, WA

DRAWING SCALE: 1"=1'0"

WETLAND A AREA MAP

SHEET 2 OF 2

CORNET BAY MARINA MITIGATION PLAN
APPENDIX B: ESSENTIAL FISH HABITAT ASSESSMENT

1 Background

Pursuant to the Magnuson-Stevenson Fishery Conservation Management Act (MSFCMA) and the 1996 Sustainable Fishery Act, an evaluation of impacts of the Cornet Bay Marina MTCA Cleanup project on Essential Fish Habitat (EFH) is necessary. EFH is defined by the MSFCMA in 50 CFR 600.905-930 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Pacific Fisheries Management Council (PFMC) has designated EFH for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fishes (NOAA Fisheries 1999, PFMC 1999).

In Washington, EFH for the Pacific salmon fishery includes all those streams, lakes, ponds, wetlands and other water bodies currently or historically accessible to Chinook (*Oncorhynchus tshawytscha*), coho (*Oncorhynchus kisutch*), and pink salmon (*Oncorhynchus gorbuscha*), except above impassible barriers (PFMC 1999). In estuarine and marine areas, designated EFH for Chinook, coho and pink salmon extends from nearshore and tidal submerged environments within state territorial waters out to the full extent of the Exclusive Economic Zone (EEZ) off the Washington coast (PFMC 1999).

The EFH designation for groundfishes and coastal pelagics includes those waters and substrates necessary to ensure the production needed to support a long-term sustainable fishery. Ground fish and coastal pelagic EFH within marine waters of Washington also extends from the nearshore and tidal submerged environment out to the EEZ.

The west coast ground fish management unit includes 83 species that typically live on or near the bottom of the ocean. Species groups include skates and sharks, rockfishes, flatfishes and ground fishes. Coastal pelagics are schooling fishes that migrate in coastal waters. West coast pelagics include the pacific sardine (*Sardinops sagax*), Pacific chub (*Scomber japonicus*), northern anchoy (*Engraulis mordax*), jack mackerel (*Trachurus symmertircus*) and market squid (*Loligo opalescens*).

The objective of this EFH assessment is to determine whether or not the Cornet Bay Marina MTCA Cleanup project "may adversely affect" designated EFH for relevant commercially, federally-managed fisheries species within the proposed Action Area. It also described conservation measures proposed to avoid, minimize or otherwise offset potential adverse effects to designated EFH associated with the Action Area.

2 Essential Fish Habitat Analysis

2.1 Essential Fish Habitat within the Action Area

Salmon, groundfish, and pelagic species and life-stages with designated EFH in Puget Sound estuaries that may be present in the Action Area are listed in Table 1, below.

Table 1. Fish species and life-stages with designated essential fish habitat in Puget Sound

Guild / Common Name	Species Name	Adults	Eggs	Juveniles	Larvae
Groundfish[1]					
Big skate	*Raja binoculata*	x	x	x	
Black rockfish	*Sebastes melanops*	x		x	
Blue rockfish	*Sebastes mystinus*	x		x	x
Bocaccio	*Sebastes paucispinis*	x		x	x
Brown rockfish	*Sebastes auriculatus*	x		x	
Butter sole	*Isopsetta isolepis*	x	x	x	x
Cabezon	*Scorpaenichthys marmoratus*	x	x	x	x
China rockfish	*Sebastes nebulosus*	x		x	
Copper rockfish	*Sebastes caurinus*	x		x	
Dover sole	*Microstomus pacificus*	x	x	x	x
English sole	*Parophrys vetulus*	x	x	x	
Flathead sole	*Hippoglossoides elassodon*	x		x	
Greenstriped rockfish	*Sebastes elongatus*	x		x	x
Kelp greenling	*Hexagrammos decagrammus*	x	x	x	x
Lingcod	*Ophiodon elongatus*			x	x
Longnose skate	*Raja rhina*	x	x	x	
Pacific cod	*Gadus macrocephalus*	x			
Pacific hake	*Merluccius productus*	x		x	
Pacific sanddab	*Citharichthys sordidus*	x	x	x	x
Petrale sole	*Eopsetta jordani*	x		x	
Quillback rockfish	*Sebastes maliger*	x		x	x
Redstripe rockfish	*Sebastes proriger*	x		x	x
Rex sole	*Glyptocephalus zachirus*	x		x	
Rock sole	*Lepidopsetta bilineata*	x	x	x	x
Sablefish	*Anoplopoma fimbria*	x	x	x	x
Sand sole	*Psettichthys melanostictus*	x	x	x	x
Spiny dogfish	*Squalus acanthias*	x		x	
Splitnose rockfish	*Sebastes diploproa*	x		x	x
Spotted ratfish	*Hydrolagus colliei*	x	x	x	
Starry flounder	*Platichthys stellatus*	x	x	x	x
Tiger rockfish	*Sebastes nigrocinctus*	x		x	x
Widow rockfish	*Sebastes entomelas*	x		x	x
Yelloweye rockfish	*Sebastes ruberrimus*	x			x
Yellowtail rockfish	*Sebastes flavidus*	x		x	

Guild / Common Name	Species Name	Adults	Eggs	Juveniles	Larvae
Pacific Salmon[2]					
Chinook	*Oncorhynchus tshawytscha*	x		x	
Coho	*Oncorhynchus kisutch*	x		x	
Puget Sound pink	*Oncorhynchus gorbuscha*	x		x	
Coastal Pelagics[2]					
Northern anchovy	*Engraulis mordax*	x	x	x	x
Pacific sardine	*Sardinops sagax caerulea*	x			
Pacific mackerel	*Scomber japonicus*	x			
Market squid	*Loligo opalescens*	x			

[1] Based on information from EFH database provided by J. Stadler (NFMS) dated January 16, 2007.
[2] Based on previously published Puget Sound EFH lists from NFMS used in EFH Assessments through 2012.

All three of the Pacific salmon management unit species (chinook, coho and pink salmon) may be present within the Project Action Area (WDFW 2013). The nearest streams with salmon spawning and rearing are approximately 8 miles away (WDFW 2013), and some seasonal rearing, particularly for Chinook salmon, may occur in the Action Area. All three salmon species may use the Action Area for adult migration and juvenile out-migration.

Many of the ground fish species that occur in Puget Sound may also occur within the Action Area. West coast pelagic fishes are primarily associated with open ocean and coastal areas (PFMC 1998), and are therefore not likely to occur within the Action Area.

2.2 Description of the Proposed Action

Detailed descriptions of proposed Project activities may be found in Section 2.3 of the Biological Evaluation (BE), to which this document is attached. Although this Project is primarily an upland cleanup of contaminated soils, there are associated in-water construction activities required. There are no impacts to EFH associated with upland cleanup activities. The potential for impacts to designated EFH within the Action Area is primarily associated with minor habitat loss due to proposed sheet pile driving. Additionally, there is potential for impacts to water quality through minor turbidity and potential for spills into the water from construction activities.

2.3 Potential Effects of the Project

This assessment of whether proposed Project activities may adversely affect designated EFH within the Action Area is based on information in the documents referenced above (NMFS 1998; PFMC 1998a, 1998b, 1999).

The primary elements of the Project that could potentially impact designated EFH, and Conservation Measures that would avoid and minimize impacts, are summarized in Table 2, below. Detail about all potential Project impacts on species of concern may be found in Section 5 of the BE.

Table 2. Affected EFH by Project element and proposed conservation measures

Project Element	Affected EFH	Impact Mechanism	Conservation Measures
Sheet wall installation	Salmon, groundfish, coastal-pelagic substrate EFH	Vibratory installation of replacement steel sheet pile bulkhead would occur 2-3 ft waterward of existing timber bulkhead for the entire shoreline within the Project Area (340 ft). This would result in a net loss of 680-1020 sf of nearshore intertidal marine habitat. The elimination of 680-1020 sf of nearshore intertidal habitat would occur in an already modified shoreline area with low substrate complexity and habitat value. In the long term, the loss of 680-1020 sf of low quality intertidal habitat would represent an insignificant change to EFH in Cornet Bay.	**1, 2, 3 (for salmon EFH), 4, 5.**
Sheet wall installation	Salmon, groundfish, coastal-pelagic water column EFH	Installation of the sheet pile bulkhead will allow the complete isolation and subsequent removal of 340 lineal feet of creosote-treated vertical creosote-treated timber bulkhead from the aquatic environment. This will benefit water quality in water column EFH in the long term.	
Construction activities	Salmon, groundfish, coastal-pelagic water column EFH	Minor turbidity could result from sheet pile driving. Any turbidity generated would be localized and temporary.	**1, 2, 3 (for salmon EFH), 5 and 6.**
		Operation of construction machinery, including pile driving equipment, would have the potential for accidental releases of hazardous substances into the water.	**1, 2, 3 (for salmon EFH), 5, 6and 7.**

List of Applicable Conservation Measures

1. Compliance with the State's standards will ensure that fish and aquatic life will be protected to the extent feasible and practicable.
2. Compliance with the substantive requirements of the Hydraulic Code.
3. Timing restrictions specifying that in-water work must occur when juvenile salmon are absent or present in very low numbers.
4. Sheet pile will be installed with a vibratory hammer.
5. Sheet pile wall will completely isolate the timber bulkhead and adjacent upland areas from the aquatic environment during demolition and clean up activities.
6. Compliance with applicable State water quality standards (WAC 173-201A).
7. Care will be taken to prevent any petroleum products, chemicals, or other toxic or deleterious materials from entering the water. If a spill were to occur, work would be stopped immediately, steps would be taken to contain the material, and appropriate agency notifications would be made. Spill response and hazardous material control plans will be produced and used by project contractors.

3 Conclusions and Determination of Effects

3.1.1 Salmon EFH

The impacts of the Project on salmon EFH are shown in Table 2. During construction, bulkhead installation will isolate 680-1020 sf of low quality nearshore intertidal habitat. This is a relatively small area of low quality substrate EFH. Further, because construction will be timed to avoid juvenile salmon outmigration, the isolation of this area is unlikely to significantly affect substrate EFH function. Increased turbidity and risk of unintentional releases from construction equipment may temporarily impact water column EFH during project activities, but these impacts would be localized, minimal, and temporary in nature. All temporary effects would be further reduced by project timing, which will reduce the likelihood for juvenile salmon presence during project activities.

In the long term, the project will permanently remove the 680-1020 sf area isolated behind the sheet pile wall during construction. Although this is permanent loss of EFH, the biological significance of this loss for salmon EFH function within the Action Area is expected to be insignificant based on its relatively small area and low habitat quality. Further, the project will benefit water column EFH through the permanent removal of 340 lf of creosote-treated timber bulkhead and cleanup of adjacent areas.

Overall, the Project ***will not adversely affect salmon EFH***.

3.1.2 Groundfish EFH

The impacts of the Project on groundfish EFH are shown in Table 2. During construction, bulkhead installation will isolate 680-1020 sf of low quality nearshore intertidal habitat. This is a relatively small area of low quality substrate EFH. Increased turbidity and risk of unintentional releases from construction equipment may temporarily impact water column EFH during project activities, but these impacts would be localized, minimal, and temporary in nature.

In the long term, the project will permanently remove the 680-1020 sf area isolated behind the sheet pile wall during construction. Although this is permanent loss of EFH, the biological significance of this loss for groundfish EFH function within the Action Area is expected to be insignificant based on its relatively small area and low habitat quality. Further, the project will benefit water column EFH through the permanent removal of 340 lf of creosote-treated timber bulkhead and cleanup of adjacent areas.

Overall, the Project ***will not adversely affect groundfish EFH***.

3.1.3 Coastal Pelagic EFH

The impacts of the Project on coastal pelagic habitat are shown in Table 2. Increased turbidity and risk of unintentional releases from construction equipment may temporarily impact water column EFH during project activities, but these impacts would be localized, minimal, and temporary in nature.

In the long term, the project will benefit water column EFH through the permanent removal of 340 lf of creosote-treated timber bulkhead and cleanup of adjacent areas.

Overall, the Project ***will not adversely affect coastal pelagic EFH***.

4 References

National Marine Fisheries Service (NMFS). 1998. Essential Fish Habitat West Coast Groundfish Appendix. NMFS, Seattle, Washington.

Pacific Fishery Management Council (PFMC). 1998a. The Pacific Coast Groundfish Fishery Management Plan. Pacific Fishery Management Council, Portland, Oregon.

Pacific Fishery Management Council (PFMC). 1998b. Coastal Pelagics Fishery Management Plan. Pacific Fishery Management Council, Portland, Oregon.

Pacific Fishery Management Council (PFMC). 1999. Appendix A. Identification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council, Portland, Oregon.

Pacific International Engineering 1999. West Blair terminal project. Fairliner habitat area and Rhone-Poulenc habitat area monitoring report, 1997. Prepared for The Port of Tacoma, Washington.

Washington Department of Fish and Wildlife (WDFW). 2012. *SalmonScape* on-line GIS salmonid distribution mapper. Queried November 29, 2012.

CORNET BAY MARINA MITIGATION PLAN
APPENDIX C: MITIGATION DESIGN SHEETS

LEGEND

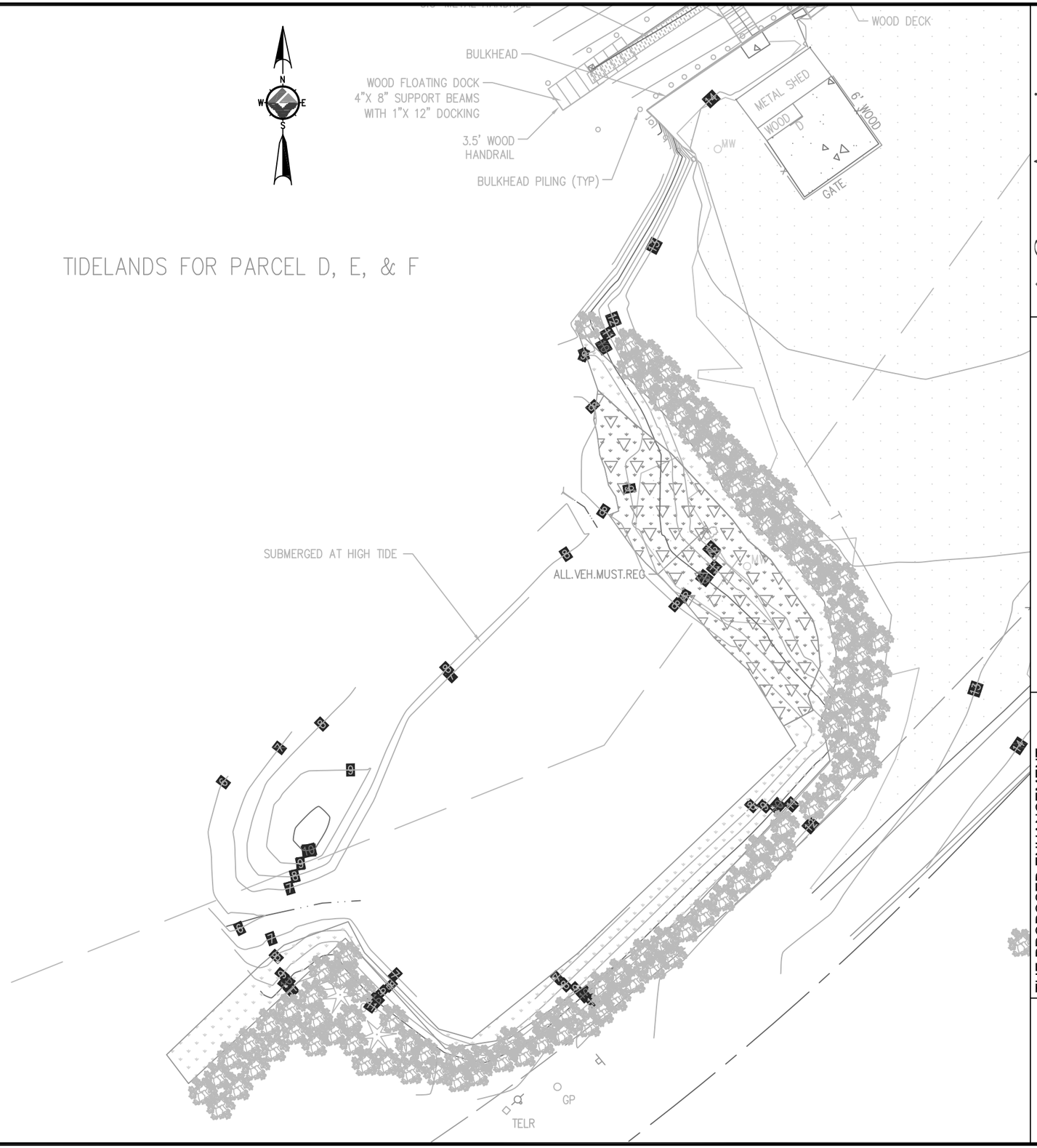
AQUATIC HABITAT CREATION
1300 SF (APPROX.)

WETLAND ENHANCEMENT
1720 SF (APPROX.)

WETLAND BUFFER ENHANCEMENT
1750 SF (APPROX.)

—MHHW— MEAN HIGHER HIGH WATER
11.02 (APPROX.)

TIDELANDS FOR PARCEL D, E, & F



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PROJECT #:304.003 DATE:05.14.13
DESIGNED BY:CW DATE:05.14.13
CHECKED BY: MB

CLIENT:
Cornet Bay Marina

CORNET BAY
REMEDIATION PROJECT
PROPOSED ONSITE MITIGATION

SITE ADDRESS: Island County, WA

DRAWING SCALE: 1/2"=1'0"

THE PROPOSED ENHANCEMENT AREAS WILL BE PLANTED WITH NATIVE SHRUB SPECIES

SHEET 1 OF 1