

Lake to Sound Trail – Segment B Final Wetland Discipline Report

Prepared for:



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Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
BMC	Burien Municipal Code
BMP	best management practice
Cities	City of Burien and City of SeaTac
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FAC	Facultative
FACW	Facultative Wetland
FHWA	Federal Highway Administration
HPA	Hydraulic Project Approval
HGM	hydrogeomorphic classification
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
Port	Port of Seattle
RM	river mile
SF	square feet
SMC	SeaTac Municipal Code
SR	State Route
TNW	Traditional Navigable Water
USFWS	U.S. Fish and Wildlife Service
USDA	U.S. Department of Agriculture
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

This Discipline Report is intended to provide information in support of the Washington State Department of Transportation (WSDOT) Environmental Classification Summary form for the National Environmental Policy Act (NEPA) Documented Categorical Exclusion process, assist project planning, and facilitate permitting. This report describes wetlands in the project area; evaluates potential impacts to wetlands and buffers from the proposed project; and presents avoidance and minimization measures included in the project design and conceptual mitigation for unavoidable impacts.

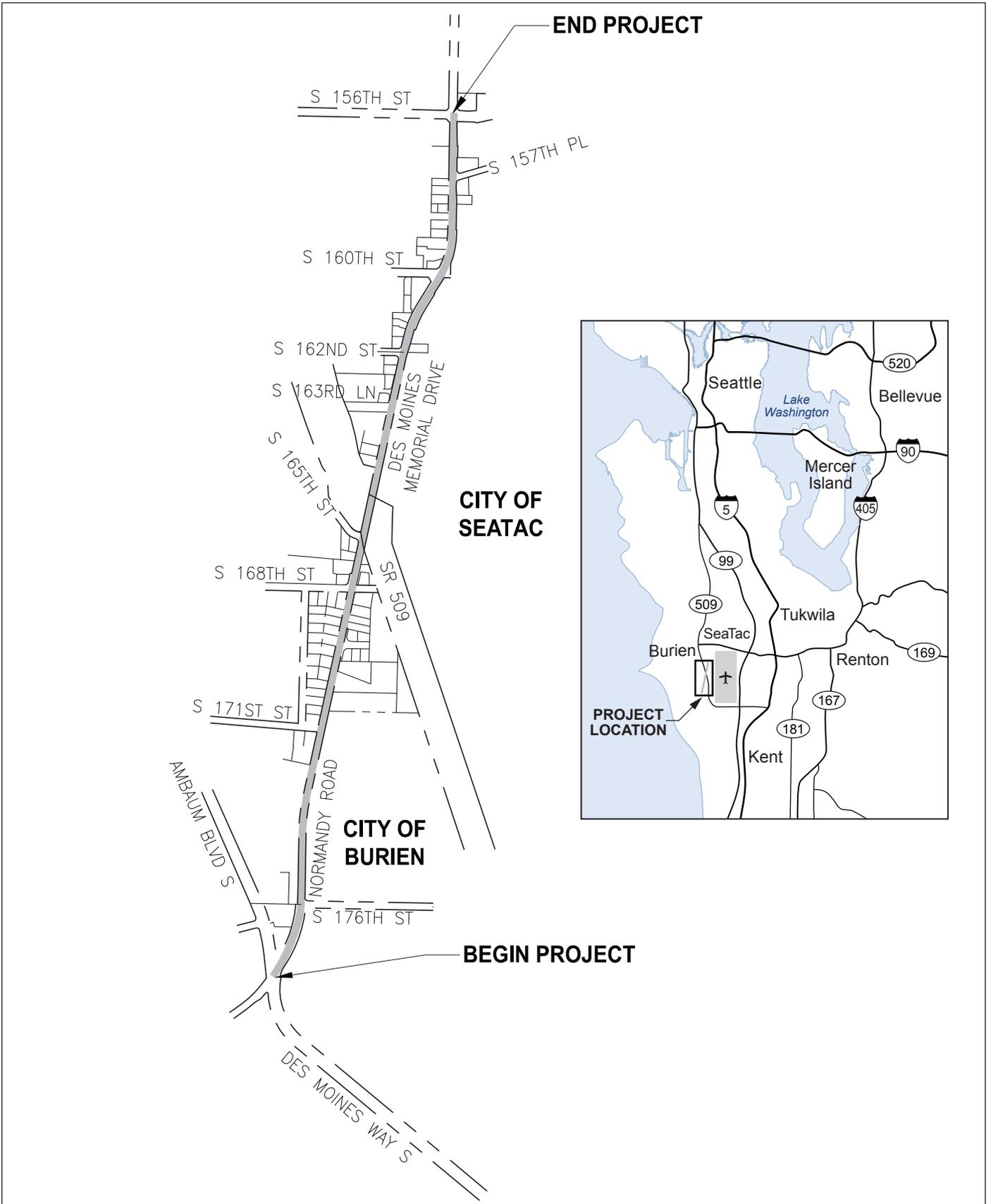
A total of seven wetlands were identified in the vicinity of the project area, three of which are located within the study area. One wetland is rated as a Class 2 by the City of Burien, one is rated as a Class 3 by the City of Burien, three are rated as Class 1 wetlands by the City of Seatac, and two are rated as Class 2 wetlands by the City of Seatac. No wetlands would be permanently filled as a result of the project. However, it is anticipated that there would be permanent impacts to the buffers of seven wetlands. Additionally, there would be temporary impacts to three of the wetlands and the buffers of seven wetlands.

1.1 Project Overview

King County, together with the cities of SeaTac and Burien (Cities), the WSDOT, and the Federal Highway Administration (FHWA), is proposing to develop a 1.5-mile segment of what would ultimately be the 16-mile Lake to Sound Trail. The 1.5-mile segment is referred to as Segment B of the Lake to Sound Trail, and is also commonly referred to as an extension of the Westside Trail. Segment B extends along the east side of Des Moines Memorial Drive from Ambaum Boulevard South to South 156th Street (Figure 1-1).

Segment B, as well as the longer Lake to Sound Trail, is part of a Regional Trail System that provides non-motorized, alternative transportation and a recreation corridor for multiple trail users, including bicyclists, pedestrians, skaters, and others. A goal of the Lake to Sound Trail is to provide non-motorized transportation facilities to economically disadvantaged communities in southwest King County that have been historically underserved by such facilities.

Once complete, Segment B would become part of a larger planned system connecting employment and residential centers in South King County with regional trails in Seattle and the greater Regional Trail System network. Segment B would connect at the north to the recently completed Westside Trail to North SeaTac Park and to existing bike lanes running east-west on South 156th Street. This network includes connections to the Duwamish Trail to the north and the Seahurst Park Trail and Burien Town Square to the west. To the east, this project would connect with a multi-use trail and on-street bike lanes along South 154th Street, built by the Port of Seattle (Port) in 2006 in conjunction with SeaTac Airport third runway project.



Parametrix 554-1521-084/B(2T300B) 1/11 (B)



NOT TO SCALE

**Figure 1-1
Vicinity Map**

Lake to Sound Trail — Segment B

1.2 Project Features

Segment B is typically 10 to 12 feet of porous asphalt pavement bounded by two 2-foot-wide shoulders and 1-foot-wide clear zones, in accordance with American Association of State Highway and Transportation Officials' (AASHTO) guidelines. The project includes:

- Construction of a 10- to 12-foot-wide porous asphalt pavement with soft-surface (gravel) shoulders;
- Fill import and excavation for general grading, pavement sections, and retaining walls;
- Separation of the trail from the adjacent road with a planter strip, which could include replacement elm trees where practical and other landscaping;
- Relocation of above-ground utilities to either the back side (east side) of the trail or underground;
- Drainage improvements related to the trail and conveyance of stormwater from the adjacent road across the trail;
- Retaining walls in some places to reduce the cut-and-fill areas needed for the trail;
- A short boardwalk section through an area in which the trail cannot avoid the adjacent Walker Creek wetland complex (Wetland WS-1);
- Channelization and consolidation of driveways where multiple driveways exist for a given property to reduce the potential for conflicts between trail users and vehicles; and
- Other access and traffic control features (bollards, striping, signage, etc.).

1.3 Project Area and Setting

The Segment B project area is a linear corridor mostly within the existing right-of-way for Des Moines Memorial Drive. Segment B is located in Sections 20, 29, and 32, Township 23 North, Range 4 East, Willamette Meridian. North of State Route (SR) 509, the trail would be within in the City of SeaTac; south of SR 509, in the City of Burien.

Des Moines Memorial Drive is a historic living memorial and tribute to those who died in World War I. In 1921, elm trees were planted along the east side of the roadway to create a “living road of remembrance.” Over time, disease, development, and road and utility improvements have threatened the trees. Of the originally planted trees, eight remain in the project area.

At the north end, most of the adjacent property to the east is owned by the Port. The Port's property is undeveloped and includes wetland mitigation constructed in conjunction with the third runway project. The undeveloped property, while fenced, provides a natural park-like setting along this otherwise urban corridor. Several small private properties (a small warehouse and a gas station/convenience store) also abut the trail in the north end.

South of SR 509, over a dozen single-family residential properties are immediately east of the trail. Farther south, a vacant property owned by the City of Burien and a mini-warehousing facility are east of the trail.

To the west of Segment B, on the other side of Des Moines Memorial Drive, relatively dense residential development occurs throughout the corridor.

1.4 Project Purpose and Need

The purpose of the Lake to Sound Trail – Segment B project is to design and construct an alternative non-motorized transportation corridor and multi-use recreational trail along the east side of Des Moines Memorial Drive from Ambaum Boulevard South to South 156th Street, in the cities of Burien and SeaTac.

The multi-use Lake to Sound Trail – Segment B would provide non-motorized access to recreation, and employment centers and complete a link in the Regional Trail System network. The trail is intended to safely accommodate a variety of user groups such as bicyclists, pedestrians, runners, wheelchair users, and skaters. Trail design standards will safely accommodate different ages and skill levels within those groups.

The Lake to Sound Trail – Segment B would:

- Serve local and regional non-motorized transportation needs and provide access to the trail for local communities.
- Help satisfy the regional need for recreational trails and provide safe recreational opportunities to a wide variety of trail users.
- Provide a critical link in the regional trails system.
- Provide economic and health benefits to communities along the trail.

2 METHODOLOGY

This report is based on a review of existing information and field investigations. The goal of these efforts is to document existing information to reflect current site conditions and to collect new information to assess impacts.

2.1 Methods of Analysis

2.1.1 Wetland Identification and Delineation

The methods specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) were used by project biologists to delineate on-site wetlands. Additionally, the methods specified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Corps of Engineers [Corps] 2010) were used. These methods comply with those in the *Washington State Wetland Identification and Delineation Manual* (Ecology 1997).

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. An area must have at least one positive indicator of wetland vegetation, soils, and hydrology to be considered a wetland. The delineated wetlands were instrument-surveyed by professional land surveyors. Wetland determination data forms from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010) were recorded for each wetland (Appendix A).

Wetlands located outside of the study area, but that have buffers located within the study area (R6b, A17a, A17b, A17c, and A17d) had previously been delineated as part of the Master Plan Update Improvements for the Seattle-Tacoma International Airport (Parametrix 2000). The names given to these wetlands as part of this project were used in this report for consistency.

Vegetation

The dominant plants and their wetland indicator status were evaluated to determine if the vegetation was hydrophytic. Hydrophytic vegetation is generally defined as vegetation adapted to prolonged saturated soil conditions. To meet the hydrophytic vegetation criterion, more than 50 percent of the dominant plants must be Facultative (FAC), Facultative Wetland (FACW), or Obligate (OBL), based on the plant indicator status category assigned to each plant species by the U.S. Fish and Wildlife Service (USFWS) (Reed 1988, 1993). Table 2-1 lists the definitions of the indicator status categories.

Table 2-1. Key to Plant Indicator Status Categories

Plant Indicator Status Category	Symbol	Definition
Obligate Wetland Plants	OBL	Plants that almost always (> 99% of the time) occur in wetlands, but which may rarely (< 1% of the time) occur in non-wetlands.
Facultative Wetland Plants	FACW	Plants that often (67% to 99% of the time) occur in wetlands, but sometimes (1% to 33% of the time) occur in non-wetlands.
Facultative Plants	FAC	Plants with a similar likelihood (33% to 66% of the time) of occurring in both wetlands and non-wetlands.
Facultative Upland Plants	FACU	Plants that sometimes (1% to 33% of the time) occur in wetlands, but occur more often (67% to 99% of the time) in non-wetlands.
Upland Plants	UPL	Plants that rarely (< 1% of the time) occur in wetlands, and almost always (> 99% of the time) occur in non-wetlands.

Source: Environmental Laboratory (1987).

Scientific and common plant names follow currently accepted nomenclature. Most names are consistent with *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973) and the PLANTS Database (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA, NRCS] 2010a). During the field investigations, dominant plant species were observed and recorded on data forms for each sample plot (Appendix A).

Soils

Generally, an area must have hydric soils to be a wetland. Hydric soil forms when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. Biological activities in saturated soil result in reduced oxygen concentrations that result in a preponderance of organisms using anaerobic processes for metabolism. Over time, anaerobic biological processes result in certain soil color patterns, which are used as indicators of hydric soil. Typically, low-chroma colors (weak color strength) are formed in the soil matrix. Bright-colored redoximorphic features form within the matrix under a fluctuating water table. Redoximorphic features are a soil property, associated with wetness, which results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and desaturation, respectively. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the subsurface. Soils were examined by excavating sample plots to a depth of 18 inches or more to observe soil profiles, colors, and textures. The depths of the sample plots ranged between 18 and 22 inches deep with varying widths. Munsell color charts (Greytag Macbeth 2000) were used to describe soil colors.

Hydrology

The project area was examined for evidence of hydrology. An area is considered to have wetland hydrology when soils are ponded or saturated consecutively 12.5 percent (sometimes 5 to 12.5 percent) of the growing season. In King County (Seattle-Tacoma Airport station), the growing season generally lasts from early March (March 9) to mid- November (November 17) (USDA, NRCS 2002), so ponding or saturation must be

present for approximately 32 consecutive days. Primary indicators of hydrology include surface inundation and saturated soils. Secondary indicators of hydrology include drainage patterns, watermarks on vegetation, water-stained leaves, and oxidized root channels.

2.1.2 Wetland Classification and Rating

Delineated wetlands were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Hydrogeomorphic classifications were assigned to wetlands using U.S. Army Corps of Engineers (Corps) methods established in a Hydrogeomorphic Classification System for Wetlands (Brinson 1993). Wetlands were rated according to City of SeaTac Municipal Code (SMC) 15.10.675, City of Burien Municipal Code (BMC) 19.40.300, and the *Washington State Wetland Rating System for Western Washington – Revised* (Hruby 2004) (Appendix B). Table 2-2 summarizes the state and local jurisdiction wetland rating criteria for each wetland category. Buffer widths assigned to wetlands in the project area reflect requirements of the City of SeaTac (SMC 15.30.290) and the City of Burien (BMC 19.40.310).

Table 2-2. Criteria for Wetland Rating Categories as Specified by Ecology and the Cities of Burien and SeaTac

Ecology^a	
Category I	Wetlands of exceptional value in terms of protecting water quality, storing flood water and stormwater, and/or providing habitat for wildlife as indicated by a rating system score of 70 points or more. These are wetland communities of infrequent occurrence that often provide documented habitat for sensitive, threatened, or endangered species and/or have other attributes that are very difficult or impossible to replace if altered.
Category II	Wetlands that have very important resources as indicated by a rating system score of between 51 and 69 points. These wetlands occur more commonly than Category 1 wetlands but still require a high level of protection.
Category III	Wetlands that have important resource value as indicated by a rating system score of between 30 and 50 points.
Category IV	Wetlands that are of limited resource value as indicated by a rating system score of less than 30 points. They typically have vegetation of similar age and class, lack special habitat features, and/or are isolated or disconnected from other aquatic systems or high quality upland habitats.
SeaTac^b	
Class I	<p>Only includes wetlands assigned the Unique/Outstanding #1 rating in the 1983 King County Wetlands Inventory (or most recent City inventory) or which meet any of the following criteria:</p> <ol style="list-style-type: none"> 1. Are wetlands which have present species listed by the Federal or State government as endangered or threatened or outstanding actual habitat for those; 2. Are wetlands which have forty percent (40%) to sixty percent (60%) permanent open water in dispersed patches with two (2) or more classes of vegetation; 3. Are wetlands equal to or greater than ten (10) acres in size and have three (3) or more wetland classes, one of which is open water; 4. Are wetlands which have present plant associations of infrequent occurrence; 5. Sphagnum or peat wetlands; or 6. Forested wetlands equal to or greater than one (1) acre in size.

Table 2-2. Criteria for Wetland Rating Categories as Specified by Ecology and the Cities of Burien and SeaTac

Class II	Only includes wetlands assigned the Significant #2 rating in the 1983 King County Wetlands Inventory (or the most recent City inventory) or which meet any of the following criteria: <ol style="list-style-type: none"> 1. Are wetlands greater than one (1) acre in size; or 2. Are wetlands equal to or less than one (1) acre in size and have three (3) or more wetland classes; or 3. Are forested wetlands less than one (1) acre in size but are larger than two thousand five hundred (2,500) square feet; or 4. Are wetlands which have present heron rookeries or raptor nesting trees.
Class III	Only includes wetlands assigned the Lesser Concern #3 rating in the 1983 King County Wetlands Inventory (or most recent City inventory) or which are wetlands equal to or less than one (1) acre in size and have two (2) or fewer wetland classes. This does not include drainage ditches used as part of an approved public storm drainage system that may support wetland vegetation or retention/detention systems. (Ord. 92-1041 § 1)
Burien	
Category 1	Wetlands that meet any of the following criteria: <ol style="list-style-type: none"> a. Documented presence of fish, wildlife, or plant species listed by the federal or state government as endangered or threatened or outstanding actual habitat for those species; b. Equal to or greater than 10 acres in size and have three or more wetland classes as defined in BMC 19.10; c. Association with a Type 1 stream; d. Presence of plant associations of infrequent occurrence or High Quality Native Wetland Communities. Examples include: bogs and fens, estuarine wetlands, mature forested wetlands, or kelp and eelgrass beds; or e. Documented as regionally significant waterfowl or shorebird concentration areas.
Category 2	Wetlands that do not meet any of the criteria for Category 1, but meet any of the following criteria: <ol style="list-style-type: none"> a. Greater than one acre in size; b. Equal to or less than one acre in size and have three or more wetland classes as defined in BMC 19.10; c. Forested wetlands equal to or less than one acre; d. Documented presence of heron rookeries or raptor nesting trees; e. Documented occurrences of sensitive species of plant, animal or fish recognized by federal or state agencies; f. Associated with Type 2 or 3 streams; or g. Wetlands with significant habitat value (Greater than or equal to 22 points on the Wetlands Rating Form).
Category 3	A wetland that does not meet any of the criteria for Category 1 or 2, but meets either of the following criteria: <ol style="list-style-type: none"> a. Of a size between 1,000 square feet and one acre, with two or fewer wetland classes as defined in BMC 19.10; b. Wetlands where the habitat score for significant habitat value is less than or equal to 21 points;
Category 4	Wetlands associated with Lake Burien.

^a Hruby et al. (2004)
^b SMC 15.10.675
^c BMC 19.40.300

2.1.3 Wetland Functional Assessment

Functions of individual wetlands were assessed using the WSDOT *Wetland Functions Characterization Tool for Linear Projects* (Null et al. 2000) (Appendix C). This method allows evaluation of wetland function, using best professional judgment and readily observed environmental characteristics. For example, an area of open water may provide habitat for waterfowl or aquatic animals. The upland habitats and buffers surrounding wetlands were also considered in the evaluation, because adjacent land uses affect the performance of wetland functions. Biologists reviewed the indicator characteristics present for each wetland and assigned a summary rating of low, moderate, or high for each wetland function.

Functions that were considered most relevant to this project are grouped into three categories: habitat, water quality, and hydrological support. Habitat functions include providing fish, avian species, and other wildlife access to food, cover, and breeding and rearing opportunities. Hydrological functions assessed include groundwater recharge/discharge, base flow support, and flood flow alteration (storage and desynchronization). Water quality functions include protection and enhancement through sedimentation, erosion protection, and nutrient retention/nutrient transformation.

2.2 Studies and Coordination

2.2.1 Review of Existing Information

Prior to conducting fieldwork, biologists reviewed maps and materials including, but not limited to:

- NRCS Web Soil Survey (USDA, NRCS 2010b)
- National Wetlands Inventory (NWI), Online interactive mapper (U.S. Fish and Wildlife Service [USFWS] 2010)
- Washington State Department of Natural Resources (DNR) Natural Heritage Program CAD Layer (DNR 2010).
- A catalog of Washington streams and salmon utilization. Volume 1, Puget Sound Region. (Williams et al. 1975).
- City of Burien Critical Areas Map (Burien 2010)
- City of SeaTac Wetland, Stream, and Shoreline Classification Map (SeaTac 2010)
- King County iMap (King County 2010)
- Wetland Delineation Report, Master Plan Update Improvements Seattle-Tacoma International Airport (Parametrix 2000)

2.2.2 Field Investigation

Field investigations at the Lake to Sound Trail – Segment B project area occurred over two site visits on October 29 and November 2 of 2010.

2.2.3 Regulations

Wetlands in the City of Burien (north of SR 509) are regulated under BMC 19.40 (the Burien Zoning Code) and wetlands in the City of SeaTac (south of SR 509) are regulated under SMC 15.30.

Wetlands, streams, and other sensitive resources in the project vicinity are also subject to federal and state regulations. At the federal level, wetlands and streams are regulated by the Clean Water Act (CWA) Section 404, which regulates placement of fill in waters of the United States. The Corps is responsible for issuing permits under Section 404 of the CWA. Activities that affect wetlands and streams may also require a water quality certification (Section 401 of the CWA), which is administered at the federal level by the U.S. Environmental Protection Agency (EPA) and implemented at the state level by the Washington State Department of Ecology (Ecology). Ecology reviews projects for compliance with state water quality standards and makes permitting and mitigation decisions based on the nature and extent of impacts, as well as the type and quality of wetlands or streams being affected. Activities that use, divert, obstruct, or change the flow of a Water of the State, including some wetlands, typically require a Hydraulic Project Approval (HPA) permit. The Washington Department of Fish and Wildlife (WDFW) is responsible for implementing HPAs under the State Hydraulic Code.

In June 2007 and revised in December 2008, the Corps and the EPA issued a joint memorandum that clarifies CWA jurisdiction following the Supreme Court's decision in the Rapanos case. Guidance in the memorandum identifies situations where a developer may need to obtain a CWA Section 404 permit before completing work in wetlands, tributaries, or other Waters of the United States.

CWA jurisdiction may also be extended to waters that are not Traditional Navigable Waters (TNWs) of the United States if either of the following two standards is met. The first standard, extends regulatory jurisdiction to non-navigable tributaries of TNWs that are relatively permanent and wetlands that directly abut (there is a surface connection) these waters. The second standard requires a case-by-case determination ("significant nexus" analysis) for non-relatively permanent tributaries and adjacent wetlands that have characteristics that may significantly affect TNWs.

3 AFFECTED ENVIRONMENT

This section describes the existing conditions of the wetlands and buffers within the study area, as well as general habitat characteristics affecting wetlands. Streams are discussed in the Lake to Sound Trail – Segment B Stream Discipline Report (Parametrix 2011).

3.1 General Habitat Characteristics

Characteristics of the project area, including the watershed, land use, topography, soils, vegetation, and fish and wildlife are described below. Photographs of wetlands are included in Appendix D.

3.1.1 Watershed

Two streams (Miller Creek and Walker Creek) are located within the Lake to Sound Trail – Segment B project area (Williams et al. 1975). Miller and Walker Creeks meet just east of the Puget Sound. Walker and Miller Creeks are located within the Duwamish River Watershed, within the Duwamish/Green Water Resource Inventory Area (WRIA) 09.

Miller Creek crosses the project corridor under Des Moines Memorial Drive South, at about river mile (RM) 2.0. Dual culverts convey Miller Creek under the roadway; a 6-foot diameter round corrugated metal culvert on the right bank, and a 5.2-foot-high by 6-foot-wide corrugated culvert on the left bank. Three plunge pools, formed by the presence of notched concrete sandbags, are located just upstream of the culverts. The pools are about 15 to 20 feet in width and are about 1 to 2 feet deep. The vertical drop at the weirs is about 1 to 1.5 feet. This drop may represent a partial fish passage barrier, at least to juvenile salmonids, although both adult and juvenile salmonids have been identified upstream of the weirs.

In Walker Creek, substrate in the vicinity of the trail corridor is a combination of placed rip-rap, cobble, and gravel, with medium embedment. The pools have some overhanging shrub vegetation present, although large wood debris is scarce in this reach. Based on the habitat conditions, this reach offers fair to good holding or rearing habitat for salmonids, although spawning would likely be limited due to substrate and channel morphology.

See the Lake to Sound Trail – Segment B Stream Discipline Report (Parametrix 2011) for further details regarding streams.

3.1.2 Land Use

The primary land use in the areas surrounding the project is urban residential and airport facilities. Many of the properties within the project area have residential structures and outbuildings, with associated driveways, lawns, and ornamental plantings.

At the north end, most of the adjacent property to the east is owned by the Port. The Port's property is undeveloped and includes a mitigation wetland constructed in conjunction with the third runway project. The undeveloped property, while fenced, provides a natural park-like setting along this otherwise urban corridor. Several small private properties (a small warehouse and a gas station/convenience store) also abut the trail at the north end.

South of SR 509, more than a dozen single-family residential properties are immediately east of the trail. Farther south, a vacant property owned by the City of Burien and a small warehousing facility are east of the trail.

3.1.3 Topography

The project area is generally flat, sloping gently from the south to the north. To the east is the Seattle-Tacoma International Airport's third runway, which was constructed at a considerably higher elevation than the project area.

3.1.4 Soils

No soil survey data are available for the study area (USDA, NRCS 2010). Information on soils observed during field investigations is provided in Section 3.3.

3.1.5 Vegetation

Vegetation within the project area consists of both wetland and upland species. Wetlands in the project area contain emergent, shrub, and forested habitats. Wetland habitats on the site are further detailed in Section 3.4.

Upland plant communities within the project area consist primarily of upland forest and roadside, maintained herbaceous vegetation. Vegetation includes red alder (*Alnus rubra*), tall fescue (*Schedonorus phoenix*), salmonberry (*Rubus spectabilis*), reed canarygrass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*), cutleaf blackberry (*Rubus laciniatus*), fringed willowherb (*Epilobium ciliatum*), beaked hazelnut (*Corylus cornuta*), vine maple (*Acer circinatum*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), western sword fern (*Polystichum munitum*), big-leaf maple (*Acer macrophyllum*), and non-native ornamental trees.

Wetland plant communities are palustrine forested, palustrine scrub-shrub, and palustrine emergent. Dominant vegetation includes American speedwell (*Veronica americana*), creeping buttercup (*Ranunculus repens*), fringed willowherb, reed canarygrass, black cottonwood, red-osier dogwood (*Cornus sericea*), small-fruited bulrush (*Scirpus microcarpus*), giant horsetail (*Equisetum telmateia*), Himalayan blackberry, western red cedar, lady fern (*Athyrium filix-femina*), salmonberry, Pacific willow (*Salix lucida*), Scouler's willow (*Salix scouleriana*), and American skunk cabbage (*Lysichiton americana*).

The DNR Natural Heritage Program does not identify any rare plants within or in the vicinity of the project area.

3.1.6 Fish and Wildlife

Wildlife species present in the study area are adapted to a wide variety of conditions. Characteristic species include European Starlings (*Sturnus vulgaris*), American Robins (*Turdus migratorius*), American Crows (*Corvus brachyrhynchos*), Dark-eyed Juncos (*Junco hyemalis*), Spotted Towhees (*Pipilo maculatus*), House Finches (*Carpodacus mexicanus*), House Sparrows (*Passer domesticus*), Black-capped Chickadees (*Poecile atricapillus*), Virginia opossums (*Didelphis virginiana*), raccoons (*Procyon lotor*), deer mice (*Peromyscus maniculatus*), and Norway rats (*Rattus norvegicus*).

WDFW (2010) fish distribution data indicate that coho salmon (*Onchorynchus kisutch*) are potentially present in the project area within Miller Creek, while chum salmon (*O. keta*) have been documented in the lower reaches (RM 0 to 0.5) of the stream. Washington Trout (2003) has documented cutthroat trout (*O. clarkii*) and coho salmon within the project reach, as well as upstream and downstream. Cutthroat trout redds have also been documented in Miller Creek upstream of the project. No Chinook salmon (*O. tshawytscha*), pink salmon (*O. gorbuscha*), bull trout (*Salvelinus confluentus*), or steelhead (*O. mykiss*) have been documented in Miller Creek (WDFW 2010; WSCC 2000). There is a single known report from the 1980s of a single sockeye salmon (*O. nerka*) adult observed in the lower reach (Parametrix 1999).

Coho salmon occur in the lower reaches of Walker Creek (WDFW 2010), and although the absolute upstream limit of coho use has not been documented, a single coho salmon was found 20 feet downstream of SR 509 (Trout Unlimited 2003). Hillman et al. (1999) conducted spawning surveys in Walker Creek from October 1998 to March 1999, and tallied 66 coho redds in the lower 2.3 miles (the project is at approximately RM 2.0). They also found seven chum redds up to RM 1.35. Neither these surveys nor existing fish distribution information indicate Chinook salmon, pink salmon, sockeye salmon, steelhead, or bull trout presence in Walker Creek.

3.2 Study Area

The study area for the Lake to Sound Trail – Segment B wetland investigation is defined as the area within 100 feet of the trail corridor, along the east side of Des Moines Memorial Drive from Ambaum Boulevard South to South 156th Street, excluding adjacent property owned by the Port.

3.3 Wetlands in Study Area

The National Wetlands Inventory (NWI) identifies one wetland complex with six components in the study area: two palustrine emergent component with a semi-permanently flooded hydrologic regime, a palustrine emergent component with a seasonally flooded hydrologic regime, two seasonally flooded scrub-shrub components, and a seasonally flooded palustrine forested component.

Biologists identified and delineated one wetland in its entirety (WS-2) and delineated portions of the boundaries of two wetlands in the project area (WS-1 and A17b) (Figures 3-1 through 3-3). Classifications of the delineated wetlands are provided in Table 3-1, and wetland functions are summarized in Table 3-2. General wetland characteristics are discussed below. Also included in this report are specific information for each of the sample plots (Appendix A), wetland rating forms (Appendix B), wetland functional assessment forms (Appendix C), and site photographs (Appendix D).

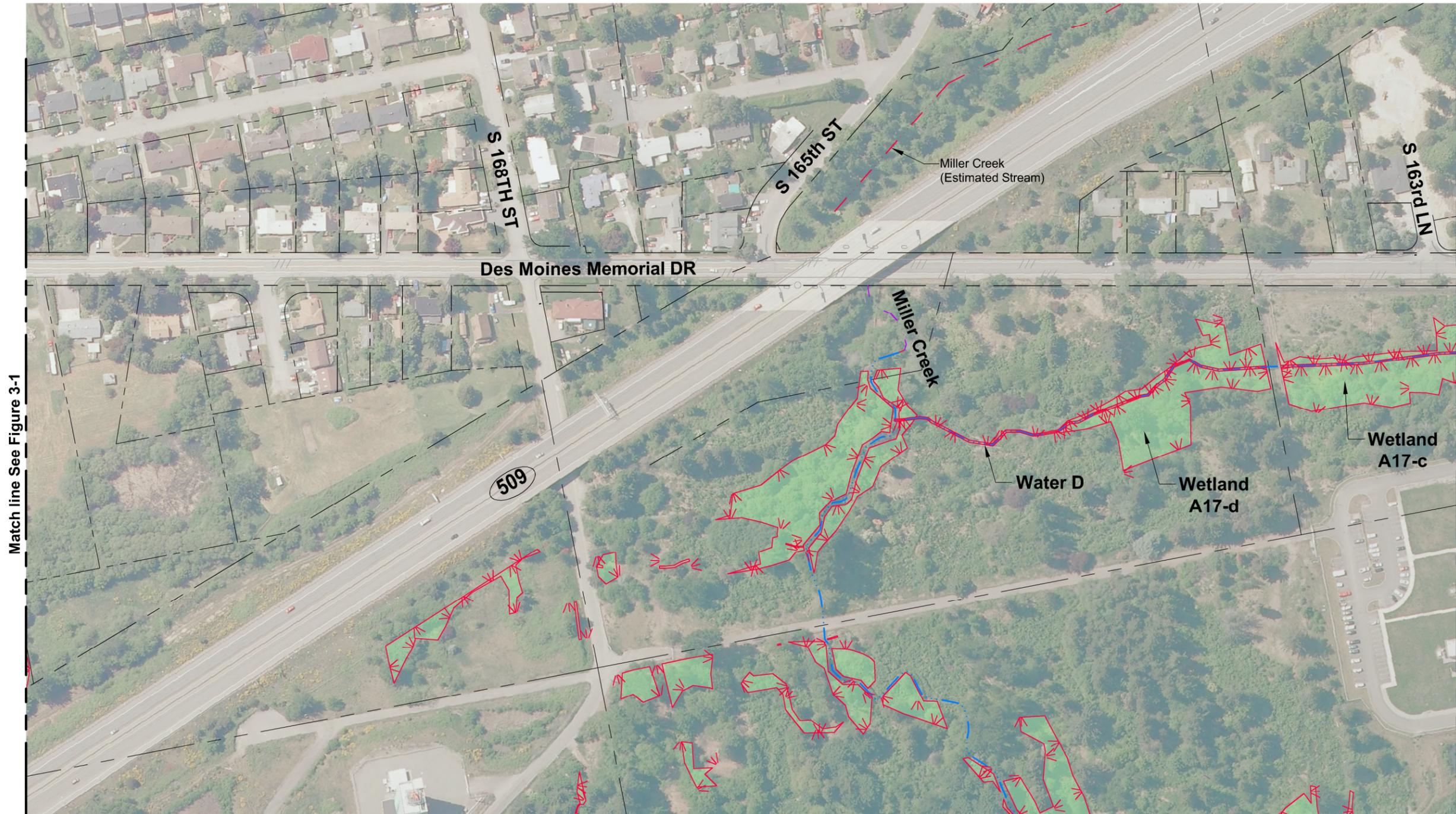


Legend:

	Stream		Wetland Boundary (Delineated)
	Estimated Stream		Wetland Boundary (Estimated)
	USGS Stream		

**Figure 3-1
Wetland and Stream**

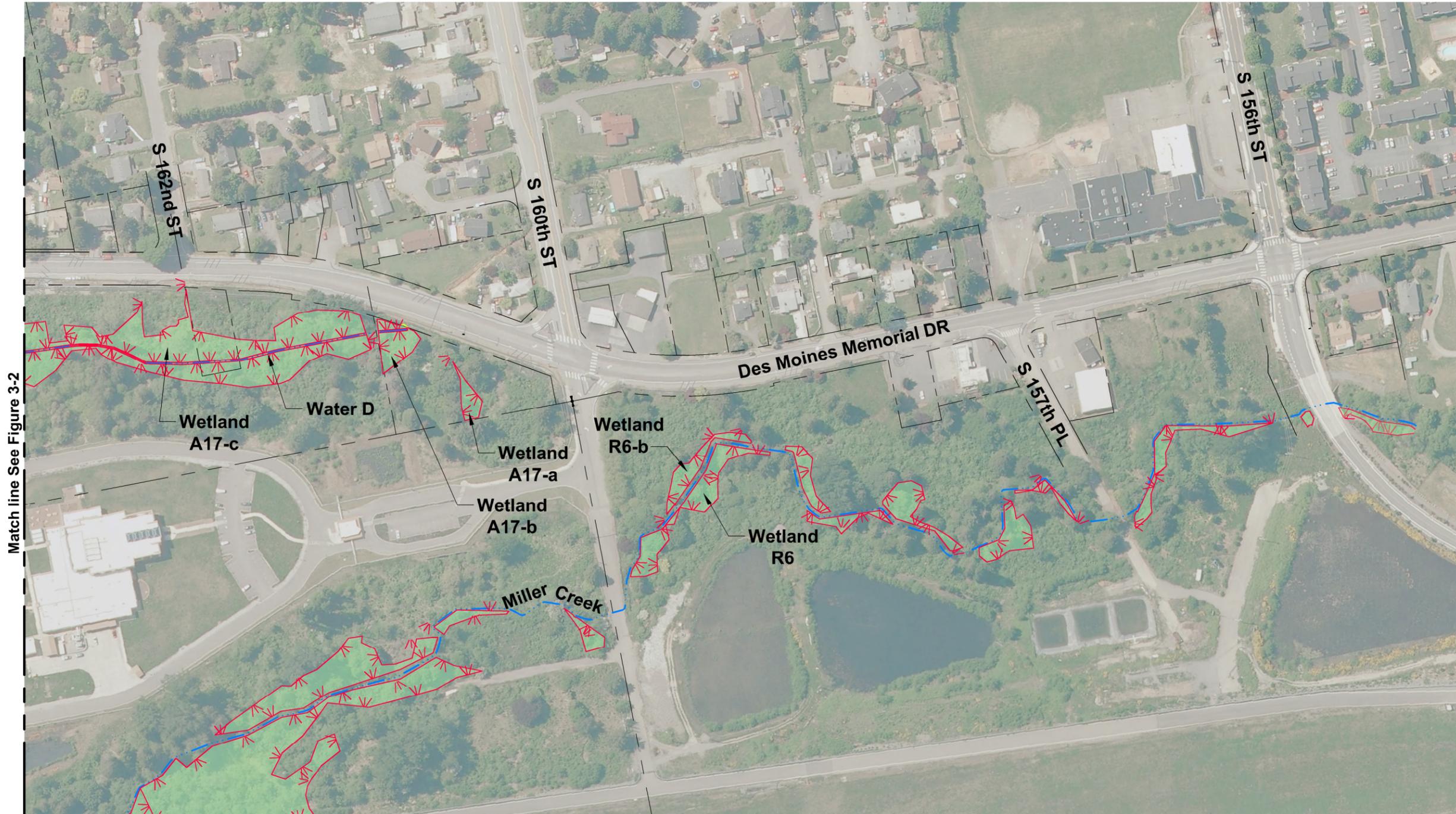
Match line See Figure 3-2



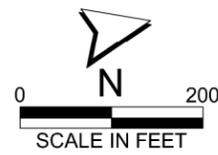
Legend:

	Stream		Wetland Boundary (Delineated)
	Estimated Stream		Wetland Boundary (Estimated)
	USGS Stream		

**Figure 3-2
Wetland and Stream**



Match line See Figure 3-2



Legend:

	Stream		Wetland Boundary (Delineated)
	Estimated Stream		Wetland Boundary (Estimated)
	USGS Stream		

**Figure 3-3
Wetland and Stream**

Table 3-1. Summary of Wetlands in the Project Area

Wetland	Area (acre)	City of Burien (B)/ SeaTac (S) Rating ^a	Buffer Width ^b (Feet)	Ecology Rating ^c	USFWS Classification ^d	HGM
WS-1	~22.50 ^e	2 (B)	100	II	PFO/PSS/PEM	Depressional
WS-2	0.01	3 (B)	50	III	PEM	Depressional
A17b	0.11 ^f	2 (S)	50	III	PFO/PEM	Riverine

- a BMC 19.40.300 and SMC 15.10.675
- b BMC19.40.310 and SMC 15.40.290
- c Hruby (2004)
- d Cowardin et al. (1979). PFO=palustrine forested, PSS=palustrine scrub-shrub, PEM=palustrine emergent
- e Area estimated based on City of Burien critical areas map (Burien 2010)
- f Wetland size was previously determined (Parametrix 2000)

Table 3-2. Summary of Wetland Functions for Wetlands in the Project Area

Wetland	Flood Flow Alteration	Sediment Removal	Nutrient and Toxicant Removal	Erosion Control and Shoreline Stabilization	Production of Organic Matter and its Export	General Habitat Suitability	Habitat for Aquatic Invertebrates
WS-1	High	Moderate	High	Moderate	Moderate	Moderate	High
WS-2	Low	Low	Low	NA	NA	Low	Low
A17b	NA	NA	NA	Low	Low	Low	Low

Table 3-2. Summary of Wetland Functions for Wetlands in the Project Area (continued)

Wetland	Habitat for Amphibians	Habitat for Wetland Associated Mammals	Habitat for Wetland Associated Birds	General Fish Habitat	Native Plant Richness	Education of Scientific Value	Uniqueness and Heritage
WS-1	Moderate	Moderate	NA	Low	Moderate	NA	NA
WS-2	Low	NA	NA	NA	NA	NA	NA
A17b	NA	NA	NA	NA	Low	NA	NA

Note: Functions assessed using WSDOT method (Null et al. 2000); see Appendix C for indicator characteristics present in each wetland.

Wetland WS-1

Size: ~22.50 acres (~980,100 SF)

City of Burien: Category 2

Ecology Rating: Category II

Buffer: 100 feet

USFWS Classification: Palustrine Forested/Palustrine Scrub-shrub/Palustrine Emergent

HGM Classification: Depressional

Sample Plots: WS1-1 and WS1-2

Wetland WS-1 is located east of Des Moines Memorial Drive and north of South 176th Street, extending outside the study area (Figure 3-1).

Wetland hydrology is supported by overbank flow from Walker Creek, stormwater runoff from nearby surfaces, and a shallow groundwater table. A stream (Unnamed Tributary to Walker Creek) supplies hydrology from a culvert that passes under South 176th Street, located at the southern boundary of the wetland. Much of the interior of Wetland WS-1 is seasonally inundated, while the out portions are saturated. Saturation at the surface was observed throughout most of the wetland with small areas inundated with 1 to 6 inches of water. Walker Creek originates east of SR 509, entering Wetland WS-1 from the east. The channel is ill-defined throughout most of the wetland. The wetland drains northwest where the channel of Walker Creek becomes more distinct. Areas surrounding the low flow channel of Walker Creek are seasonally inundated and appear to frequently flood after rain events.

Wetland WS-1 contains emergent, scrub-shrub, and forested communities. Vegetation within the emergent communities includes broadleaf cattail (*Typha latifolia*) and reed canarygrass. The scrub-shrub communities are dominated by willows, (primarily Pacific willow and Sitka willow [*Salix sitchensis*]) and hardhack (*Spiraea douglasii*). Vegetation in the forested communities include red alder, Pacific willow, lady fern, and an unknown, non-native alder (*Alnus* sp.).

Soil was examined to a depth of 18 inches and consists of two horizons. The top horizon is an 11-inch layer of very dark gray (2.5Y 3/1) silty clay loam. The lower horizon is a dark gray (2.5Y 4/1) silty clay loam. Soils in the wetland are not mapped by the NRCS.

The buffer surrounding Wetland WS-1 consists of narrow, disturbed strips of upland grasses and forbs to the west and north, and forested areas to the east and south. Vegetation along the shoulder of Des Moines Memorial Drive includes tall fescue, colonial bentgrass (*Agrostis capillaris*), narrowleaf plantain (*Plantago lanceolata*), red alder, sow thistle (*Sonchus* sp.), and giant horsetail. Vegetation in the forested buffer includes red alder, big leaf maple, western swordfern, apple (*Malus* sp.), Indian plum (*Oemleria cerasiformis*), English holly (*Ilex aquifolium*), beaked hazelnut, and Himalayan blackberry. A portion of the buffer located southwest of Wetland WS-1 and adjacent to an existing gravel trail has been planted with native vegetation and includes western red cedar, pacific ninebark (*Physocarpus capitatus*), red elderberry (*Sambucus racemosa*), and vine maple.

Wetland WS-1 is a palustrine emergent, palustrine scrub-shrub, and palustrine forested wetland under the Cowardin (1979) system, and is a riverine/depressional wetland under the hydrogeomorphic classification (HGM) system (Brinson 1995). According to the City of Burien, Wetland WS-1 is rated a Category 2

(BMC 19.40.300). According to Ecology’s wetland rating system, the wetland is rated a Category II wetland based on score. The wetland scored 57 points on Ecology’s rating form (18 points for water quality, 20 points for hydrologic functions, and 19 points for habitat functions) (Appendix B). The City of Burien requires a 100-foot buffer for Category 2 wetlands (BMC 19.40.310).

Wetland WS-2

Size: 0.01 acre (641 SF)

City of Burien Rating: Category 3

Ecology Rating: Category III

Buffer: 50 feet

USFWS Classification: Palustrine Emergent

HGM Classification: Depressional

Sample Plots: WS2-1 and WS2-2

Wetland WS-2 is located in a ditch east of Des Moines Memorial Drive, north of Wetland WS-1, entirely within the study area (Figure 3-1).

Wetland hydrology is supported by stormwater runoff from nearby surfaces and a shallow groundwater table and is seasonally inundated. Water flows into the wetland via a culvert at the north end. Saturation at the surface was observed throughout most of the wetland, while the center of the wetland contained flowing water that was 2 to 12 inches deep. The wetland drains to a concrete drop structure at the south end of the wetland.

Wetland WS-2 contains an emergent vegetation community that includes creeping buttercup, water parsley (*Oenanthe sarmentosa*), and grasses such as bluegrass (*Poa* sp.) and bentgrass (*Agrostis* sp.). Vegetation in Wetland WS-2 had recently been mowed at the time of the delineation.

Soil was examined to a depth of 22 inches and consists of two horizons. The top horizon is a 7-inch layer of very dark gray (10YR 3/1) silt loam. The lower horizon is a very dark greenish gray (10Y 3/1) clay loam. Soils in the wetland are not mapped by the NRCS.

The buffer surrounding Wetland WS-2 consist of a narrow strip of planted trees and shrubs to the east. Beyond these trees and shrubs are maintained grasses and forbs. The buffer to the south is composed of upland grasses and forbs. A driveway is located to the north and Des Moines Memorial Drive is to the west. Vegetation in the buffer includes Douglas fir (*Pseudotsuga menziesii*), tall fescue, lilac (*Syringa* sp.), western red cedar, English holly, common velvetgrass (*Holcus lanatus*), and vine maple. The shrubs in the buffer are individual plantings located just east of the wetland.

Wetland WS-2 is a palustrine emergent wetland under the Cowardin (1979) system and is a depressional wetland under the HGM system (Brinson 1995). According to the City of Burien, Wetland WS-2 is rated a Category 3 (BMC 19.40.300) wetland. According to Ecology’s wetland rating system the wetland is rated a Category III wetland based on score. The wetland scored 31 points on Ecology’s rating form (10 points for water quality, 16 points for hydrologic functions, and 5 points for habitat functions) (Appendix B). The City of Burien requires a 50-foot buffer for Category 3 wetlands (BMC 19.40.310).

Wetland A17b

Size: 0.11 acre (4,653 SF)

City of SeaTac Rating: Class 2

Ecology Rating: Category III

Buffer: 50 feet

USFWS Classification: Palustrine Forested

HGM Classification: Riverine

Sample Plots: A17b-1 and A17b-2

Wetland A17b is located east of Des Moines Memorial Drive, just south of South 160th Street (Figure 3-3). The majority of the wetland is located east of a chain-link fence, on Port property. Only the portion of the wetland located west of the fence was delineated.

Wetland hydrology is supported by surface water coming from a ditch on the west side of Des Moines Memorial Drive. Soils were saturated in the portion of the wetland that was delineated and some pockets of inundation were observed through the fence on Port property. Water flows from A17b, along Stream 09.0371G and into Miller Creek.

The delineated portion consists of emergent vegetation; however, most of Wetland A17b is forested. Wetland A17b is vegetated with black cottonwood, red alder, lady fern, salmonberry, creeping buttercup, American speedwell, giant horsetail, watercress, and common velvetgrass.

The sample plot was examined to a depth of 18 inches and consists of two horizons. The upper horizon is a 9-inch layer of very dark gray (10YR 3/1) silt loam. The second horizon is a dark greenish gray (5G 4/1) gravelly sandy loam. Soils in the wetland are not mapped by the NRCS.

The western buffer of Wetland A17b consists primarily of upland grasses and forbs on fill slopes. Common velvetgrass, bluegrass, and common dandelion (*Taraxacum officinale*) were observed in the buffer of Wetland A17b. Some of the buffers of Wetland A17b were planted as part of the Port Seattle-Tacoma International Airport Improvements compensatory mitigation.

Wetland A17b is a palustrine forested wetland under the Cowardin (1979) system and is a riverine/slope wetland under the HGM system (Brinson 1995). According to the City of SeaTac (SMC 15.30.675) the wetland is rated a Class 2 wetland. According to Ecology's wetland rating system the wetland is rated a Category III wetland based on score. The wetland scored 47 points on Ecology's rating form for Western Washington (20 points for water quality, 16 points for hydrologic functions, and 11 points for habitat functions) (Appendix B). The City of SeaTac requires a 50-foot buffer for Class 2 wetlands (SMC 15.30.290).

3.4 Wetlands Adjacent to Study Area

Biologists identified four additional wetlands in the vicinity of the project, but outside of the study area (Wetlands R6b, A17a, A17c and A17d) (Figures 3-2 and 3-3). These wetlands are located on Port property, but have buffers in the study area. Soils were not examined in these wetlands. SeaTac wetland ratings (SMC 15.10.675) of these wetlands are provided in Table 3-3. General wetland characteristics are

summarized below based on a Port report (Parametrix 2000) from wetland delineations that occurred from 1998 to 2000, and site observations in 2010 from public vantage points.

Table 3-3. Classification, Rating, and Hydrologic Sources for Wetlands near the Project Area

Wetland	Area (acre) ^a	City of SeaTac Rating ^b	Wetland Buffer Width ^c (Feet)	Classification ^d	HGM ^e
R6b	0.09	1	100	PFO	Riverine
A17a	0.05	2	100	PFO	Riverine
A17c	1.76	1	100	PFO	Riverine
A17d	0.77	1	100	PFO	Riverine

^a Wetland sizes were previously determined (Parametrix 2000)

^b SMC code 15.10.675

^c SMC 15.40.290

^d Hruby (2004)

^e Cowardin et al. (1979). PFO=palustrine forested, PSS=palustrine scrub-shrub, PEM=palustrine emergent

Wetland R6b

Size: 0.09 acre (4,058 SF)

City of SeaTac: Class 1

Buffer: 100 feet

USFWS Classification: Palustrine Forested

HGM Classification: Riverine

Wetland R6b is located east of Des Moines Memorial Drive and north of South 160th Street, approximately 75 feet east of the chain-link fence (Figure 3-3).

Wetland hydrology is supported by overbank and subsurface flow from Miller Creek, stormwater runoff from nearby surfaces, and a shallow groundwater table. Saturation at the surface was observed throughout most of the wetland with small areas of inundation. The wetland drains directly into Miller Creek from the slopes on both sides.

Wetland R6b contain scrub-shrub and forested vegetation communities. Vegetation within the wetlands includes black cottonwood, red alder, lady fern, salmonberry, and creeping buttercup.

The buffer surrounding Wetland R6b consists of narrow, disturbed strips of grasses and forbs, including bentgrass, bluegrass, and common dandelion to the west of the chain-link security fence, while vegetation east of the fence includes red alder, western redcedar, and creeping buttercup.

Wetland R6b is a palustrine forested wetland under the Cowardin (1979) system and is a riverine wetland under the HGM system (Brinson 1995). According to the City of SeaTac Wetland, Stream, and Shoreline Classification Map, Wetland R6b is rated a Class 1 wetland (SMC 15.10.675). The City of SeaTac requires a 100-foot buffer for Class 1 wetlands (SMC 15.30.290).

A17 Wetlands (A17a, A17b, A17c, and A17d)

Size: 0.05 acres (2,135 SF), 0.11 (4,652 SF), 1.76 acres (76,790 SF) and 0.77 acre (33,598 SF)

City of SeaTac: Class 1

Buffer: 100 feet

USFWS Classification: Palustrine Forested

HGM Classification: Riverine

The A17 Wetlands are located east of Des Moines Memorial Drive and south of South 160th Street (Figures 3-2 and 3-3). The wetlands are generally located from 10 to 125 feet east of the chain-link fence. A17 Wetlands are situated sequentially with A17a at the north end and A17d at the south end. A small portion of Wetland A17b is within the study area and the wetland is discussed in more detail in Section 3.3.

Wetland hydrology is supported by overbank and subsurface flow from Stream 0371G, stormwater runoff from nearby surfaces, and a shallow groundwater table. Saturation at the surface was observed throughout most of the wetland with small areas of inundation. The wetland drains south to Miller Creek via Stream 0371G.

The A17 Wetlands contain forested and scrub-shrub vegetation communities. Vegetation within the forested communities includes black cottonwood, red alder, western red cedar, while the shrub communities include willow and salmonberry.

The buffers of the A17 Wetlands located within the study area consist of a narrow band of grasses and forbs for the portions located west of the chain-link fence, similar to those in the buffer of R6b. Vegetation in the buffer east of the fence includes silver poplar (*Populus alba*), Portuguese laurel (*Prunus lusitanica*), black cottonwood, red alder, western red cedar, black locust (*Robinia pseudoacacia*), Lombardi poplar (*Populus nigra*), and Douglas fir. Some of the vegetation within the buffers of the A17 Wetlands was originally planted as ornamental plantings around homes that were historically located here.

The A17 Wetlands are palustrine forested wetlands under the Cowardin (1979) system and are riverine wetlands under the HGM system (Brinson 1995). According to the City of SeaTac, Wetlands A17c and A17d are rated as Class 1 wetlands and Wetland A17a is rated as a Class 2 wetland (15.10.675). The City of SeaTac requires a 100-foot buffer for Class 1 wetlands and a 50-foot buffer for Class 2 wetlands (SMC 15.30.290).

4 ENVIRONMENTAL CONSEQUENCES

4.1 Construction Effects

Construction of Segment B would impact wetlands and buffers. Preliminary impacts on these resources were calculated by overlaying the proposed design onto the project base maps showing wetland and buffer locations. Affected areas are determined as the area of intersection of the two sets. It is anticipated that there would be no permanent impacts to wetlands from fill, but there would be 65 square feet of impacts from shading of one wetland. However, 0.01 acre (356 square feet) of temporary impacts would occur to three wetlands. Additionally, the project would result in 0.48 acre (20,804 square feet) of permanent impacts to the buffer of seven wetlands, and 0.11 acre (4,696 square feet) of temporary impacts to the buffer of seven wetlands.

This section describes the extent and type of temporary and permanent (direct and indirect) impacts to wetlands that would occur as a result of constructing the proposed project. No fill would be placed in any of the wetlands (Table 4-1; Figures 4-1 through 4-9). However, some permanent impacts to buffers are unavoidable. Some overlap between stream buffers and wetland buffers occur in the Lake to Sound Trail – Segment B project area. Where this overlap occurs, impacts to these areas were calculated as wetland buffers. Details associated with impacts to streams are included in the Lake to Sound Trail-Segment B: Stream Discipline Report (Parametrix 2011).

Table 4-1. Wetland and Buffer Impacts

Wetland	City of Burien (B) ^a /SeaTac (S) Rating ^b	Wetland		Buffer	
		Perm. Impacts (SF/acres)	Temp. Impacts (SF/acres)	Perm. Impacts (SF/acres)	Temp. Impacts (SF/acres)
Wetland WS-1	2 (B)	0/0	290/0.01	6,964/0.16	1,387/0.03
Wetland WS-2	3 (B)	0/0	53/>0.01	1,968/0.05	298/0.01
Wetland A17a	2 (S)	0/0	0	767/0.02	187/>0.01
Wetland A17b	2 (S)	0/0	13/>0.01	1,530/0.04	262/0.01
Wetland A17c	1 (S)	0/0	0	5,882/0.14	1,849/0.04
Wetland A17d	1 (S)	0/0	0	3,540/0.08	500/0.01
Wetland R6b	1 (S)	0/0	0	153/>0.01	213/>0.01
Total^c		0/0	356/0.01	20,804/0.48	4,696/0.11

^a Wetland rating according to BMC 19.40.300

^b Wetland rating according to SMC 15.10.675

^c Total acreage of impact was determined by converting the square footage of the total impact into acres and then rounding to the nearest 0.01 acre.

SF = square feet, Perm. = Permanent, Temp. = Temporary

4.1.1 Permanent Wetland Effects

No wetlands would be permanently filled as a result of the project. One wetland (WS-1) would have approximately 65 square feet of shading from the boardwalk.

4.1.2 Permanent Wetland Buffer Effects

Permanent impacts to the buffers of seven wetlands would result from minor grading to construct retaining walls and the trail, a portion of which (within the buffer of Wetland WS-1) would be constructed on pin piles to minimize impacts. Additional impacts would be caused by the installation of stormwater outfalls composed of quarry spalls placed in the buffers to disperse stormwater.

A total of approximately 20,804 square feet of impacts to project area wetland buffers are anticipated as a result of the Lake to Sound Trail – Segment B project. These buffers are generally low functioning, and are composed primarily of maintained grasses and forbs. The buffers of the A17 Wetlands are located between a fence and Des Moines Memorial Drive.

4.1.3 Temporary Wetland Effects

Temporary impacts totaling approximately 356 square feet would occur to Wetlands A17b, WS-1, and WS-2. These temporary impacts to the wetlands would occur from minor clearing work to construct the shoulder of the trail. All of the temporary impacts to wetlands are short-term temporary impacts.

4.1.4 Temporary Buffer Effects

Temporary impacts to wetland buffers would occur from construction-related activities including, but not limited to, clearing vegetation. None of the temporary impacts would occur to forested buffers. A total of approximately 4,696 square feet of temporary impacts to wetland buffers are anticipated as a result of the construction of the Segment B portion of the Lake to Sound Trail project. These impacts would affect the buffers of seven wetlands in the study area.

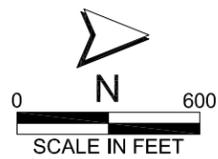
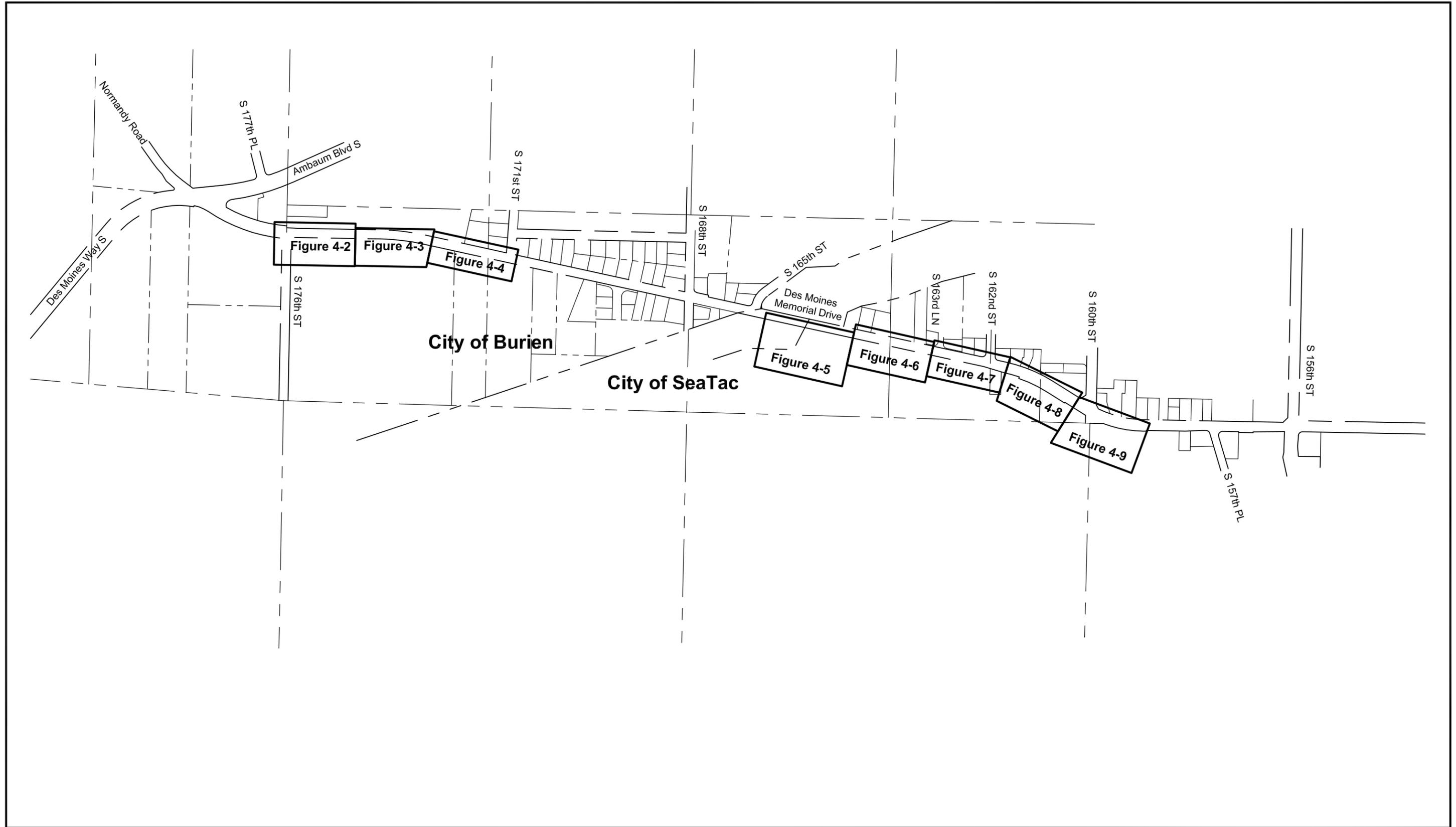
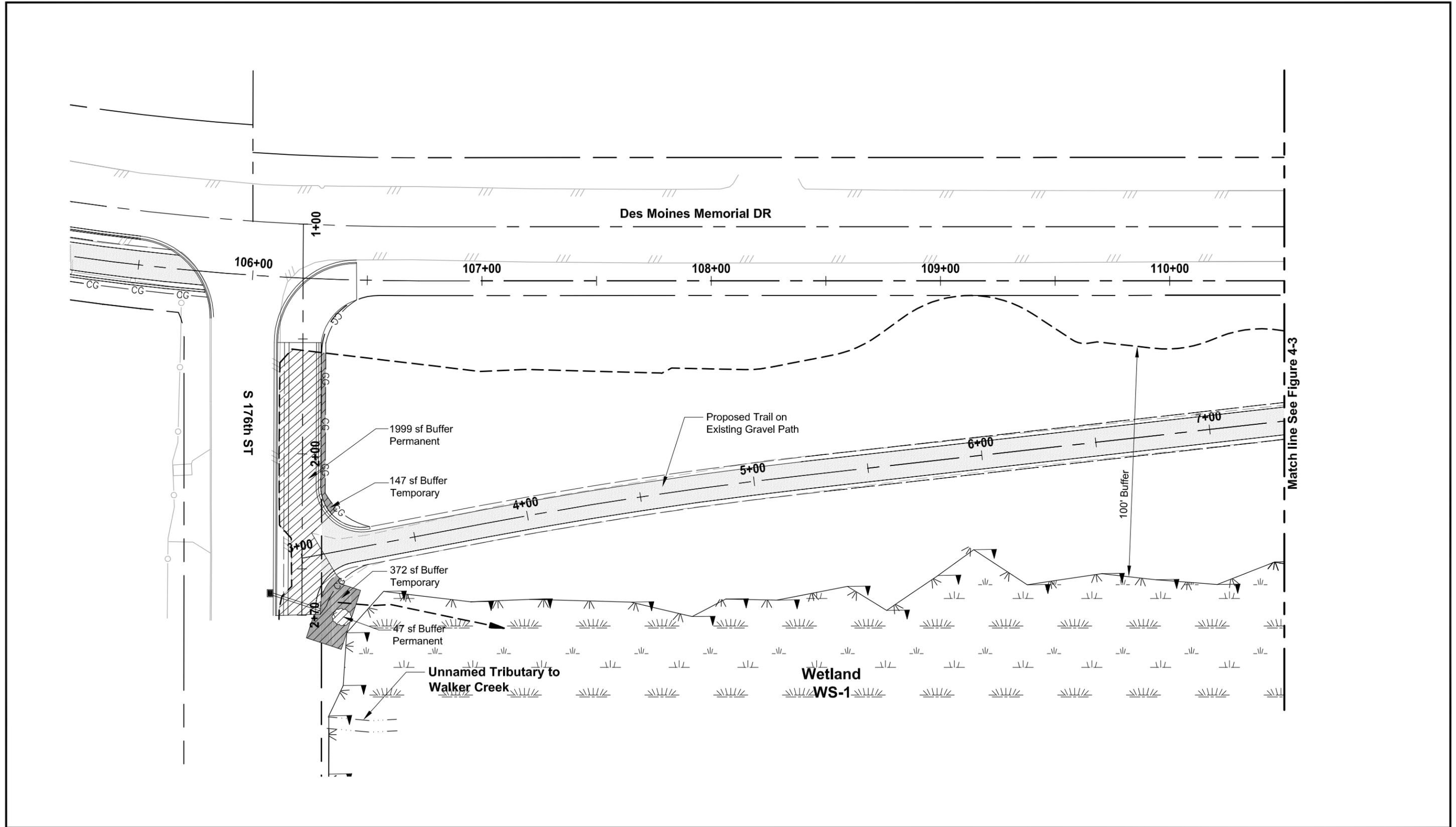
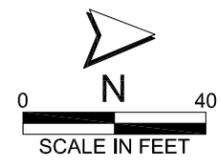


Figure 4-1
Wetland and Stream
Buffer Impacts



Match line See Figure 4-3

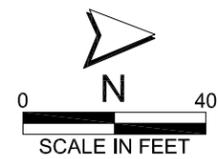
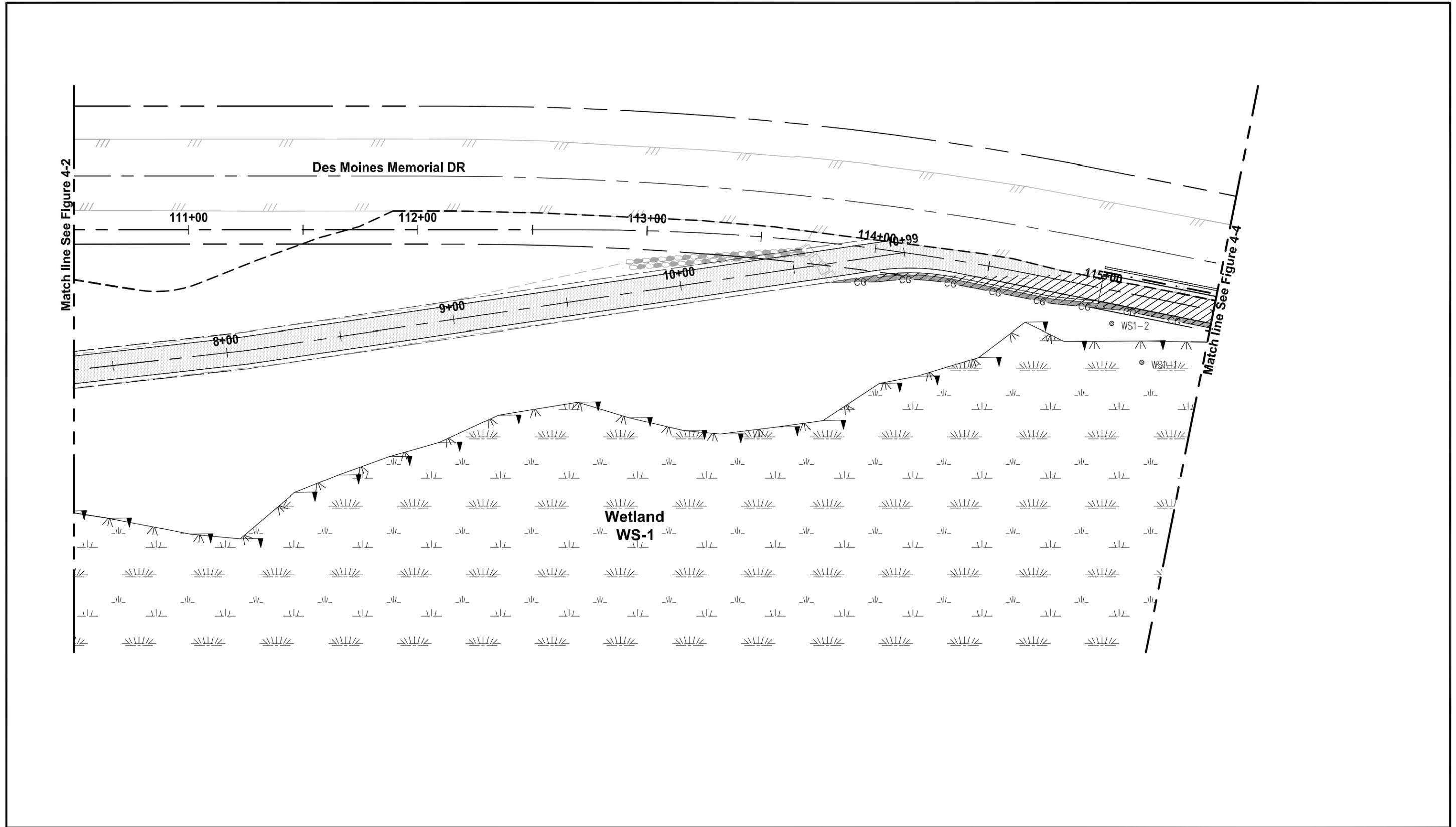
Parametrix DATE: January 25, 2011 FILE: BL1521084PBT2T2F4-2



Legend:	----- Critical Areas Buffer	CG CG Clear and Grubbing	Wetland Buffer Permanent Impact	Wetland Shading Impact
----- Wetland Boundary	----- Right of Way Line	Wetland Buffer Temporary Impact	Stream Buffer Permanent Impact	
----- Stream	----- Property Line	Wetland Temporary Impact	Stream Buffer Temporary Impact	
----- F F Fill Line	----- Existing Asphalt			
----- C C Cut Line	----- Proposed Trail			

**Figure 4-2
Critical Areas Impacts**

Lake to Sound Trail – Segment B

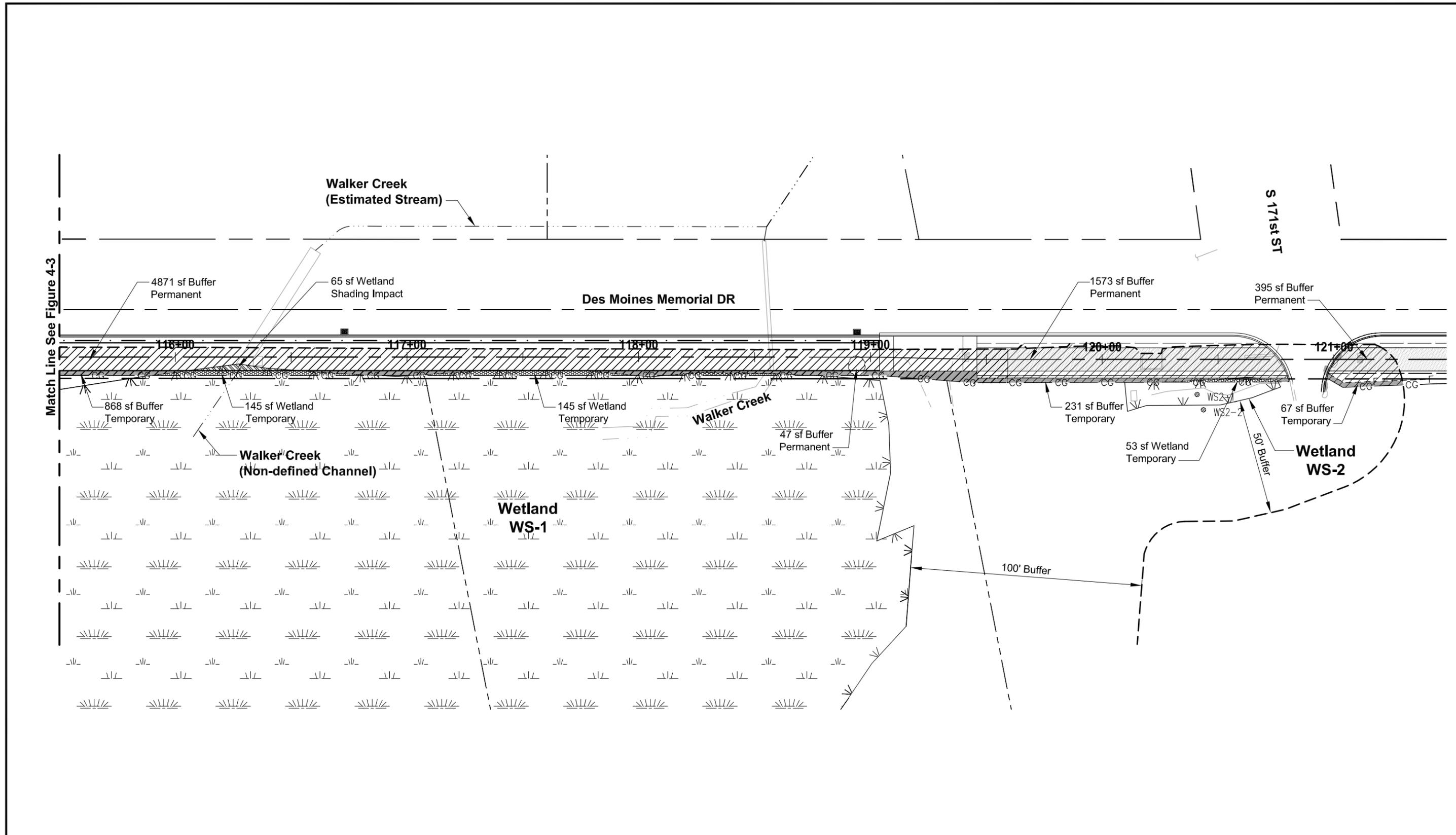


Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Cut Line		Proposed Trail				

**Figure 4-3
Critical Areas Impacts**

Lake to Sound Trail – Segment B



Parametrix DATE: January 26, 2011 FILE: BL1521084PBT2T2F4-2

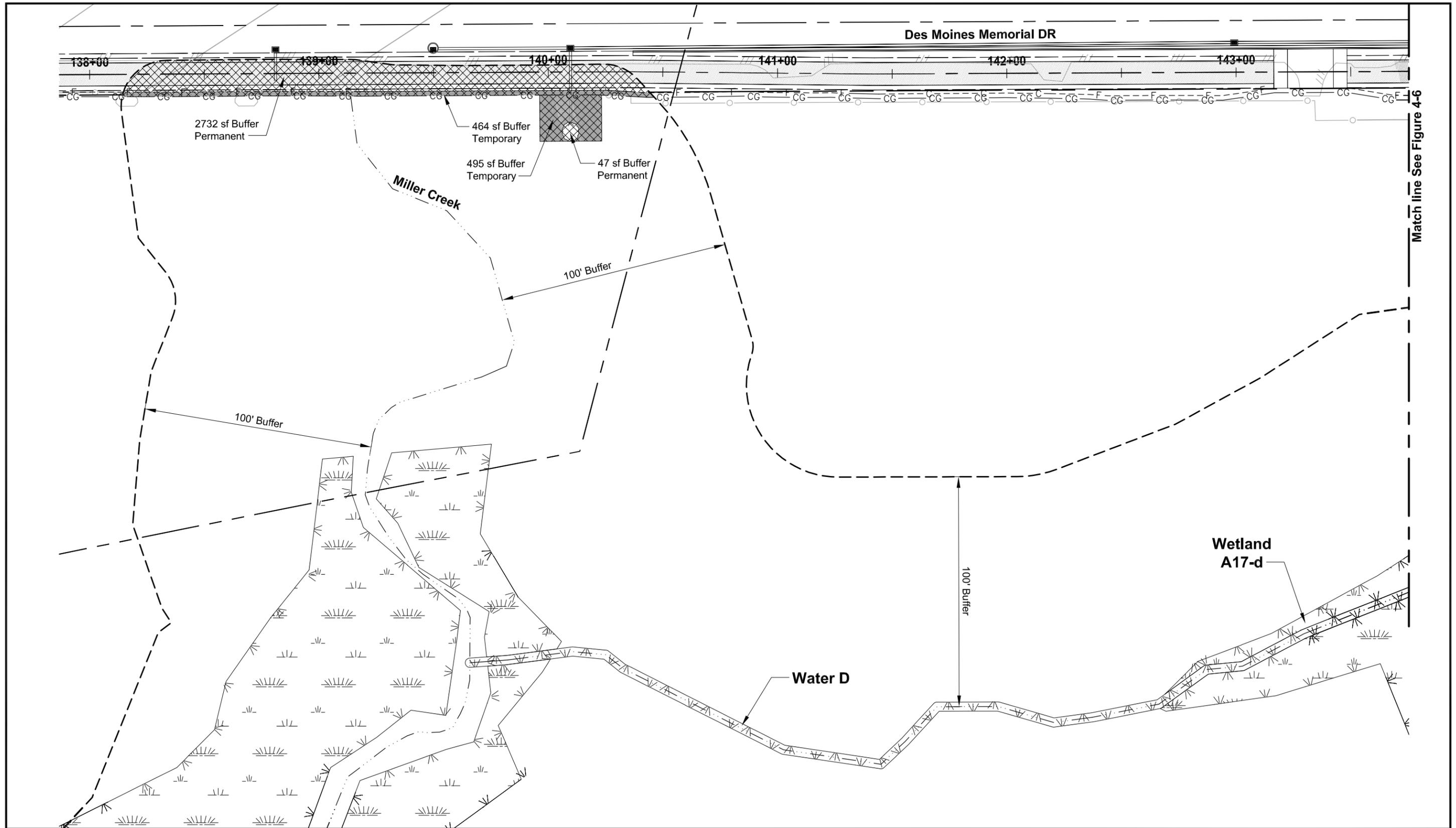


Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt		Proposed Trail		
	Cut Line						

**Figure 4-4
Critical Areas Impacts**

Lake to Sound Trail – Segment B



Match line See Figure 4-6

Parametrix DATE: January 25, 2011 FILE: BL1521084PBT2T2F4-2

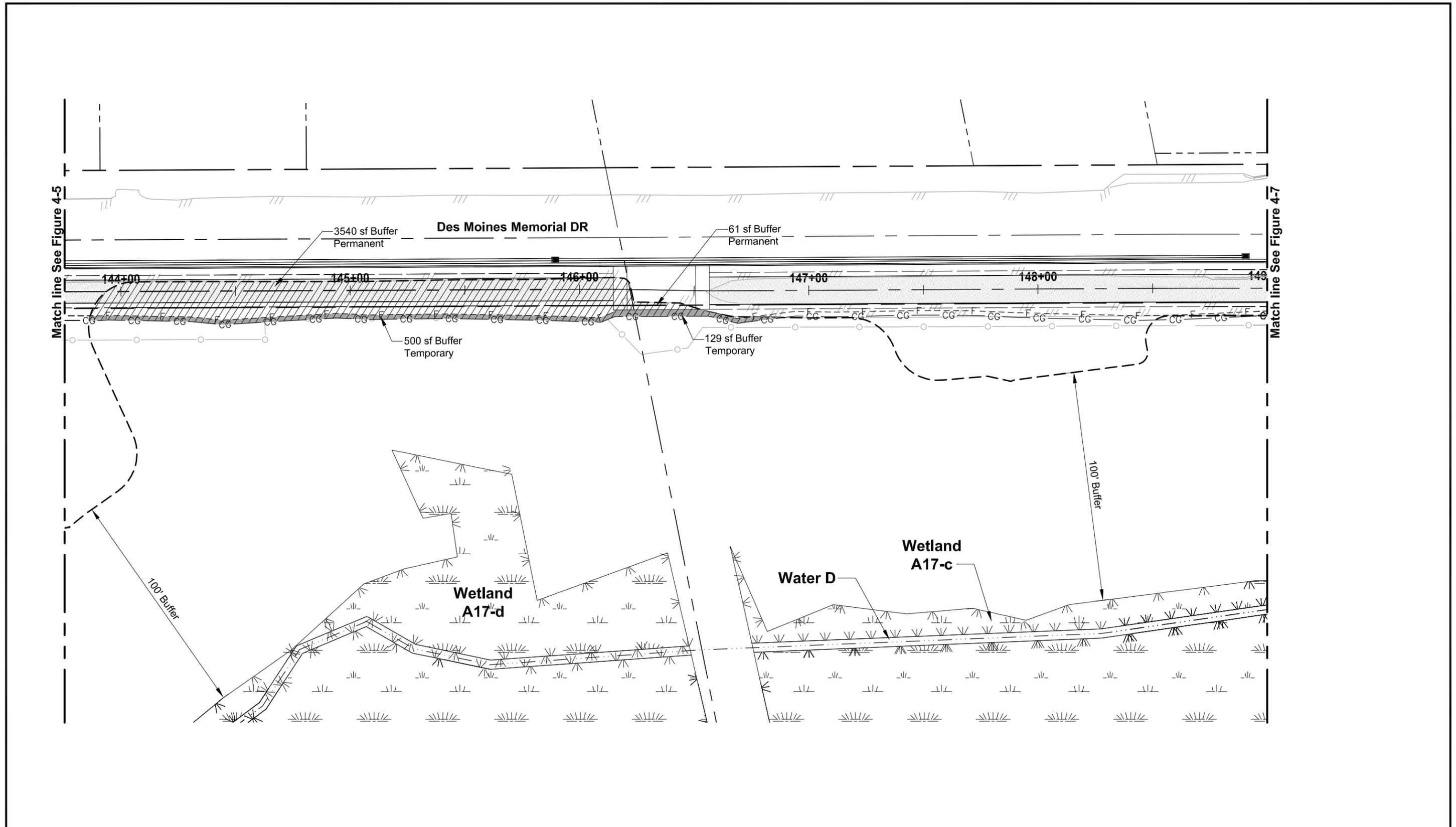


Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt				
	Cut Line		Proposed Trail				

**Figure 4-5
Critical Areas Impacts**

Lake to Sound Trail – Segment B



Parametrix DATE: January 25, 2011 FILE: BL1521084PBT2T2F4-2

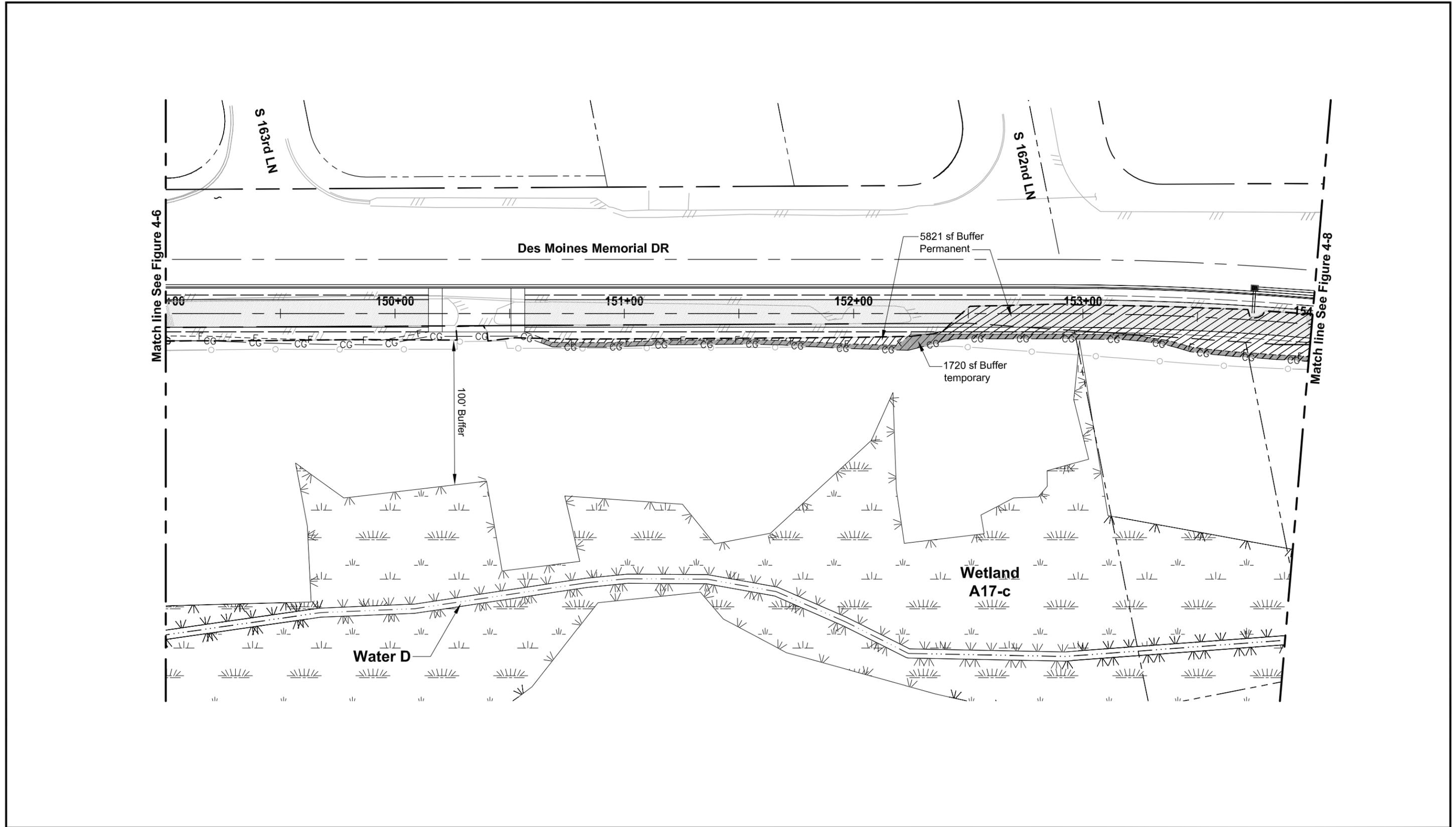


Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt		Proposed Trail		
	Cut Line						

**Figure 4-6
Critical Areas Impacts**

Lake to Sound Trail – Segment B



Parametrix DATE: January 25, 2011 FILE: BL1521084PBT2T2F4-2

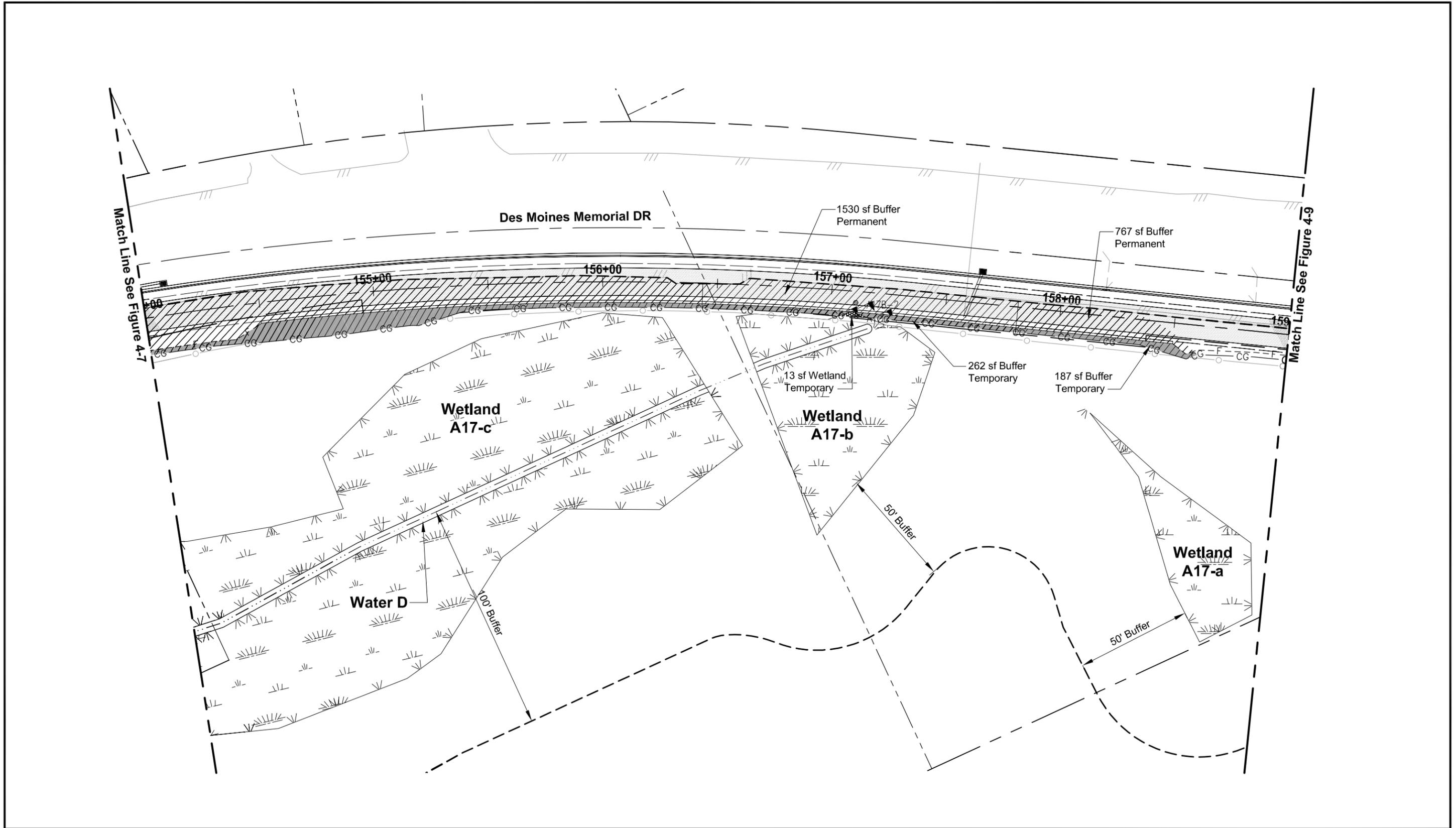


Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt		Proposed Trail		
	Cut Line						

**Figure 4-7
Critical Areas Impacts**

Lake to Sound Trail – Segment B



Match Line See Figure 4-7

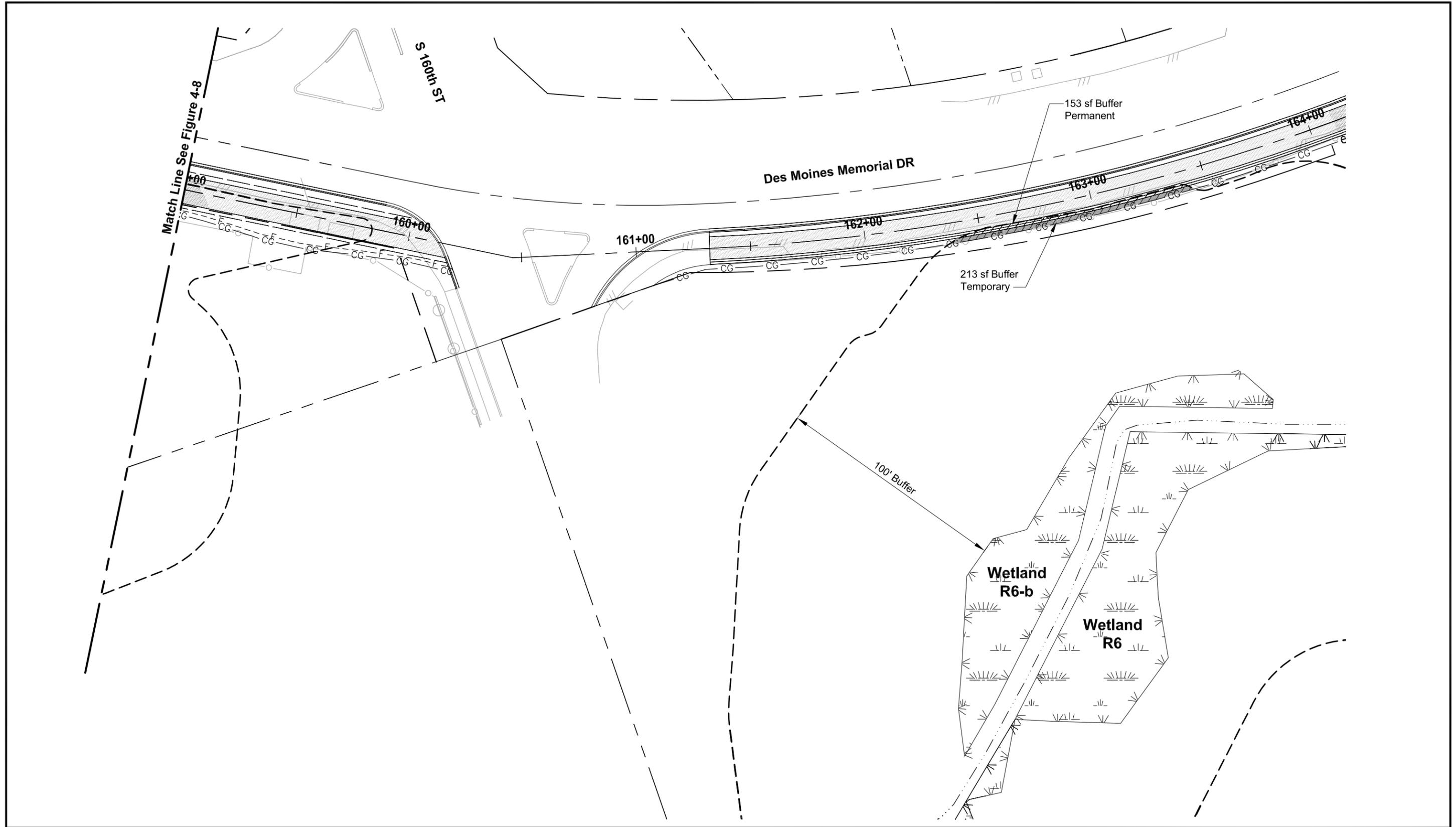
Match Line See Figure 4-9



Legend:					
Critical Areas Buffer	CG-CG	Clear and Grubbing	Wetland Buffer Permanent Impact	Wetland Shading Impact	
Wetland Boundary	Right of Way Line	Property Line	Wetland Buffer Temporary Impact	Stream Buffer Permanent Impact	
Stream	Existing Asphalt	Proposed Trail	Wetland Temporary Impact	Stream Buffer Temporary Impact	
Fill Line	Cut Line				

Figure 4-8
Critical Areas Impacts

Lake to Sound Trail – Segment B



Parametrix DATE: January 25, 2011 FILE: BL1521084PBT2T2F4-2



Legend:

	Critical Areas Buffer		Clear and Grubbing		Wetland Buffer Permanent Impact		Wetland Shading Impact
	Wetland Boundary		Right of Way Line		Wetland Buffer Temporary Impact		Stream Buffer Permanent Impact
	Stream		Property Line		Wetland Temporary Impact		Stream Buffer Temporary Impact
	Fill Line		Existing Asphalt				
	Cut Line		Proposed Trail				

Figure 4-9
Critical Areas Impacts

Lake to Sound Trail – Segment B

5 MITIGATION

The Lake to Sound Trail – Segment B project would mitigate impacts to wetlands in accordance with the mitigation sequencing requirements established by NEPA, the CWA, and local wetland protection programs (SMC 19.40.330 and BMC 15.10.406). According to NEPA (40 CFR paragraphs 1508.20), the definition of mitigation is as follows:

- a.) Avoiding the impact all together by not taking a certain action or parts of an action.
- b.) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- c.) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- d.) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- e.) Compensating for the impact by replacing or providing substitute resources or environments.

5.1 Avoidance and Minimization Measures

Consistent with the above sequencing requirements, a high priority was placed on avoiding and minimizing wetland and buffer impacts. The wetlands in the study area have been avoided to the greatest feasible extent and no permanent filling of wetlands is anticipated. King County would apply the following strategies to minimize wetland and buffer impacts during the design, permitting, and construction phases:

- Add boardwalk with pin piles along Wetland WS-1 where the wetland abuts the roadway fill slope of Des Moines Memorial Drive.
- Use retaining walls to narrow the trail footprint in the vicinity of wetland boundaries.
- Near wetlands and streams, limit earthwork to the dry season to reduce the potential for sediment runoff.
- Use erosion control best management practices (BMPs) to reduce direct and indirect impacts during construction.

5.2 Restoration of Temporary Effects

All temporarily affected areas would be restored to pre-construction conditions and re-planted or seeded with native species.

5.3 Compensatory Mitigation

In cooperation with resource agencies, King County would develop plans for habitat improvements or restoration to mitigate the effects of the project. Specific plans would be included in permit applications for construction of the project, but would focus on planting wetland buffer area to provide equal or greater functions than were impacted. The mitigation site would be planted at a ratio of at least 1:1 (mitigation area to impact area) to offset project impacts. This would likely be constructed in conjunction with riparian buffer mitigation (Parametrix 2011). Within the wetland buffer mitigation site, native trees and shrubs would be planted within the regulated wetland buffer. On-site mitigation is preferred, but would likely require

cooperation with adjacent landowners because the project right-of-way is highly confined, and would be largely occupied by the proposed project. Mitigation may occur offsite in the Miller or Walker Creek basins, upstream or downstream of the project, or at a similar subbasin in the same geographic area. Wetland buffer mitigation would likely consist of planting, or underplanting, in an area where existing buffer conditions are degraded. This type of mitigation would offset the project's impacts on wetland buffer resources by maintaining or enhancing those functions that support water quality and wildlife habitat. All temporarily disturbed areas would be fully revegetated with native plants and/or grasses and would support a level of function that is the same, or greater, than under existing conditions.

5.3.1 Regulatory Requirements

The local jurisdictions (Cities of SeaTac and Burien) do not specify required compensatory mitigation ratios for impacts to wetland or stream buffer impacts. Impacts to wetland and stream buffer impacts are generally replaced at a ratio of 1:1.

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APPENDIX A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM
Western Mountains, Valleys, and Coast Supplement to the
1987 COE Wetlands Delineation Manual

Project Site: <u>Lake to Sound Trail (Westside)</u>	Sampling Date: <u>11/02/10</u>
Applicant/Owner: <u>King County</u>	Sampling Point: <u>A17b SP-1</u>
Investigator: <u>C Hoffman, M Maynard</u>	City/County: <u>Seatac/King</u>
Section, Township, Range: <u>S29, T23N, R04E</u>	State: <u>WA</u>
Landform (hillslope, terrace, etc) <u>hillslope</u>	Slope (%) <u>5%</u>
	Local relief (concave, convex, none) <u>concave</u>
Subregion (LRR) <u>A</u>	Lat <u>N 47 27' 32"</u>
	Long <u>W 122 19' 27"</u>
	Datum <u>NAD 83</u>
Soil Map Unit Name <u>N/A</u>	NWI classification <u>PFO (SP is PEM)</u>
Are climatic/hydrologic conditions on the site typical for this time of year? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? No	
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? No	(If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Remarks: Wetland A17b is a previously delineated wetland primarily located east of a chainlink fence. Wetland SP-1 is located in a small tip of the wetland that protrudes to the west of the fence.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1.				Number of Dominant Species that are OBL, FACW, or FAC:	2 (A)
2.				Total Number of Dominant Species Across All Strata:	2 (B)
3.				Percent of Dominant Species that are OBL, FACW, or FAC:	100 (A/B)
4.					
_____ = Total Cover					
Sapling/Shrub Stratum (Plot size _____)				Prevalence Index Worksheet	
1.				Total % Cover of	
2.				OBL species	Multiply by
3.				FACW species	x 1 =
4.				FAC species	x 2 =
5.				FACU species	x 3 =
				UPL species	x 4 =
				Column totals	x 5 =
_____ = Total Cover				(A)	(B)
Herb Stratum (Plot size <u>1M</u>)				Prevalence Index = B / A =	
1. Ranunculus repens	50	Y	FACW		
2. Holcus lanatus	30	Y	FAC		
3. Athyrium filix-femina	5	N	FAC		
4. Nasturtium officinale	5	N	OBL		
5. Veronica americana	5	N	OBL		
6. Epilobium ciliatum	5	N	FACW		
7.					
8.					
9.					
10.					
11.					
_____ = Total Cover					
Woody Vine Stratum (Plot size _____)				Hydrophytic Vegetation Indicators	
1.				X	Dominance test is > 50%
2.					Prevalence test is ≤ 3.0 *
				Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)	
				Wetland Non-Vascular Plants *	
				Problematic Hydrophytic Vegetation * (explain)	
				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
_____ = Total Cover					
% Bare Ground in Herb Stratum _____					
Remarks: The vegetation around SP-1 appears to be regularly mowed. The sample plot is dominated by hydrophytic vegetation.					

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10 YR 3/1	100					Silty loam	
9-18	5G 4/1	100					Sandy gravelly loam	

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

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³

- 2cm Muck (A10)
- Red Parent Material (TF2)
- 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 soil present?

Yes

No

Remarks: Gleyed soils were observed within the upper 12 inches, which satisfies the criteria for Hydric Soil Indicator F2.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface water (A1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (explain in remarks) |

Secondary Indicators (2 or more required):

- Water-Stained Leaves (B9) **(MLRA 1, 2, 4A & 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

Field Observations

- | | | | |
|------------------------|---|--|---------------------|
| Surface Water Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Water Table Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Saturation Present? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Depth (in): Surface |

Wetland Hydrology Present?

Yes

No

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

Remarks: Flowing water was observed approximately 2 feet down gradient from the sample plot. The water appears to be coming from a partially collapsed or buried culvert on the other side of a chain link fence. Saturated soils satisfy the wetland hydrology criteria.

WETLAND DETERMINATION DATA FORM
Western Mountains, Valleys, and Coast Supplement to the
1987 COE Wetlands Delineation Manual

Project Site: <u>Lake to Sound Trail (Westside)</u>		Sampling Date: <u>11/02/10</u>	
Applicant/Owner: <u>King County</u>		Sampling Point: <u>A17b SP-2</u>	
Investigator: <u>C Hoffman, M Maynard</u>		City/County: <u>Seatac/King</u>	
Section, Township, Range: <u>S29, T23N, R04E</u>		State: <u>WA</u>	
Landform (hillslope, terrace, etc) <u>hillslope</u>		Slope (%) <u>3%</u>	
		Local relief (concave, convex, none) <u>None</u>	
Subregion (LRR) <u>A</u>		Lat <u>N 47 27' 32"</u>	
		Long <u>W 122 19' 27"</u>	
		Datum <u>NAD 83</u>	
Soil Map Unit Name <u>N/A</u>		NWI classification <u>PFO (SP is PEM)</u>	
Are climatic/hydrologic conditions on the site typical for this time of year? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? No			
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? No		(If needed, explain any answers in Remarks.)	

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

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is this Sampling Point within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Remarks: <u>Sample plot SP-2 is located east of Des Moines Memorial Drive in the mowed grass.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet																					
1.				Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50</u> (A/B)																					
2.																									
3.																									
4.																									
_____ = Total Cover																									
Sapling/Shrub Stratum (Plot size _____)				Prevalence Index Worksheet																					
1.				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Total % Cover of</th> <th>Multiply by</th> </tr> <tr> <td>OBL species</td> <td></td> <td>x 1 =</td> </tr> <tr> <td>FACW species</td> <td></td> <td>x 2 =</td> </tr> <tr> <td>FAC species</td> <td></td> <td>x 3 =</td> </tr> <tr> <td>FACU species</td> <td></td> <td>x 4 =</td> </tr> <tr> <td>UPL species</td> <td></td> <td>x 5 =</td> </tr> <tr> <td>Column totals</td> <td>(A)</td> <td>(B)</td> </tr> </table>	Total % Cover of		Multiply by	OBL species		x 1 =	FACW species		x 2 =	FAC species		x 3 =	FACU species		x 4 =	UPL species		x 5 =	Column totals	(A)	(B)
Total % Cover of		Multiply by																							
OBL species		x 1 =																							
FACW species		x 2 =																							
FAC species		x 3 =																							
FACU species		x 4 =																							
UPL species		x 5 =																							
Column totals	(A)	(B)																							
2.																									
3.																									
4.																									
5.																									
_____ = Total Cover																									
Herb Stratum (Plot size <u>1M</u>)				Prevalence Index = B / A =																					
1. <u>Holcus lanatus</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>																						
2. <u>Poa sp.</u>	<u>20</u>	<u>Y</u>	<u>NL</u>																						
3. <u>Taraxacum officinale</u>	<u>Trace</u>	<u>N</u>	<u>NL</u>																						
4.																									
5.																									
6.																									
7.																									
8.																									
9.																									
10.																									
11.																									
_____ = Total Cover																									
Woody Vine Stratum (Plot size _____)				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic																					
1.																									
2.																									
_____ = Total Cover																									
% Bare Ground in Herb Stratum _____																									
Remarks: <u>The vegetation located in SP-2 is composed of mowed grasses and forbs. Other grasses were observed in the sample plot that were not identifiable because of the mowing.</u>																									

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10 YR 3/2	100					Sandy loam	
9-18	2.5Y 4/2	100					Sandy loam	

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

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

- | | |
|--|--|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³

- 2cm Muck (A10)
- Red Parent Material (TF2)
- 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 soil present?

Yes

No

Remarks: No hydric soil indicators were observed in SP-2.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface water (A1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (explain in remarks) |

Secondary Indicators (2 or more required):

- Water-Stained Leaves (B9) **(MLRA 1, 2, 4A & 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

Field Observations

- Surface Water Present? Yes No Depth (in): _____
- Water Table Present? Yes No Depth (in): _____
- Saturation Present? Yes No Depth (in): _____
(includes capillary fringe)

Wetland Hydrology Present?

Yes

No

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

Remarks: No wetland hydrology indicators were observed in SP-2.

WETLAND DETERMINATION DATA FORM
Western Mountains, Valleys, and Coast Supplement to the
1987 COE Wetlands Delineation Manual

Project Site: <u>Lake to Sound Trail (Westside)</u>		Sampling Date: <u>10/29/10</u>	
Applicant/Owner: <u>King County</u>		Sampling Point: <u>WS1 SP-1</u>	
Investigator: <u>C Hoffman, M Maynard</u>		City/County: <u>Burien/King</u>	
Section, Township, Range: <u>S29, T23N, R04E</u>		State: <u>WA</u>	
Landform (hillslope, terrace, etc) <u>depression</u>		Slope (%) <u>0</u>	
		Local relief (concave, convex, none) <u>concave</u>	
Subregion (LRR) <u>A</u>		Lat <u>N47 26' 52"</u>	Long <u>W122 19' 40"</u>
		Datum <u>NAD 83</u>	
Soil Map Unit Name <u>N/A</u>		NWI classification <u>PSS</u>	
Are climatic/hydrologic conditions on the site typical for this time of year? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		(If no, explain in remarks.)	
Are "Normal Circumstances" present on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? No			
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? No		(If needed, explain any answers in Remarks.)	

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

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Remarks: <u>Wetland WS1 is a large wetland located at the southern end of the project area near the intersection of Des Moines Memorial Drive and South 176th Street.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size <u>5M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. Acer macrophyllum (rooted outside of wetland)	40	N	FACU	Number of Dominant Species that are OBL, FACW, or FAC:	3 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species that are OBL, FACW, or FAC:	100 (A/B)
4.	<u>40</u> = Total Cover				
Sapling/Shrub Stratum (Plot size <u>2M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index Worksheet	
1. Salix lucida	45	Y	FACW	Total % Cover of	
2. Rubus spectabilis	15	Y	FAC	OBL species	Multiply by
3.				FACW species	x 1 =
4.				FAC species	x 2 =
5.				FACU species	x 3 =
	<u>60</u> = Total Cover			UPL species	x 4 =
				Column totals	(A) (B)
Herb Stratum (Plot size <u>1M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index = B / A =	
1. Oenanthe sarmentosa	70	Y	OBL	Hydrophytic Vegetation Indicators X Dominance test is > 50% Prevalence test is ≤ 3.0 * Morphological Adaptations * (provide supporting data in remarks or on a separate sheet) Wetland Non-Vascular Plants * Problematic Hydrophytic Vegetation * (explain)	
2. Callitriche heterophylla	10	N	OBL		
3. Athyrium filix-femina	5	N	FAC		
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.	<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size)	Absolute % Cover	Dominant Species?	Indicator Status	* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
1.					
2.					
	<u> </u> = Total Cover			Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
% Bare Ground in Herb Stratum <u> </u>					
Remarks: <u>SP-1 is dominated by hydrophytic vegetation and therefore satisfies the hydrophytic vegetation criteria. The big leaf maple rooted outside of the wetland provides cover over the sampling plot, but was not considered as part of the sampling plot vegetation.</u>					

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	2.5Y 3/1	100					Silty clay loam	
11-18	2.5Y 4/1	100					Silty clay loam	

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

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input checked="" type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³

- | |
|---|
| <input type="checkbox"/> 2cm Muck (A10) |
| <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> |

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric soil present?

Yes

No

Remarks: It is assumed, based on best professional judgment, that these soils would have redoximorphic features if allowed to dry out and thus would meet the criteria for a wetland soil. The weather conditions were too wet to allow the soil to dry.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input checked="" type="checkbox"/> Surface water (A1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (explain in remarks) |

Secondary Indicators (2 or more required):

- | |
|--|
| <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 4B) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Shallow Aquitard (D3) |
| <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) |
| <input type="checkbox"/> Frost-Heave Hummocks |

Field Observations

- | | | | | |
|--|---|--|-------------|---------|
| Surface Water Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): | |
| Water Table Present? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Depth (in): | 8 |
| Saturation Present?
(includes capillary fringe) | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Depth (in): | Surface |

Wetland Hydrology Present?

Yes

No

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

Remarks: The presence of a high water table and saturated soils satisfies the wetland hydrology criteria.

WETLAND DETERMINATION DATA FORM
Western Mountains, Valleys, and Coast Supplement to the
1987 COE Wetlands Delineation Manual

Project Site: <u>Lake to Sound Trail (Westside)</u>	Sampling Date: <u>11/02/10</u>
Applicant/Owner: <u>King County</u>	Sampling Point: <u>WS1 SP-2</u>
Investigator: <u>C Hoffman, M Maynard</u>	City/County: <u>Burien/King</u>
Section, Township, Range: <u>S29, T23N, R04E</u>	State: <u>WA</u>
Landform (hillslope, terrace, etc) <u>hillslope</u> Slope (%) <u>3%</u>	Local relief (concave, convex, none) <u>None</u>
Subregion (LRR) <u>A</u> Lat <u>N47 26" 52'</u>	Long <u>W122 19' 40"</u> Datum <u>NAD 83</u>
Soil Map Unit Name <u>N/A</u>	NWI classification <u>Upland shrub</u>
Are climatic/hydrologic conditions on the site typical for this time of year? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? No	(If needed, explain any answers in Remarks.)
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? No	

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

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is this Sampling Point within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Remarks: Sample plot SP-2 is located east of Des Moines Memorial Drive on a forested slope, upgradient from Wetland WS1. Trash was observed in the buffer of the wetland near SP-2.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size <u>5M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. Salix scouleriana	25	Y	FAC	Number of Dominant Species that are OBL, FACW, or FAC:	2 (A)
2. Acer macrophyllum	5	N	FACU	Total Number of Dominant Species Across All Strata:	5 (B)
3.				Percent of Dominant Species that are OBL, FACW, or FAC:	40 (A/B)
4.					
	<u>30</u>		= Total Cover		
Sapling/Shrub Stratum (Plot size <u>5 M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index Worksheet	
1. Rubus spectabilis	20	Y	FAC	Total % Cover of	
2. Salix lucida	10	N	FACW	OBL species	Multiply by x 1 =
3. Corylus cornuta	80	N	FACU	FACW species	x 2 =
4. Oemleria cerasiformis	30	Y	FACU	FAC species	x 3 =
5.				FACU species	x 4 =
	<u>140</u>		= Total Cover	UPL species	x 5 =
				Column totals	(A) (B)
Herb Stratum (Plot size <u>1M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index = B / A =	
1. Polystichum munitum	10	Y	FACU		
2. Equisetum telmateia	Trace	N	FACW		
3. Cardamine oligosperma	Trace	N	FAC		
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
	<u>10</u>		= Total Cover		
Woody Vine Stratum (Plot size <u>5M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators	
1. Rubus armeniacus	Trace	N	FACU	Dominance test is > 50%	
2. Rubus ursinus	20	Y	FACU	Prevalence test is ≤ 3.0 *	
	<u>20</u>		= Total Cover	Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)	
				Wetland Non-Vascular Plants *	
				Problematic Hydrophytic Vegetation * (explain)	
% Bare Ground in Herb Stratum				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
				Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: There is moss and leaf litter covering much of the ground at sample plot location.					

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10 YR 2/2	100					Loam	
10-19	2.5Y 3/3	100					Course sand with gravel	

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

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

- | | |
|--|---|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³

- 2cm Muck (A10)
- Red Parent Material (TF2)
- 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 soil present?

Yes

No

Remarks: No hydric soil indicators were observed in SP-2.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|--|
| <input type="checkbox"/> Surface water (A1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (explain in remarks) |

Secondary Indicators (2 or more required):

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 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

Field Observations

- | | | | |
|--|------------------------------|--|---------------------|
| Surface Water Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Water Table Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Saturation Present?
(includes capillary fringe) | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): (17 in) |

Wetland Hydrology Present?

Yes

No

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

Remarks: No wetland hydrology indicators were observed in SP-2. Saturation was observed below 17 inches, therefore does not satisfy the saturation (A3) wetland hydrology indicator.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 3/1	100					Silty loam	High organic content
7-22	10Y 3/1	100					Clay loam	Gley

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

<p>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Histosol (A1)</td> <td><input type="checkbox"/> Sandy Redox (S5)</td> </tr> <tr> <td><input type="checkbox"/> Histic Epipedon (A2)</td> <td><input type="checkbox"/> Stripped Matrix (S6)</td> </tr> <tr> <td><input type="checkbox"/> Black Histic (A3)</td> <td><input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Hydrogen Sulfide (A4)</td> <td><input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)</td> </tr> <tr> <td><input type="checkbox"/> Depleted Below Dark Surface (A11)</td> <td><input type="checkbox"/> Depleted Matrix (F3)</td> </tr> <tr> <td><input type="checkbox"/> Thick Dark Surface (A12)</td> <td><input type="checkbox"/> Redox Dark Surface (F6)</td> </tr> <tr> <td><input type="checkbox"/> Sandy Mucky Mineral (S1)</td> <td><input type="checkbox"/> Depleted Dark Surface (F7)</td> </tr> <tr> <td><input type="checkbox"/> Sandy Gleyed Matrix (S4)</td> <td><input type="checkbox"/> Redox Depressions (F8)</td> </tr> </table>	<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input checked="" type="checkbox"/> Hydrogen Sulfide (A4)	<input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	<p>Indicators for Problematic Hydric Soils³</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> 2cm Muck (A10)</td> </tr> <tr> <td><input type="checkbox"/> Red Parent Material (TF2)</td> </tr> <tr> <td><input type="checkbox"/> Other (explain in remarks)</td> </tr> <tr> <td><input type="checkbox"/> </td> </tr> </table> <p>³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic</p>	<input type="checkbox"/> 2cm Muck (A10)	<input type="checkbox"/> Red Parent Material (TF2)	<input type="checkbox"/> Other (explain in remarks)	<input type="checkbox"/>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)																				
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)																				
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)																				
<input checked="" type="checkbox"/> Hydrogen Sulfide (A4)	<input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)																				
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)																				
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)																				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)																				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)																				
<input type="checkbox"/> 2cm Muck (A10)																					
<input type="checkbox"/> Red Parent Material (TF2)																					
<input type="checkbox"/> Other (explain in remarks)																					
<input type="checkbox"/>																					

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric soil present? Yes No

Remarks: Two hydric soil indicators are present (A4 and F2), which satisfies the hydric soil criteria.

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p><i>Primary Indicators (minimum of one required: check all that apply):</i></p> <table style="width:100%;"> <tr> <td><input checked="" type="checkbox"/> Surface water (A1)</td> <td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Salt Crust (B11)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Aquatic Invertebrates (B13)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Surface Soil Cracks (B6)</td> <td><input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)</td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td><input type="checkbox"/> Other (explain in remarks)</td> </tr> </table>		<input checked="" type="checkbox"/> Surface water (A1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (explain in remarks)	<p><i>Secondary Indicators (2 or more required):</i></p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 4B)</td> </tr> <tr> <td><input type="checkbox"/> Drainage Patterns (B10)</td> </tr> <tr> <td><input type="checkbox"/> Dry-Season Water Table (C2)</td> </tr> <tr> <td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td> </tr> <tr> <td><input type="checkbox"/> Geomorphic Position (D2)</td> </tr> <tr> <td><input type="checkbox"/> Shallow Aquitard (D3)</td> </tr> <tr> <td><input type="checkbox"/> FAC-Neutral Test (D5)</td> </tr> <tr> <td><input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)</td> </tr> <tr> <td><input type="checkbox"/> Frost-Heave Hummocks</td> </tr> </table>	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A & 4B)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	<input type="checkbox"/> Frost-Heave Hummocks
<input checked="" type="checkbox"/> Surface water (A1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)																														
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<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)																														
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)																														
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)																														
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)																														
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<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)																															
<input type="checkbox"/> Frost-Heave Hummocks																															

<p>Field Observations</p> <p>Surface Water Present? <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth (in): .5</p> <p>Water Table Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Depth (in):</p> <p>Saturation Present? (includes capillary fringe) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Depth (in):</p>	<p>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
--	--

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

Remarks: Water flow is heavy through wetland. Water averaged 3.5 inches deep, but was approximately 1 foot deep near the culvert at the north end of the wetland.

WETLAND DETERMINATION DATA FORM
Western Mountains, Valleys, and Coast Supplement to the
1987 COE Wetlands Delineation Manual

Project Site: <u>Lake to Sound Trail (Westside)</u>	Sampling Date: <u>11/02/10</u>
Applicant/Owner: <u>King County</u>	Sampling Point: <u>WS2 SP-2</u>
Investigator: <u>C Hoffman, M Maynard</u>	City/County: <u>Burien/King</u>
Section, Township, Range: <u>S29, T23N, R04E</u>	State: <u>WA</u>
Landform (hillslope, terrace, etc) <u>depression</u>	Slope (%) <u>20</u>
Local relief (concave, convex, none) <u>concave</u>	
Subregion (LRR) <u>A</u>	Lat <u>N47 26' 57"</u>
	Long <u>W122 19' 38"</u>
	Datum <u>NAD 83</u>
Soil Map Unit Name <u>N/A</u>	NWI classification <u>PSS</u>
Are climatic/hydrologic conditions on the site typical for this time of year? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(If no, explain in remarks.)
Are "Normal Circumstances" present on the site? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed? No	(If needed, explain any answers in Remarks.)
Are Vegetation <input type="checkbox"/> , Soil, <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? No	

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

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Remarks: <u>WS2 is located in a ditch, along the eastern side of Des Moines Memorial Drive. A concrete drop structure is located at the southern end of the wetland.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size <u>5M</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet	
1. Acer circinatum	5	Y	FAC	Number of Dominant Species that are OBL, FACW, or FAC:	<u>4</u> (A)
2. Pseudotsuga menziesii	5	Y	FACU	Total Number of Dominant Species Across All Strata:	<u>5</u> (B)
3. Thuja plicata	Trace	N	FAC	Percent of Dominant Species that are OBL, FACW, or FAC:	<u>80</u> (A/B)
4.					
	<u>10</u>	= Total Cover			
Sapling/Shrub Stratum (Plot size <u>2M</u>)				Prevalence Index Worksheet	
1. Ilex aquifolium	Trace	N	NL	Total % Cover of	
2.				Multiply by	
3.				OBL species	x 1 =
4.				FACW species	x 2 =
5.				FAC species	x 3 =
	<u>Trace</u>	= Total Cover		FACU species	x 4 =
				UPL species	x 5 =
				Column totals	(A) (B)
Herb Stratum (Plot size <u>1M</u>)				Prevalence Index = B / A =	
1. Holcus lanatus	40	Y	FAC		
2. Poa sp.	40	Y	FAC		
3. Ranunculus repens	20	Y	FACW		
4. Schedonorus phoenix	10	N	FAC		
5. Hypochaeris radicata	Trace	N	FACU		
6. Taraxacum officinale	Trace	N	FACU		
7.					
8.					
9.					
10.					
11.					
	<u>110</u>	= Total Cover			
Woody Vine Stratum (Plot size)				Hydrophytic Vegetation Indicators	
1.				X	Dominance test is > 50%
2.					Prevalence test is ≤ 3.0 *
					Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
					Wetland Non-Vascular Plants *
					Problematic Hydrophytic Vegetation * (explain)
				* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
% Bare Ground in Herb Stratum					
Remarks: <u>Moss observed in sample plot. The tree stratum is dominated by planted vegetation.</u>					

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 3/2	100					Loam	
7-19	10YR 3/2	100					Clay loam with gravel	Wood shavings observed in soils

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

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

- | | |
|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³

- 2cm Muck (A10)
- Red Parent Material (TF2)
- 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 soil present?

Yes

No

Remarks: Soils appear to be historically disturbed. Wood chips observed, primarily below 12 inches.

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| <input type="checkbox"/> Surface water (A1) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Water-Stained Leaves (except MLRA 1, 2, 4A & 4B) (B9) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (explain in remarks) |

Secondary Indicators (2 or more required):

- Water-Stained Leaves (B9) **(MLRA 1, 2, 4A & 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

Field Observations

- | | | | |
|--|------------------------------|--|-------------|
| Surface Water Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Water Table Present? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |
| Saturation Present?
(includes capillary fringe) | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Depth (in): |

Wetland Hydrology Present?

Yes

No

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

Remarks: Soils were moist, most likely from previous day's rain event.

APPENDIX B
Wetland Rating Forms

Wetland name or number A17b

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): A17b Date of site visit: 11/02/10

Rated by: M Maynard Trained by Ecology? Yes X No Date of training: 04/06

SEC: 29 TWNSHP: 23N RNGE: 04E Is S/T/R in Appendix D? Yes No X

Map of wetland unit: Figure Estimated size

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I II III X IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	16
Score for Habitat Functions	11
TOTAL Score for Functions	47

Category based on SPECIAL CHARACTERISTICS of Wetland I II Does not apply X

Final Category (choose the “highest” category from above”) III

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	Wetland HGM Class used for Rating
Estuarine	
Natural Heritage Wetland	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	
	Check if unit has multiple HGM classes present

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

D 4	<p>Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. <i>Note which of the following indicators of opportunity apply.</i></p> <p><input type="checkbox"/> Wetland is in a headwater of a river or stream that has flooding problems.</p> <p><input type="checkbox"/> Wetland drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other _____</p> <p style="text-align: center;">YES multiplier is 2 NO multiplier is 1</p>	<p>(see p. 49)</p> <p>Multiplier</p> <p>_____</p>
◆	<p>TOTAL – Hydrologic Functions Multiply the score from D3 by D4; then <i>add score to table on p. 1</i></p>	<p>_____</p>

Comments:

R Riverine and Freshwater Tidal Fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box)
R 1	Does the wetland have the <u>potential</u> to improve water quality? (see p.52)	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: <ul style="list-style-type: none"> • Depressions cover > 3/4 area of wetland points = 8 • Depressions cover > 1/2 area of wetland points = 4 (If depressions > 1/2 of area of unit draw polygons on aerial photo or map) • Depressions present but cover < 1/2 area of wetland. points = 2 • No depressions present points = 0 	Figure ____ 2
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): <ul style="list-style-type: none"> • Trees or shrubs > 2/3 area of the unit points = 8 • Trees or shrubs > 1/3 area of the wetland points = 6 • Ungrazed, herbaceous plants > 2/3 area of unit points = 6 • Ungrazed herbaceous plants > 1/3 area of unit points = 3 • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0 	Figure ____ 8
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		10
R 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p. 53)
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <ul style="list-style-type: none"> ___ Grazing in the wetland or within 150 ft ___ Untreated stormwater discharges to wetland ___ Tilled fields or orchards within 150 ft. of wetland <u>X</u> A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging <u>X</u> Residential, urban areas, golf courses are within 150 ft. of wetland ___ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ___ Other _____ 	Multiplier 2
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Water Quality Functions Multiply the score from R1 by R2; then <i>add score to table on p. 1</i>	20
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
R 3	Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p.54)
	R 3.1 Characteristics of the overbank storage the wetland provides: <i>Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).</i> <ul style="list-style-type: none"> • If the ratio is more than 20..... points = 9 • If the ratio is between 10 – 20..... points = 6 • If the ratio is 5- <10..... points = 4 • If the ratio is 1- <5..... points = 2 • If the ratio is < 1 points = 1 	Figure ____ 1
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: <i>Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):</i> <ul style="list-style-type: none"> • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area points = 7 • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 • Vegetation does not meet above criteria points = 0 	Figure ____ 7
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		8
R 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?	(see p.57)
	Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. <i>Note which of the following conditions apply.</i> <ul style="list-style-type: none"> <u>X</u> There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ___ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ___ Other _____ 	Multiplier 2
(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)		
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Hydrologic Functions Multiply the score from R3 by R4; then <i>add score to table on p. 1</i>	16

Comments:

L Lake-fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.		(only 1 score per box)
L 1	Does the wetland unit have the <u>potential</u> to improve water quality? (see p.59)	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): <ul style="list-style-type: none"> • Vegetation is more than 33 ft. (10m) wide points = 6 • Vegetation is more than 16 ft.(5m) wide and < 33 ft points = 3 • Vegetation is more than 6 ft. (2m) wide and < 16 ft points = 1 • Vegetation is less than 6 ft. wide..... points = 0 <p style="text-align: center;">Map of Cowardin classes with widths marked</p>	Figure ____
	L 1.2 Characteristics of the vegetation in the wetland: <i>Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.</i> <ul style="list-style-type: none"> • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit points = 3 • Other vegetation that is not aquatic bed in > 1/3 vegetated area points = 1 • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 <p style="text-align: center;">Map with polygons of different vegetation types</p>	Figure ____
<i>Add the points in the boxes above</i>		
L 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p.61)
	Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <ul style="list-style-type: none"> ____ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ____ Grazing in the wetland or within 150 ft ____ Polluted water discharges to wetland along upland edge ____ Tilled fields or orchards within 150 ft. of wetland ____ Residential or urban areas are within 150 ft. of wetland ____ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ____ Power boats with gasoline or diesel engines use the lake ____ Other _____ <p style="text-align: center;">YES multiplier is 2 NO multiplier is 1</p>	Multiplier ____
◆	TOTAL – Water Quality Functions	Multiply the score from L1 by L2; then add score to table on p. 1
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.		
L 3	Does the wetland have the <u>potential</u> to reduce shoreline erosion?	(see p.62)
	L 3 Average width and characteristics of vegetation along the lakeshore (<i>do not include aquatic bed</i>): (<i>choose the highest scoring description that matches conditions in the wetland</i>) <ul style="list-style-type: none"> • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide points = 6 • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide. points = 4 • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) points = 0 <p style="text-align: center;">Aerial photo or map with Cowardin vegetation classes</p>	Figure ____
<i>Record the points in the boxes above</i>		
L 4	Does the wetland have the <u>opportunity</u> to reduce erosion?	(see p. 64)
	Are there features along the shore that will be impacted if the shoreline erodes? <i>Note which of the following conditions apply.</i> <ul style="list-style-type: none"> ____ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ____ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ____ Other _____ <p style="text-align: center;">YES multiplier is 2 NO multiplier is 1</p>	Multiplier ____
◆	TOTAL – Hydrologic Functions	Multiply the score from L3 by L4; then add score to table on p. 1

Comments:

S Slope Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box) (see p.64)
S 1	Does the wetland have the <u>potential</u> to improve water quality?	
S 1.1	Characteristics of average slope of unit: <ul style="list-style-type: none"> • Slope is 1% or less (a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)..... points = 3 • Slope is 1% - 2% points = 2 • Slope is 2% - 5% points = 1 • Slope is greater than 5% points = 0 	
S 1.2	The soil 2 inches below the surface (or duff layer) is clay, organic (Use NRCS definitions). YES = 3 points NO = 0 points	
S 1.3	Characteristics of the vegetation in the wetland that trap sediments and pollutants: <i>Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.</i> <ul style="list-style-type: none"> • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 • Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 • Dense, woody, vegetation > 1/2 of area..... points = 2 • Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 • Does not meet any of the criteria above for vegetation points = 0 	Figure ____
Total for S 1		<i>Add the points in the boxes above</i>
S 2	Does the wetland have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> _____ Grazing in the wetland or within 150 ft _____ Untreated stormwater discharges to wetland _____ Tilled fields, logging, or orchards within 150 ft. of wetland _____ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland _____ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 67) Multiplier _____
◆ TOTAL – Water Quality Functions		Multiply the score from S1 by S2; then add score to table on p. 1
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
S 3	Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?	(see p.68)
S 3.1	Characteristics of vegetation that reduce the velocity of surface flows during storms: <i>Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).</i> <ul style="list-style-type: none"> • Dense, uncut, rigid vegetation covers > 90% of the area of the wetland points = 6 • Dense, uncut, rigid vegetation > 1/2 area of wetland..... points = 3 • Dense, uncut, rigid vegetation > 1/4 area..... points = 1 • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid points = 0 	
S 3.2	Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. YES = 2 points NO = 0 points	
Total for S 3		<i>Add the points in the boxes above</i>
S 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion? Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i> _____ Wetland has surface runoff that drains to a river or stream that has flooding problems _____ Other _____ (Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)) YES multiplier is 2 NO multiplier is 1	(see p. 70) Multiplier _____
◆ TOTAL – Hydrologic Functions		Multiply the score from S3 by S4; then add score to table on p. 1

Comments:

<p><i>These questions apply to wetlands of all HGM classes.</i></p>		<p>Points (only 1 score per box)</p>	
<p>HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.</p>			
<p>H 1 Does the wetland have the <u>potential</u> to provide habitat for many species?</p>			
<p>H 1.1 <u>Vegetation structure</u> (see P. 72): Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres. <input type="checkbox"/> Aquatic Bed <input type="checkbox"/> Emergent plants <input type="checkbox"/> Scrub/shrub (areas where shrubs have > 30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have > 30% cover) If the unit has a forested class check if: <input checked="" type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. Add the number of vegetation types that qualify. If you have: </p>	<p>Map of Cowardin vegetation classes 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0</p>	<p>Figure ____ 1</p>	
<p>H 1.2 <u>Hydroperiods</u> (see p.73): Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods). <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input type="checkbox"/> Occasionally flooded or inundated <input type="checkbox"/> Saturated only <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input checked="" type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points </p>	<p>4 or more types present points = 3 3 or more types present points = 2 2 types present points = 1 1 type present points = 0</p> <p>Map of hydroperiods</p>	<p>Figure ____ 1</p>	
<p>H 1.3 <u>Richness of Plant Species</u> (see p. 75): Count the number of plant species in the wetland that cover at least 10 ft² (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle. If you counted: > 19 species points = 2 5 – 19 species points = 1 < 5 species points = 0 List species below if you want to: _____ _____ _____ </p>	<p>> 19 species points = 2 5 – 19 species points = 1 < 5 species points = 0</p>	<p>1</p>	
<p>H 1.4 <u>Interspersion of Habitats</u> (see p. 76): Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>	<p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points [riparian braided channels]</p>	<p>Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always “high”. Use map of Cowardin classes.</p>	<p>Figure ____ 1</p>
<p>H 1.5 <u>Special Habitat Features</u> (see p. 77): Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p>	<p><input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) <input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet turned grey/brown) <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (structures for egg-laying by amphibians) <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants NOTE: The 20% stated in early printings of the manual on page 78 is an error.</p>	<p>0</p>	<p>0</p>
<p>H 1 TOTAL Score – potential for providing habitat</p>		<p>Add the points in the column above</p>	<p>4</p>

	<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> (see p. 82): (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</p> <p>Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report p. 152).</p> <p><input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock.</p> <p><input type="checkbox"/> Old-growth/Mature forests: (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158).</p> <p><input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (full descriptions in WDFW PHS report p. 161).</p> <p><input type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p>If wetland has 3 or more priority habitats = 4 points If wetland has 2 priority habitats = 3 points If wetland has 1 priority habitat = 1 point No habitats = 0 points</p> <p>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</p>	1
	<p>H 2.4 <u>Wetland Landscape:</u> Choose the one description of the landscape around the wetland that best fits (see p. 84)</p> <ul style="list-style-type: none"> • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.....points = 5 • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 5 • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed.points = 3 • The wetland fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 3 • There is at least 1 wetland within 1/2 milepoints = 2 • There are no wetlands within 1/2 mile.....points = 0 	5
	<p>H 2 TOTAL Score – opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i></p>	7
	<p style="text-align: right;"><i>TOTAL for H 1 from page 8</i></p>	4
◆	<p>Total Score for Habitat Functions Add the points for H 1 and H 2; then record the result on p. 1</p>	11

Comments:

<p>SC4</p>	<p>Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its function.</i> ___ Old-growth forests: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ___ Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO = <u>X</u> not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC5</p>	<p>Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ___ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ___ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom.</i>) YES = Go to SC 5.1 NO <u>X</u> not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ___ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ___ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ___ The wetland is larger than 1/10 acre (4350 square ft.) YES = Category I NO = Category II</p>	<p>Cat. I Cat. II</p>
<p>SC6</p>	<p>Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES = Go to SC 6.1 NO <u>X</u> not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? YES = Category II NO = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III</p>	<p>Cat. II Cat. III</p>
<p>◆</p>	<p>Category of wetland based on Special Characteristics Choose the "highest" rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter "Not Applicable" on p. 1</p>	

Comments:

Wetland name or number WS-1

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
 Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): WS-1 Date of site visit: 10/29/10

Rated by: M Maynard Trained by Ecology? Yes X No Date of training: 04/06

SEC: 29 TWNSHP: 23N RNGE: 04E Is S/T/R in Appendix D? Yes No X

Map of wetland unit: Figure Estimated size

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I II X III IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	18
Score for Hydrologic Functions	20
Score for Habitat Functions	19
TOTAL Score for Functions	57

Category based on SPECIAL CHARACTERISTICS of Wetland I II Does not apply X

Final Category (choose the “highest” category from above”) II

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	Wetland HGM Class used for Rating
Estuarine	<input checked="" type="checkbox"/>
Natural Heritage Wetland	<input checked="" type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

R Riverine and Freshwater Tidal Fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box)
R 1	Does the wetland have the <u>potential</u> to improve water quality? (see p.52)	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: <ul style="list-style-type: none"> • Depressions cover > 3/4 area of wetland points = 8 • Depressions cover > 1/2 area of wetland points = 4 (If depressions > 1/2 of area of unit draw polygons on aerial photo or map) • Depressions present but cover < 1/2 area of wetland. points = 2 • No depressions present points = 0 	Figure ____
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): <ul style="list-style-type: none"> • Trees or shrubs > 2/3 area of the unit points = 8 • Trees or shrubs > 1/3 area of the wetland points = 6 • Ungrazed, herbaceous plants > 2/3 area of unit points = 6 • Ungrazed herbaceous plants > 1/3 area of unit points = 3 • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0 	Figure ____
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		
R 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p. 53)
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <ul style="list-style-type: none"> ____ Grazing in the wetland or within 150 ft ____ Untreated stormwater discharges to wetland ____ Tilled fields or orchards within 150 ft. of wetland ____ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ____ Residential, urban areas, golf courses are within 150 ft. of wetland ____ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ____ Other _____ 	Multiplier ____
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Water Quality Functions Multiply the score from R1 by R2; then add score to table on p. 1	
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
R 3	Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p.54)
	R 3.1 Characteristics of the overbank storage the wetland provides: <i>Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).</i> <ul style="list-style-type: none"> • If the ratio is more than 20..... points = 9 • If the ratio is between 10 – 20..... points = 6 • If the ratio is 5- <10..... points = 4 • If the ratio is 1- <5..... points = 2 • If the ratio is < 1..... points = 1 	Figure ____
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: <i>Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):</i> <ul style="list-style-type: none"> • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area points = 7 • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 • Vegetation does not meet above criteria points = 0 	Figure ____
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		
R 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?	(see p.57)
	Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. <i>Note which of the following conditions apply.</i> <ul style="list-style-type: none"> ____ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ____ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ____ Other _____ (Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)	Multiplier ____
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Hydrologic Functions Multiply the score from R3 by R4; then add score to table on p. 1	

Comments:

L Lake-fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.		(only 1 score per box)
L 1	Does the wetland unit have the <u>potential</u> to improve water quality? (see p.59)	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): • Vegetation is more than 33 ft. (10m) wide points = 6 • Vegetation is more than 16 ft.(5m) wide and < 33 ft points = 3 • Vegetation is more than 6 ft. (2m) wide and < 16 ft points = 1 • Vegetation is less than 6 ft. wide..... points = 0 <p style="text-align: center;">Map of Cowardin classes with widths marked</p>	Figure ____
	L 1.2 Characteristics of the vegetation in the wetland: <i>Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.</i> • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit points = 3 • Other vegetation that is not aquatic bed in > 1/3 vegetated area points = 1 • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 <p style="text-align: center;">Map with polygons of different vegetation types</p>	Figure ____
<i>Add the points in the boxes above</i>		
L 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p.61)
	Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> ____ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ____ Grazing in the wetland or within 150 ft ____ Polluted water discharges to wetland along upland edge ____ Tilled fields or orchards within 150 ft. of wetland ____ Residential or urban areas are within 150 ft. of wetland ____ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ____ Power boats with gasoline or diesel engines use the lake ____ Other _____ YES multiplier is 2 NO multiplier is 1	Multiplier ____
◆	TOTAL – Water Quality Functions	Multiply the score from L1 by L2; then add score to table on p. 1
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.		
L 3	Does the wetland have the <u>potential</u> to reduce shoreline erosion?	(see p.62)
	L 3 Average width and characteristics of vegetation along the lakeshore (<i>do not include aquatic bed</i>): (<i>choose the highest scoring description that matches conditions in the wetland</i>) • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide points = 6 • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide. points = 4 • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) points = 0 <p style="text-align: center;">Aerial photo or map with Cowardin vegetation classes</p>	Figure ____
<i>Record the points in the boxes above</i>		
L 4	Does the wetland have the <u>opportunity</u> to reduce erosion?	(see p. 64)
	Are there features along the shore that will be impacted if the shoreline erodes? <i>Note which of the following conditions apply.</i> ____ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ____ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ____ Other _____ YES multiplier is 2 NO multiplier is 1	Multiplier ____
◆	TOTAL – Hydrologic Functions	Multiply the score from L3 by L4; then add score to table on p. 1

Comments:

S Slope Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box) (see p.64)
S 1	Does the wetland have the <u>potential</u> to improve water quality?	
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less (a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)..... points = 3 • Slope is 1% - 2% points = 2 • Slope is 2% - 5% points = 1 • Slope is greater than 5% points = 0	
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic (Use NRCS definitions). YES = 3 points NO = 0 points	
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches. • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 • Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 • Dense, woody, vegetation > 1/2 of area..... points = 2 • Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 • Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure _____
Total for S 1		<i>Add the points in the boxes above</i>
S 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p. 67)
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. _____ Grazing in the wetland or within 150 ft _____ Untreated stormwater discharges to wetland _____ Tilled fields, logging, or orchards within 150 ft. of wetland _____ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland _____ Other _____ YES multiplier is 2 NO multiplier is 1	Multiplier _____
◆ TOTAL – Water Quality Functions		Multiply the score from S1 by S2; then add score to table on p. 1
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
S 3	Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?	(see p.68)
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows). • Dense, uncut, rigid vegetation covers > 90% of the area of the wetland points = 6 • Dense, uncut, rigid vegetation > 1/2 area of wetland..... points = 3 • Dense, uncut, rigid vegetation > 1/4 area..... points = 1 • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid points = 0	
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. YES = 2 points NO = 0 points	
Total for S 3		<i>Add the points in the boxes above</i>
S 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?	(see p. 70)
	Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? Note which of the following conditions apply. _____ Wetland has surface runoff that drains to a river or stream that has flooding problems _____ Other _____ (Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam) YES multiplier is 2 NO multiplier is 1	Multiplier _____
◆ TOTAL – Hydrologic Functions		Multiply the score from S3 by S4; then add score to table on p. 1

Comments:

	<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> (see p. 82): (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</p> <p>Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report p. 152).</p> <p><input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock.</p> <p><input type="checkbox"/> Old-growth/Mature forests: (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158).</p> <p><input type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (full descriptions in WDFW PHS report p. 161).</p> <p><input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p>If wetland has 3 or more priority habitats = 4 points If wetland has 2 priority habitats = 3 points If wetland has 1 priority habitat = 1 point No habitats = 0 points</p> <p>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</p>	1
	<p>H 2.4 <u>Wetland Landscape:</u> Choose the one description of the landscape around the wetland that best fits (see p. 84)</p> <ul style="list-style-type: none"> • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.....points = 5 • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 5 • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed.points = 3 • The wetland fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 3 • There is at least 1 wetland within 1/2 milepoints = 2 • There are no wetlands within 1/2 mile.....points = 0 	3
<p>H 2 TOTAL Score – opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i></p>		5
<p><i>TOTAL for H 1 from page 8</i></p>		14
◆	<p>Total Score for Habitat Functions Add the points for H 1 and H 2; then record the result on p. 1</p>	19

Comments:

Wetland name or number WS-2

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): WS-2 Date of site visit: 11/02/10

Rated by: M Maynard Trained by Ecology? Yes X No Date of training: 04/06

SEC: 29 TWNSHP: 23N RNGE: 04E Is S/T/R in Appendix D? Yes No X

Map of wetland unit: Figure Estimated size

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I II III X IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	10
Score for Hydrologic Functions	16
Score for Habitat Functions	5
TOTAL Score for Functions	31

Category based on SPECIAL CHARACTERISTICS of Wetland I II Does not apply X

Final Category (choose the “highest” category from above”) III

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	Wetland HGM Class used for Rating
Estuarine	X
Natural Heritage Wetland	
Bog	
Mature Forest	
Old Growth Forest	
Coastal Lagoon	
Interdunal	
None of the above	
	Check if unit has multiple HGM classes present

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?

NO – go to 2

YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES – **Freshwater Tidal Fringe**

NO – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. _____).*

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?

_____ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;

_____ At least 30% of the open water area is deeper than 6.6 (2 m)?

NO – go to 4

YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?

_____ The wetland is on a slope (*slope can be very gradual*).

_____ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

_____ The water leaves the wetland **without being impounded**?

NOTE: Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

NO – go to 5

YES – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?

_____ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.

_____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding..

NO – go to 6

YES – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

No – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	HGM Class to Use in Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D 4	<p>Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</p> <p>Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. <i>Note which of the following indicators of opportunity apply.</i></p> <p><input type="checkbox"/> Wetland is in a headwater of a river or stream that has flooding problems.</p> <p><input checked="" type="checkbox"/> Wetland drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other _____</p> <p>YES multiplier is 2 NO multiplier is 1</p>	<p>(see p. 49)</p> <p>Multiplier</p> <p><u>2</u></p>
◆	<p>TOTAL – Hydrologic Functions Multiply the score from D3 by D4; then <i>add score to table on p. 1</i></p>	<p>16</p>

Comments:

R Riverine and Freshwater Tidal Fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box)
R 1	Does the wetland have the <u>potential</u> to improve water quality? (see p.52)	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: <ul style="list-style-type: none"> • Depressions cover > 3/4 area of wetland points = 8 • Depressions cover > 1/2 area of wetland points = 4 (If depressions > 1/2 of area of unit draw polygons on aerial photo or map) • Depressions present but cover < 1/2 area of wetland. points = 2 • No depressions present points = 0 	Figure ____
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): <ul style="list-style-type: none"> • Trees or shrubs > 2/3 area of the unit points = 8 • Trees or shrubs > 1/3 area of the wetland points = 6 • Ungrazed, herbaceous plants > 2/3 area of unit points = 6 • Ungrazed herbaceous plants > 1/3 area of unit points = 3 • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0 	Figure ____
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		
R 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p. 53)
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <ul style="list-style-type: none"> ___ Grazing in the wetland or within 150 ft ___ Untreated stormwater discharges to wetland ___ Tilled fields or orchards within 150 ft. of wetland ___ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ___ Residential, urban areas, golf courses are within 150 ft. of wetland ___ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ___ Other _____ 	Multiplier _____
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Water Quality Functions Multiply the score from R1 by R2; then <i>add score to table on p. 1</i>	
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
R 3	Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p.54)
	R 3.1 Characteristics of the overbank storage the wetland provides: <i>Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).</i> <ul style="list-style-type: none"> • If the ratio is more than 20..... points = 9 • If the ratio is between 10 – 20..... points = 6 • If the ratio is 5- <10..... points = 4 • If the ratio is 1- <5..... points = 2 • If the ratio is < 1..... points = 1 	Figure ____
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: <i>Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):</i> <ul style="list-style-type: none"> • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area points = 7 • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 • Vegetation does not meet above criteria points = 0 	Figure ____
Aerial photo or map showing polygons of different vegetation types		
Add the points in the boxes above		
R 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?	(see p.57)
	Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. <i>Note which of the following conditions apply.</i> <ul style="list-style-type: none"> ___ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ___ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ___ Other _____ 	Multiplier _____
(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)		
YES multiplier is 2 NO multiplier is 1		
◆	TOTAL – Hydrologic Functions Multiply the score from R3 by R4; then <i>add score to table on p. 1</i>	

Comments:

L Lake-fringe Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.		(only 1 score per box)
L 1	Does the wetland unit have the <u>potential</u> to improve water quality? (see p.59)	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): <ul style="list-style-type: none"> • Vegetation is more than 33 ft. (10m) wide points = 6 • Vegetation is more than 16 ft.(5m) wide and < 33 ft points = 3 • Vegetation is more than 6 ft. (2m) wide and < 16 ft points = 1 • Vegetation is less than 6 ft. wide..... points = 0 <p style="text-align: center;">Map of Cowardin classes with widths marked</p>	Figure ____
	L 1.2 Characteristics of the vegetation in the wetland: <i>Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.</i> <ul style="list-style-type: none"> • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit points = 3 • Other vegetation that is not aquatic bed in > 1/3 vegetated area points = 1 • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 <p style="text-align: center;">Map with polygons of different vegetation types</p>	Figure ____
<i>Add the points in the boxes above</i>		
L 2	Does the wetland have the <u>opportunity</u> to improve water quality?	(see p.61)
	Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> <ul style="list-style-type: none"> ____ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ____ Grazing in the wetland or within 150 ft ____ Polluted water discharges to wetland along upland edge ____ Tilled fields or orchards within 150 ft. of wetland ____ Residential or urban areas are within 150 ft. of wetland ____ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ____ Power boats with gasoline or diesel engines use the lake ____ Other _____ <p style="text-align: center;">YES multiplier is 2 NO multiplier is 1</p>	Multiplier ____
◆ TOTAL – Water Quality Functions		
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.		
L 3	Does the wetland have the <u>potential</u> to reduce shoreline erosion?	(see p.62)
	L 3 Average width and characteristics of vegetation along the lakeshore (<i>do not include aquatic bed</i>): (<i>choose the highest scoring description that matches conditions in the wetland</i>) <ul style="list-style-type: none"> • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide points = 6 • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide. points = 4 • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) points = 0 <p style="text-align: center;">Aerial photo or map with Cowardin vegetation classes</p>	Figure ____
<i>Record the points in the boxes above</i>		
L 4	Does the wetland have the <u>opportunity</u> to reduce erosion?	(see p. 64)
	Are there features along the shore that will be impacted if the shoreline erodes? <i>Note which of the following conditions apply.</i> <ul style="list-style-type: none"> ____ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ____ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ____ Other _____ <p style="text-align: center;">YES multiplier is 2 NO multiplier is 1</p>	Multiplier ____
◆ TOTAL – Hydrologic Functions		
Multiply the score from L3 by L4; then add score to table on p. 1		

Comments:

S Slope Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box) (see p.64)
S 1	Does the wetland have the <u>potential</u> to improve water quality?	
S 1.1	Characteristics of average slope of unit: <ul style="list-style-type: none"> Slope is 1% or less (a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)..... points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0 	
S 1.2	The soil 2 inches below the surface (or duff layer) is clay, organic (Use NRCS definitions). YES = 3 points NO = 0 points	
S 1.3	Characteristics of the vegetation in the wetland that trap sediments and pollutants: <i>Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.</i> <ul style="list-style-type: none"> Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > 1/2 of area..... points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure _____
Total for S 1		<i>Add the points in the boxes above</i>
S 2	Does the wetland have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> _____ Grazing in the wetland or within 150 ft _____ Untreated stormwater discharges to wetland _____ Tilled fields, logging, or orchards within 150 ft. of wetland _____ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland _____ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 67) Multiplier _____
◆ TOTAL – Water Quality Functions		Multiply the score from S1 by S2; then add score to table on p. 1
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
S 3	Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?	(see p.68)
S 3.1	Characteristics of vegetation that reduce the velocity of surface flows during storms: <i>Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).</i> <ul style="list-style-type: none"> Dense, uncut, rigid vegetation covers > 90% of the area of the wetland points = 6 Dense, uncut, rigid vegetation > 1/2 area of wetland..... points = 3 Dense, uncut, rigid vegetation > 1/4 area..... points = 1 More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid points = 0 	
S 3.2	Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. YES = 2 points NO = 0 points	
Total for S 3		<i>Add the points in the boxes above</i>
S 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion? Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i> _____ Wetland has surface runoff that drains to a river or stream that has flooding problems _____ Other _____ (Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam) YES multiplier is 2 NO multiplier is 1	(see p. 70) Multiplier _____
◆ TOTAL – Hydrologic Functions		Multiply the score from S3 by S4; then add score to table on p. 1

Comments:

<p><i>These questions apply to wetlands of all HGM classes.</i></p>		<p>Points (only 1 score per box)</p>
<p>HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.</p>		
<p>H 1</p>	<p>Does the wetland have the <u>potential</u> to provide habitat for many species?</p>	
<p>H 1.1 <u>Vegetation structure</u> (see P. 72): Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres. <input type="checkbox"/> Aquatic Bed <input checked="" type="checkbox"/> Emergent plants <input type="checkbox"/> Scrub/shrub (areas where shrubs have > 30% cover) <input type="checkbox"/> Forested (areas where trees have > 30% cover) If the unit has a forested class check if: <input type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. Add the number of vegetation types that qualify. If you have: 4 structures or more points = 4 2 structures points = 1</p>	<p>Figure ____</p> <p>0</p>	
<p>H 1.2 <u>Hydroperiods</u> (see p.73): Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods). <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input checked="" type="checkbox"/> Occasionally flooded or inundated <input type="checkbox"/> Saturated only <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points</p>	<p>4 or more types present points = 3 3 or more types present points = 2 2 types present points = 1 1 type present points = 0</p> <p>Map of Cowardin vegetation classes 3 structures points = 2 1 structure points = 0</p> <p>Map of hydroperiods</p>	<p>Figure ____</p> <p>1</p>
<p>H 1.3 <u>Richness of Plant Species</u> (see p. 75): Count the number of plant species in the wetland that cover at least 10 ft² (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle. If you counted: > 19 species points = 2 5 – 19 species points = 1 < 5 species points = 0 List species below if you want to: _____ _____ _____</p>		<p>0</p>
<p>H 1.4 <u>Interspersion of Habitats</u> (see p. 76): Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>	<p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points [riparian braided channels]</p>	<p>Figure ____</p> <p>Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always “high”.</p> <p>Use map of Cowardin classes.</p> <p>0</p>
<p>H 1.5 <u>Special Habitat Features</u> (see p. 77): Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p>	<p><input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) <input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet turned grey/brown) <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (structures for egg-laying by amphibians) <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants NOTE: The 20% stated in early printings of the manual on page 78 is an error.</p>	<p>0</p>
<p>H 1 TOTAL Score – potential for providing habitat</p>		<p>Add the points in the column above</p> <p>1</p>

	<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> (see p. 82): (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</p> <p>Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed.</i></p> <p>___ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p>___ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report p. 152).</p> <p>___ Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock.</p> <p>___ Old-growth/Mature forests: (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.</p> <p>___ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158).</p> <p>___ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p>___ Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (full descriptions in WDFW PHS report p. 161).</p> <p>___ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p>___ Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).</p> <p>___ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p>___ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p>___ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p>___ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p>If wetland has 3 or more priority habitats = 4 points If wetland has 2 priority habitats = 3 points If wetland has 1 priority habitat = 1 point No habitats = 0 points</p> <p>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</p>	0
	<p>H 2.4 <u>Wetland Landscape:</u> Choose the one description of the landscape around the wetland that best fits (see p. 84)</p> <ul style="list-style-type: none"> • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.....points = 5 • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 5 • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed.points = 3 • The wetland fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 3 • There is at least 1 wetland within 1/2 milepoints = 2 • There are no wetlands within 1/2 mile.....points = 0 	3
	<p>H 2 TOTAL Score – opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i></p>	4
	<p style="text-align: right;"><i>TOTAL for H 1 from page 8</i></p>	1
◆	<p>Total Score for Habitat Functions Add the points for H 1 and H 2; then record the result on p. 1</p>	5

Comments:

<p>SC4</p>	<p>Forested Wetlands (see p. 90) Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its function.</i> ___ Old-growth forests: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ___ Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO = <u>X</u> not a forested wetland with special characteristics</p>	<p>Cat. I</p>
<p>SC5</p>	<p>Wetlands in Coastal Lagoons (see p. 91) Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ___ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ___ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom.</i>) YES = Go to SC 5.1 NO <u>X</u> not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ___ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ___ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ___ The wetland is larger than 1/10 acre (4350 square ft.) YES = Category I NO = Category II</p>	<p>Cat. I Cat. II</p>
<p>SC6</p>	<p>Interdunal Wetlands (see p. 93) Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES = Go to SC 6.1 NO <u>X</u> not an interdunal wetland for rating <i>If you answer yes you will still need to rate the wetland based on its functions.</i> In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? YES = Category II NO = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III</p>	<p>Cat. II Cat. III</p>
<p>◆</p>	<p>Category of wetland based on Special Characteristics Choose the "highest" rating if wetland falls into several categories, and record on p. 1. If you answered NO for all types enter "Not Applicable" on p. 1</p>	

Comments:

APPENDIX C

Wetland Functions and Values Forms

Wetland Functions & Values Form

Wetland I.D. A17b Project: Lake to Sound Trail Assessed by: M Maynard

Cowardin Class: PFO Ecology Category: III Local Rating: Class 2 Wetland size: 0.11 acre Date: 11/02/10

Function/Value	Occurrence		Rationale	Principal Function(s)	Comments
	Y	N			
Flood Flow Alteration		X	Wetland A17b does not have sufficient ponding to provide this function.		
Sediment Removal		X	Wetland A17b does not have sufficient ponding to provide this function.		
Nutrient & Toxicant Removal		X	Wetland A17b does not have sufficient ponding to provide this function.		
Erosion Control & Shoreline Stabilization	X		Vegetation that can provide this function are present, but the water course is very small.	1, 2, 3	Low-There is limited opportunity.
Production of Organic Matter and its Export	X		The flow of water through the wetland is intermittent and therefore export is limited.	1,6	Low
General Habitat Suitability	X		The buffer of the wetland has been disturbed and habitat connectivity is limited.	3	Low
Habitat for Aquatic Invertebrates	X		Aquatic invertebrates would be primarily limited to the small intermittent stream.	1, 4, 6	Low
Habitat for Amphibians		X	There is no standing water in the wetland, some shallow flowing water, seasonally.		
Habitat for Wetland-Associated Mammals		X	Wetland A17b does not provide permanent water.		
Habitat for Wetland-Associated Birds		X	Wetland A17b lacks sufficient open water, and therefore does not provide this function.		
General Fish Habitat		X	The small intermittent stream associated with this wetland is not likely fish bearing.		
Native Plant Richness	X		The wetland is limited in the number of species.	1, 3	Low
Educational or Scientific Value		X	No scientific value or suitable parking. Most of the wetland is in a fenced (restricted) area.		
Uniqueness and Heritage		X	No unique features or threatened or endangered species are known to be in A17b.		

Wetland Functions & Values Form

Wetland I.D. WS-1 Project: Lake to Sound Trail Assessed by: M Maynard

Cowardin Class: PEM/PSS/PFO Ecology Category: II Local Rating: Cat 2 Wetland size: ~22.5 ac Date: 10/29/10

Function/Value	Occurrence		Rationale	Principal Function(s)	Comments
	Y	N			
Flood Flow Alteration	X		WS-1 is flat and densely vegetated.	2,4,5,6	High-Large wetland associated with Walker Creek.
Sediment Removal	X		WS-1 Densely vegetated with slow moving water flow.	2,3,4,5	Moderate-Unknown/limited sediment sources upgradient.
Nutrient & Toxicant Removal	X		Dense stand of cattail near inlet of wetland provides high quality nutrient and toxicant removal.	1,2,3,5	High-Opportunity is high due to limited buffers and urbanized surroundings.
Erosion Control & Shoreline Stabilization	X		Dense vegetation, including shrubs along stream.	1,2,3	Moderate-Stream is small.
Production of Organic Matter and its Export	X		WS-1 provides high interspersion of plants and inundation, and species diversity.	1,2,3,4,5,6	Moderate-Export is limited by restricted outlet.
General Habitat Suitability	X		Signs of past beaver activity and high Cowardin class interspersion.	1,4,5,6,7	Moderate-Buffer is developed.
Habitat for Aquatic Invertebrates	X		WS-1 provides leaf litter, dense vegetation, and flowing water.	1,2,4,5,6	High-Different levels of water.
Habitat for Amphibians	X		Walker Creek provides permanent water and there is dense vegetation associated with the stream.	1,2,4,6	Moderate-Surrounding land is developed.
Habitat for Wetland-Associated Mammals	X		Dense stands of shrubs and trees and signs of past beaver activity.	1,2,3,4,7	Moderate-No stream banks or open water.
Habitat for Wetland-Associated Birds		X	WS-1 does not provide the necessary open water ratio.	2,3,4,6	
General Fish Habitat	X		WS-1 is associated with Walker Creek.	1,4	Low-Stream is shallow and braided through much of wetland
Native Plant Richness	X		Co-dominants are native and multiple strata in WS-1.	1,2,3	Moderate-Some invasives located in wetland and buffer.
Educational or Scientific Value		X	No scientific value or suitable parking.		
Uniqueness and Heritage		X	No unique features or threatened or endangered species are known to be in WS-1.		

Wetland Functions & Values Form

Wetland I.D. WS-2 Project: Lake to Sound Trail Assessed by: M Maynard

Cowardin Class: PEM Ecology Category: III Local Rating: Cat 3 Wetland size: 0.01 ac Date: 11/02/10

Function/Value	Occurrence		Rationale	Principal Function(s)	Comments
	Y	N			
Flood Flow Alteration	X		WS-2 has a limited holding capacity due to outlets and small size.	4	Low-WS-2 is small.
Sediment Removal	X		The wetland has dense herbaceous vegetation, but has limited opportunities.	3,5	Low-Only one small area where ponding can occur.
Nutrient & Toxicant Removal	X		The wetland has dense herbaceous vegetation, but has limited opportunities.	4	Low-Only one small area where ponding can occur.
Erosion Control & Shoreline Stabilization		X	The wetland is not associated with a water course.		
Production of Organic Matter and its Export		X	WS-2 does not provide this function because the vegetation is mowed and outlet is constricted.		
General Habitat Suitability	X		WS-2 provides very low levels of this function. There is only one Cowardin class and vegetation is mowed and there is a limited and developed buffer.	7	Low-A frog was observed in WS-2.
Habitat for Aquatic Invertebrates	X		Herbaceous vegetation throughout wetland, but habitat is limited by size and mowing.	1,4,6	Low-Inundation likely becomes very limited for much of the year.
Habitat for Amphibians	X		A frog was observed in WS-2, but habitat is generally quite poor.	1,2,6	Low-Inundation likely becomes very limited for much of the year.
Habitat for Wetland-Associated Mammals		X	No permanent water and habitat is insufficient to support any wetland associated mammals.		
Habitat for Wetland-Associated Birds		X	Lacks required open water ratio to support wetland associated birds.		
General Fish Habitat		X	Not associated with a fish bearing water.		
Native Plant Richness		X	Mowed grasses and forbs.		
Educational or Scientific Value		X	No scientific value or suitable parking.		
Uniqueness and Heritage		X	No unique features or threatened or endangered species are known to be in WS-2.		

APPENDIX D
Site Photographs



Photograph 1. Wetland WS-1 Facing East, Near Walker Creek



Photograph 2. Wetland WS-1 Facing North from South End of Wetland



Photograph 3. Wetland WS-2 Facing North



Photograph 4. Buffer of Wetland A17d Facing North



Photograph 5. Wetland A17b and Buffer Facing Southeast

