

ATTACHMENT 3  
EELGRASS SURVEY

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# TECHNICAL MEMORANDUM

Prepared for: Reid Middleton

Date: July 14, 2008

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File No.: 404.003

Re: Boulevard Park Overwater Walkway Eelgrass Survey

## **INTRODUCTION**

Grette Associates<sup>LLC</sup> was hired by Reid Middleton to conduct an eelgrass survey for the City of Bellingham from the Cornwall Landfill site to Boulevard Park in Bellingham, WA (Figure 1). The survey was conducted in accordance with the Washington Department of Fish and Wildlife (WDFW) Intermediate Eelgrass/macroalgae Habitat Survey guidelines, which are designed to determine the presence and density of eelgrass. This Technical Memorandum presents the results of the eelgrass survey conducted on June 3-5, 2008. The purpose of the survey was to assess the potential impacts to eelgrass as a result of the construction of an overwater walkway through the embayment, and to provide information for any future projects in the area. The walkway would extend northeast from Boulevard Park to the Cornwall Landfill site and would span the embayment between the two sites. The survey entailed a detailed delineation of the landward and waterward extents of the eelgrass beds, as well as a density survey. Density surveys were conducted along the northeastern shoreline of Boulevard Park (southwest end of the proposed walkway) and the Cornwall Landfill site (northeast end of the proposed walkway), where impacts to eelgrass may potentially occur (Figure 2).

## **METHODS**

The eelgrass survey employed a modified version of the WDFW Intermediate Eelgrass/Macroalgae survey methods (WDFW 2007). WDFW staff reviewed and approved the survey methods prior to the implementation of the field effort. The survey entailed a detailed delineation of the landward and waterward extents of the eelgrass beds, as well as a density survey at the landing locations. Densities were not collected in the embayment as the walkway will be constructed waterward of the eelgrass bed.

## **EELGRASS DELINEATION**

The landward and waterward edges of the existing eelgrass beds in the embayment between Boulevard Park landing and the Cornwall Landfill site were delineated using Differential Global Positioning Satellite (dGPS, horizontal accuracy  $\pm 1\text{m}$ ). The landward edge of the eelgrass bed was surveyed by walking the edge at low tide and recording the boundary with dGPS. Divers delineated the waterward edge of the eelgrass beds by swimming along the eelgrass/non-eelgrass boundary, and holding a rope attached to a surface buoy at intervals determined by the complexity of the edge (typically between 20 to 30-foot intervals). In

areas where the edge was complex, the distance between buoys was reduced to capture the complexity. The dive tender then positioned the boat over the buoy, pulled the line tight (with the diver holding onto the anchor end of the line to keep it in place), and logged the position into the dGPS data recorder. This process was repeated until the eelgrass beds were delineated. In addition, nine perpendicular transects were conducted in the embayment, four of which were 500 feet long, and five of which were 300 ft long. These transects were to verify the edge of the eelgrass and assess macroalgae and substrates within the embayment. Upland monument positions were also logged in order to tie the survey to existing base maps.

The locations of sampling points recorded in the dGPS data logger were downloaded to GPS Pathfinder Office 2.90 software and converted to NAD-83 state plane coordinates. The state plane coordinate data were then converted to an AutoCAD file and plotted on an aerial photograph of the site.

### **EELGRASS DENSITY SURVEY**

Eelgrass density data were collected at both shore landing locations. Seven (7) transects were sampled at the Boulevard Park landing and 16 transects were sampled at the Cornwall Landfill landing. Transects were spaced 40 ft apart over approximately 230 linear ft of shoreline at Boulevard Park and approximately 600 linear ft at Cornwall landfill, and encompassed the entire shoreline area within which a future walkway landing may be constructed. After the transects were established, turion counts were collected at 5 evenly spaced locations along the transects and within the eelgrass beds. Densities were sampled using a 0.25 m<sup>2</sup> quadrat. Divers also recorded macroalgae presence and substrate characteristics.

### **RESULTS**

The eelgrass delineation revealed an eelgrass band as depicted in Figures 3-5. The eelgrass band is present along the entire Boulevard Park shoreline, extending northeast through the embayment to the Cornwall Landfill site. Eelgrass presence ends abruptly at approximately Transect 14 at the Cornwall Landfill site, with the exception of 3 very small, isolated patches northeast of Transect 14. Concrete slabs present in the water north of Transect 14 also impede eelgrass presence. The eelgrass band begins at an upper elevation of approximately -1.7 ft to -2.0 ft MLLW and extends waterward to approximately -8 to -10 ft MLLW. No eelgrass is present in deeper water beyond this waterward edge. The landward edge of eelgrass presence was strongly determined by the substrate. Eelgrass begins in the lower intertidal where gravel and cobble transition to mud and silt.

The eelgrass band varies in width. At Boulevard Park, the eelgrass band is a maximum of approximately 130 ft in the southern portion of the shoreline, and is narrowest at Transects 2 and 3 near the existing pier, at approximately 36 ft. At the Cornwall Landfill site, eelgrass is a maximum of approximately 150 ft wide in the southern portion of the Cornwall Landfill site, tapering to a minimum of approximately 30 ft in the northern portion. In the embayment area, the eelgrass band is a maximum width of approximately 110 ft.

Eelgrass densities surveyed at Boulevard Park and at the Cornwall Landfill site are listed in Table 1 below. No densities were collected on the 9 embayment transects. Transects 14-23 in the northern end of the Cornwall Landfill site showed no eelgrass.

**Table 1. Turion densities and macroalgae coverage by transect**

<b>Transect</b>	<b>Average Turion Count (/m<sup>2</sup>)</b>	<b>Macroalgae</b>
Boulevard 1	73.6	None
Boulevard 2	59.2	None
Boulevard 3	24	None
Boulevard 4	86.4	Ulva/Fucus at landward end; ~30% coverage
Boulevard 5	82.4	Ulva/Fucus at landward end; ~35% coverage
Boulevard 6	60.0	Ulva/Fucus at landward end; ~11% coverage
Boulevard 7	60.8	Ulva/Fucus at landward end; ~8% coverage
<b>Average</b>	<b>63.8</b>	
Cornwall 8	44.0	Ulva/Fucus at landward end; ~8% coverage
Cornwall 9	78.4	Fucus at landward end; ~8% coverage
Cornwall 10	72.0	None
Cornwall 11	69.6	Fucus at landward end; ~8% coverage
Cornwall 12	53.6	Fucus at landward end; minimal coverage
Cornwall 13	61.6	Fucus at landward end
Cornwall 14-23	No Eelgrass Present	Fucus at landward end; some laminaria waterward (~10% typ. coverage)
<b>Average<sup>1</sup></b>	<b>63.2</b>	

<sup>1</sup> Represents the average of transects on which eelgrass was encountered

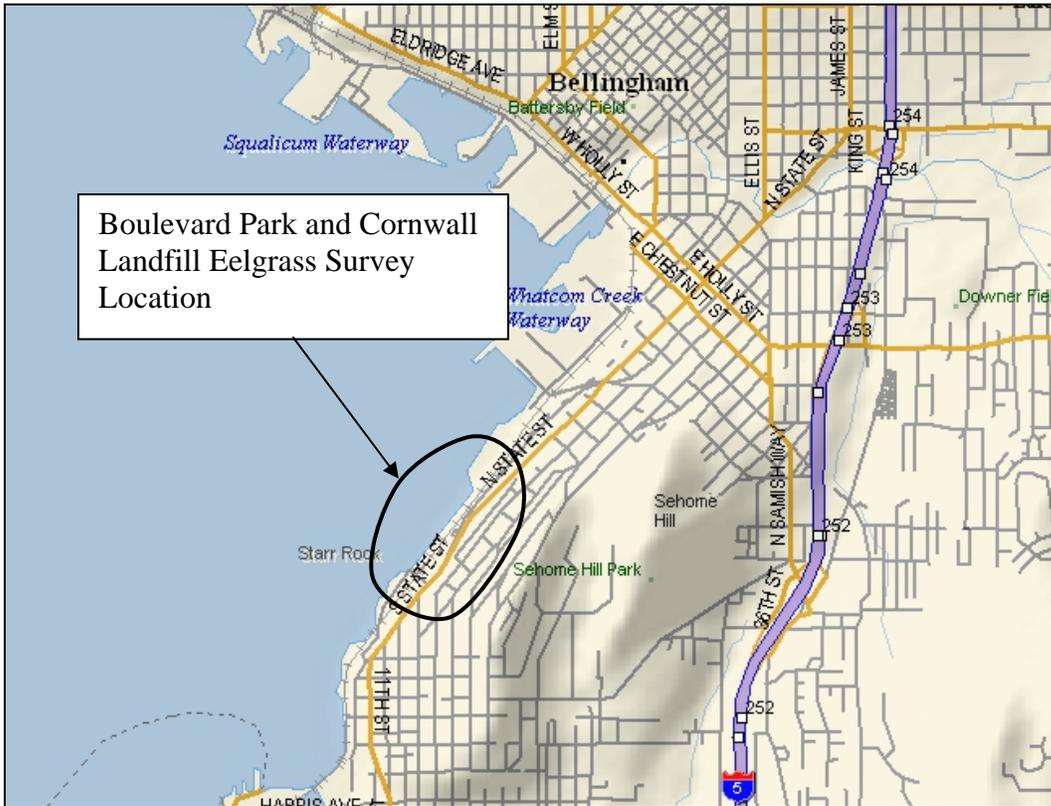
The average density of the Boulevard Park transects was 63.8 turions per square meter; the average density at the Cornwall Landfill site (on transects containing eelgrass) was 63.2 turions per square meter. It should be noted that, at Boulevard Park, lowest eelgrass densities were recorded in Transects 2 and 3, which are nearest the existing pier. The eelgrass band is also narrowest at the existing pier (Figure 3). Thus, potential impacts to eelgrass of the proposed walkway landing would be minimized by locating the walkway landing at the existing pier location. At the Cornwall Landfill site, as mentioned above, eelgrass ends at Transect 14 (Figure 4). Thus, eelgrass impacts would be avoided completely by locating the walkway landing north of Transect 14, or at the point of the Cornwall Landfill site. Additionally, concrete slabs located at approximately -2 to -3 ft MLLW north of Transect 14 limit eelgrass presence. It is possible that, were these slabs removed, eelgrass would establish in these locations.

Sparse stands of macroalgae were present on several of the transects. Macroalgae was consistently found landward of eelgrass. Fucus and Ulva were present on most transects, and sparse Laminaria was observed further waterward on some transects.

The dominant substrate within the eelgrass beds was mud and silt. Substrate at the Boulevard Park landing consisted of moderately sloped riprap and cobble in the upper intertidal zone, transitioning to silt and sand further waterward. Substrate at the Cornwall Landfill consisted cobble and rip rap moderately sloped to the water, then transitioned to silt and sand. As mentioned above, some concrete slabs are also present. Substrate in the embayment consists of riprap transitioning to cobble and eventually silt approximately 50 ft waterward of the toe of the riprap slope.

## **References**

Washington Department of Fish and Wildlife. 2007. Eelgrass/Macro Algae Habitat Survey Guidelines.



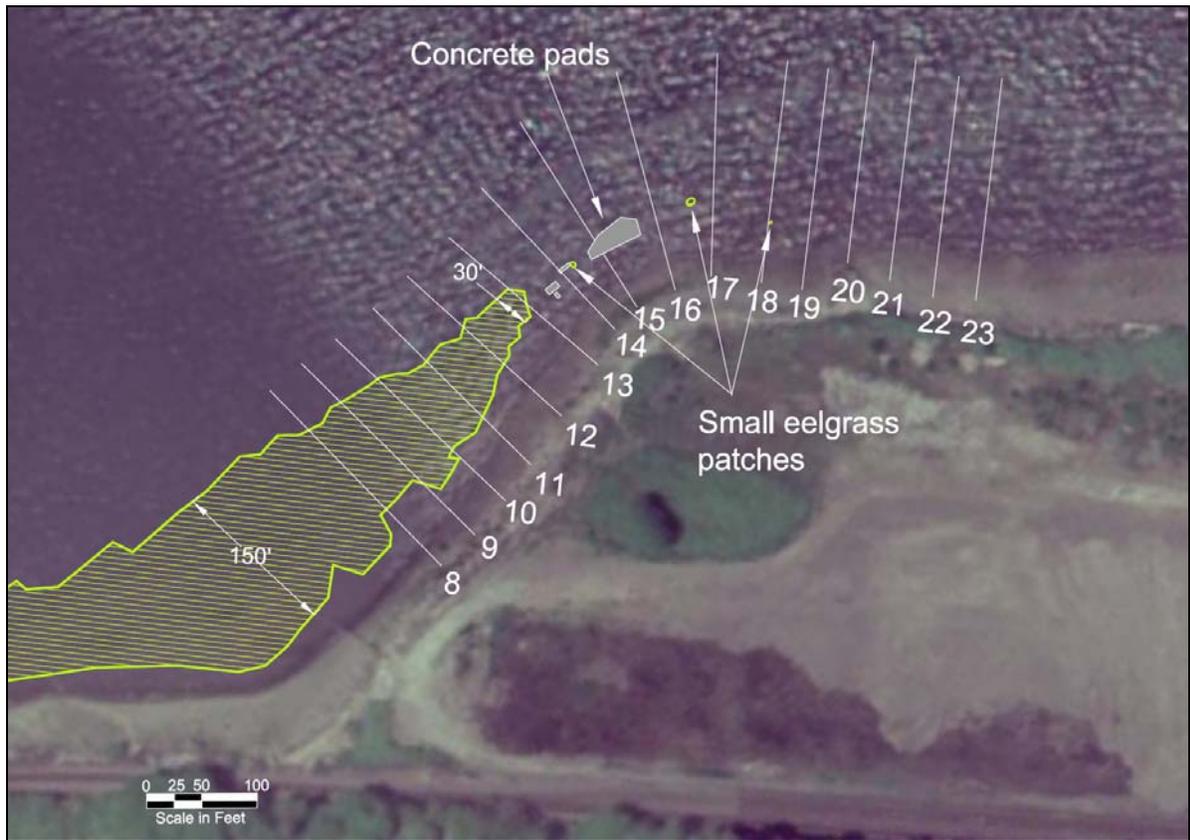
**Figure 1: Vicinity Map**



**Figure 2. Eelgrass delineation site map**



**Figure 3. Boulevard Park transects, eelgrass bed**



**Figure 4. Cornwall Landfill transects, eelgrass bed**



**Figure 5: Embayment transects, eelgrass landward and waterward location**