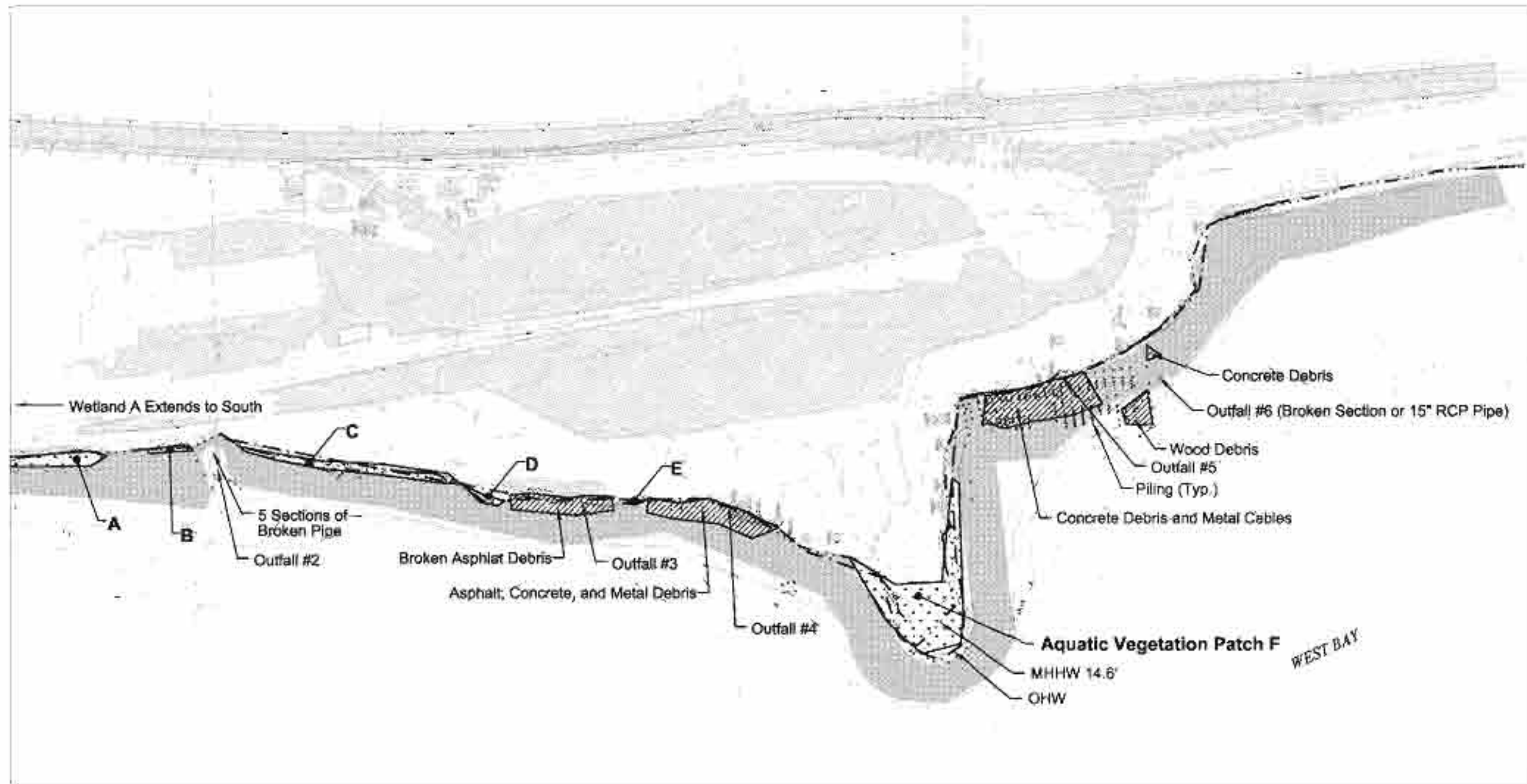






Jul 02, 2007 1:51pm c:\dev\p001\KCI\Udbs\070324-West Bay Park\07032401\07032401-000.dwg FIG. 3



Legend

-  Wetland
-  Debris
-  Piling
-  Ordinary High Water (OHW)
-  Mean Higher High Water (MHHW)



Note:
 Horizontal Datum: NAD 83 WA State Plane South
 Vertical Datum: MLLW = 0.0

1.2.2 Soils

There are three soil types mapped by the NRCS in the project area: Xerorthents, with 0 to 5 percent slopes; Alderwood gravelly sandy loam, with 15 to 30 percent slopes; and Dystric Xerorthents, with 60 to 90 percent slopes (USDA 2007). Almost the entire Property is mapped by NRCS as Xerorthents, which are described as deep, moderately well drained to somewhat excessively drained soils on uplands and tidelands. They formed in sandy and loamy cut and fill material. The Alderwood series consists of somewhat acidic, moderately deep, well-drained soils formed on glacial till in upland contexts. Dystric Xerorthents are composed of deep well-drained soils formed in glacial till and situated on the sidewalls of drainages (USDA 1990). None of the three soil series is classified as hydric soils according to *Hydric Soil List of Thurston County, Washington* (USDA 2001).

Historic map information from a topographic map of Budd Inlet indicates that the entire project site below West Bay Drive was originally a mudflat (US Coast and Geodetic Survey, 1873). Therefore it appears that the upland portion of the site was constructed on fill material. Layers of wood fiber material were observed in several areas along the shoreline near the OHW line, typically where the shoreline has vertical banks. These layers ranged in thickness from a few inches to more than a foot. In some areas the layers were located near the ground surface while in other areas they were observed more than two feet below ground. Soils near the OHW line are described to a depth of 18 inches in the sample plot soil profiles in Section 5.2 and presented in the field data forms in Appendix A. A summary of soils data collected at each sampling plot is presented in Appendix C.

1.2.3 Hydrology

The study area is located in the Deschutes Basin Water Resource Inventory Area (WRIA) 13 (Ecology 2007b). Hydrologic characteristics at the site are influenced by the following factors: regional groundwater, direct precipitation, surface water runoff, and tidal patterns of Puget Sound. At least five drainages are piped or naturally flowing beneath the ground at the Property and outfall at the marine shoreline below the OHW line. Stream and drainages are described in Section 3. For the purpose of this study, the individual contribution of each factor to the hydrologic regime could not be determined,

although due to the Property location on Puget Sound, and the fact that only estuarine and not freshwater wetlands were identified in the areas studied for this report, daily tidal fluctuations of Puget Sound have the most significant influence on the hydrology of Wetlands on the Property.

Sample plot hydrology is described in Section 5.2 and presented in the field data forms in Appendix A. A summary of hydrology data collected at each sampling plot is presented in Appendix C.

1.2.4 Plant Communities

The *USFWS Wetlands Mapper for National Wetlands Inventory Map Information* (USFWS 2007a) identifies E2US wetland habitat along the entire shoreline of the Property. Wetland vegetation community types identified during the delineation also include E2US wetland systems. Wetland vegetation includes salt tolerant emergent species. Upland vegetation at the Property includes a variety of native and non-native invasive or ornamental tree, shrub, grass, and herbaceous species. Upland vegetation in the investigated area is described in Section 4 and presented in the field data sheets in Appendix A. Wetland vegetation in the investigated area is described in Section 5.2 and presented in the field data sheets in Appendix A. Plant species observed in upland and wetland communities are summarized in Appendix C.

1.2.5 Habitat

In general, wildlife habitat on the Property is limited under existing conditions because most of the Property is paved and non-native invasive and ornamental vegetation are the dominant plant species in the upland areas (see Section 4). Surrounding habitat includes fragmented and disturbed areas associated with residential development and the aquatic habitat of Puget Sound. Puget Sound provides quality habitat for a variety of species that rely on aquatic habitat for breeding and foraging. There are no freshwater wetlands in the areas studied for this report to provide potential habitat for amphibians. Drainages that outfall onto the beach do not appear to provide access for fish use (see Section 3). No evidence of rare, uncommon, or unique wildlife or wildlife habitat is apparent at this site. Wildlife use of this area likely includes a variety of native and non-native species typical of populated residential areas in Thurston County. The

WDFW PHS database does not identify any priority habitats or documented presence of protected species within the Property, with the exception of fish and salmon use of Puget Sound (WDFW 2007). A review of WDFW PHS Database information is provided in Section 6.



2 LANDSLIDE HAZARD AREAS (OMC 18.32.605 THROUGH OMC 18.32.645)

The Property is characterized by sloping banks from the existing West Bay Drive NW down to the park, and within the park along the shoreline. The typical slope between West Bay Drive NW and the park is 2 horizontal to 1 vertical (2H:1V), or 50 percent, with a change in elevation of 15 to 20 feet between the road and the park. Shoreline slopes range from 5H:1V to near vertical in some areas, with a change in elevation of less than 10 feet between the top of the slope and the beach below.

The OMC defines Landslide Hazard Areas in Ordinance Chapter 18.32.600. Briefly, Landslide Hazard Areas are those areas with:

- Slopes greater than 40 percent, and heights greater than 10 feet or
- Slopes of impermeable soil greater than 15 percent, showing seeps during the wet season, and greater than 10 feet in height or
- Areas with historic landslide evidence.

Constructed slopes built using accepted construction standards are not part of this definition. The OMC specifies development buffers in Landslide Hazard Areas, and provides exemptions for specific development activities, such as provision of beach or shoreline access. Buffers of 10 feet at the base of slopes would likely be adequate to satisfy the requirements of the OMC. At the top of the slopes, buffers ranging from 5 to 7 feet would satisfy OMC provisions.

Based on review of the existing survey, the slopes between the relatively level core area of the Property and West Bay Drive are considered Landslide Hazard Areas. Based on the observed condition of the access roadways, it appears that these areas were built in accordance with accepted construction standards and thus are exempt from designation as Landslide Hazard Areas per OMC 18.32.605.B. In addition, the shoreline slopes between the core area and the tideflat are not considered Landslide Hazard Areas.

3 STREAMS AND DRAINAGE CHANNELS (OMC 18.32.410 THROUGH OMC 18.32.440)

During the May 10, 2007 site visit, Anchor ecologists identified stream and drainage channels in the Project area. Stream typing and upstream sources of drainages were not identified as part of this investigation. The City of Olympia Municipal Code defines Streams in Ordinance Chapter 18.32.410.

3.1 Results

Six drainage outfalls were observed during the investigation, identified as Outfalls 1, 2, 3, 4, 5, and 6. Two of the drainage channels are piped (2 and 6), and four are naturally flowing from beneath the ground (seeps) and emerge below the OHW line of Puget Sound. The outfall locations are shown on Figure 3.

All six outfalls were actively flowing during the site visit. Outfalls 1 and 2 had defined scour channels in the upper intertidal area of the beach. Outfall 2 flows from a broken culvert (see Photograph 1) and is the terminus of Garfield Creek. Garfield Creek flows through open channel in a wooded ravine west of West Bay Drive NW. It is culverted below West Bay Drive NW and the Property. The flows of Outfalls 3, 4, and 5 consisted of seeps with sheet flow patterns with no discernable scouring (see Photograph 2). Outfall 6 flows from a broken culvert that is exposed in the upper intertidal area about 50 feet below the OHW line and is therefore beneath water during much of the tidal cycles. Outfalls 1, 3, 4, and 5 are seeps with no exposed pipes or culverts identifying the source of the flows.



Photograph 1. Outfall 2



Photograph 2. Outfall 3

4 VEGETATION COMMUNITIES

During the May 10, 2007 site visit, Anchor ecologists documented general information regarding dominant plant species and communities while walking through the Property. A description of upland vegetation communities on the Property is provided in this section. Wetland habitats and salt tolerant vegetation are described in Section 5.

4.1 Results

Tree, shrub, and herbaceous vegetation in the upland area of the Property include a variety of native and non-native invasive or ornamental species. Salt tolerant vegetation is located along the shoreline of Puget Sound. No freshwater wetland habitats were observed in the areas studied for this report. All of the vegetation communities within the upland area are fragmented and located between roads, paved surfaces, and relic concrete foundations and rubble (see Photograph 3). Vegetation was frequently observed growing between cracks in the pavement and in soil layers several inches thick located on top of pavement. A list of vegetation species observed during the site visit is provided in Table 1. An aerial photograph of the Property is provided on Figure 2.



Photograph 3. Upland Vegetation

Dominant tree species include ornamental cherry (*Prunus* sp.) and the non-native species Black locust (*Robinia pseudoacacia*). Additional tree species observed include the native species big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), and Pacific madrona (*Arbutus menziesii*). Trees on the Property are relatively young with no mature trees observed.

Shrub species communities are dominated by the non-native invasive plant species Himalayan blackberry (*Rubus armeniacus*), Scot's broom (*Cytisus scoparius*), and Japanese knotweed (*Polygonum cuspidatum*), with twinberry (*Lonicera involucrate*) also occurring.

Grass and herbaceous plant species within the Property include a variety of native and non-native species that are common in Thurston County and western Washington. Dominant grass and herbaceous species include common velvet-grass (*Holcus lanatus*), Canadian thistle (*Cirsium arvense*), tall fescue (*Festuca arundinacea*), and common dandelion (*Taraxacum officinale*). The non-native invasive species English ivy (*Hedra helix*) was frequently observed as a dominant ground cover and growing up the trunks of trees.

Dominant salt tolerant vegetation located along the beach intertidal area include sea plantain (*Plantago maritima*) and pickleweed (*Salicornia virginica*), as described in the Wetland Delineation section of this report (Section 5).