

# **WETLAND MITIGATION PLAN**

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## **Breckenridge Subdivision (Corps No. TBD; City of Camas SUB#06-08 - Breckenridge)**

**SE 202<sup>nd</sup> Court, Camas, Washington**

### **Prepared by:**

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**April 29, 2013**



# WETLAND MITIGATION REPORT

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**Breckenridge Subdivision**

**April 29, 2013**

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# Executive Summary

This wetland mitigation plan addresses wetland impacts to wetlands located at the proposed Breckenridge Subdivision in Camas, Washington. The proposed wetland impacts are associated with the development of two lots in the northwest corner of the project area.

The proposed project will have unavoidable impacts to one Category 4 wetland. Wetland impact will total 0.12 acres (Table 1). The USACE and the City of Camas have regulatory authority over the proposed wetlands to be filled. Because the wetland impacts are under 0.25 acres and the project will be permitted under a USACE Nationwide 29 Permit, a 401 Water Quality Certification though the Washington Department of Ecology is not required.

The proposed project impacts occur to palustrine emergent, Ecology Category IV, slope wetlands. These wetlands are generally low to moderate quality and provide limited levels of hydrologic and water quality functions. Vegetated buffers around the impacted wetlands are dominated by non-native blackberries and provide limited habitat functions. Buffer areas beyond the blackberry thickets consist of mowed field.

The compensatory mitigation will occur on-site within and adjacent to the remaining Category 4 wetlands. The mitigation provides the following to compensate for project impacts to wetlands:

- 0.15 acres of wetland creation
- 0.14 acres of wetland enhancement

The Applicant proposes to replace the impacted Category 4 wetlands with Category 4 created and enhanced wetlands dominated by native trees and shrubs. The created wetlands will provide improved flood flow storage and water quality function, and will add habitat functions compared to the impacted wetlands. The enhanced wetlands will provide greater habitat interspersions, species richness, and improved vegetative structure compared to the condition of the existing wetland at the mitigation site. The buffers around the mitigation wetlands will typically be 25 to over 50 feet wide (required for a wetland rated Category 4 by the City of Camas) and composed of native trees and shrubs.

The proposed mitigation site will be monitored for ten years. Monitoring, contingency, and management plans are described, and will be used to adaptively manage the mitigation site.

**Table 1. Summary of project wetland impacts and compensatory mitigation.**

<b>Project</b>	Breckenridge Subdivision
<b>Township/Range/Section (impact)</b>	NE 1/4, Section 08, Township 1N, Range 3E
<b>Permanent Wetland Impact</b>	0.12 acres (Category 4)
<b>Indirect Wetland Impact</b>	None
<b>Temporary Wetland Impact</b>	None
<b>Permanent Buffer Impact</b>	None
<b>Temporary Buffer Impact</b>	None
<b>Jurisdictional Wetland Impact Areas</b>	0.12 acres (Category 4)
	Regulated by USACE and City of Camas
<b>Mitigation Location</b>	NE 1/4, Section 08, Township 1N, Range 3E
<b>Total Area of Mitigation Site</b>	0.29 acres
<b>Area &amp; Type of Mitigation</b>	0.15 acres of Wetland Creation
<b>Area &amp; Type of Mitigation</b>	0.14 acres of Wetland Enhancement
<b>Total Area of Mitigation</b>	0.30 acres
<b>Years of Monitoring</b>	10 Years

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## Acronyms and Abbreviations

Ecology	Washington State Department of Ecology
NWI	National Wetlands Inventory
PEM	palustrine emergent
PSS	palustrine scrub-shrub
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WRIA	Water Resource Inventory Area

# Chapter 1. Proposed Project

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## 1.1 Introduction

This revised wetland mitigation plan addresses unavoidable wetland impacts to 0.12 acres of Category 4 palustrine emergent (PEM) wetlands located in the northwest corner of the Breckenridge Subdivision in Camas, Washington. The proposed wetland impacts are associated with the siting of two residential lots (13 and 14). The previous plan titled “*Compensatory Wetland Mitigation Plan – Breckenridge Subdivision*” was approved by the January 26, 2006 Hearing Examiner Final Order SUB #06-08.

This report will be used to obtain the following permits:

- U.S. Army Corps of Engineers Section 404 permit
- City of Camas Wetland Permit

Observed conditions are discussed in the *Wetland Delineation and Assessment Report* (Barnes 2013). This mitigation report addresses project impacts and their mitigation. The following documents and guidelines were used in preparation of this report:

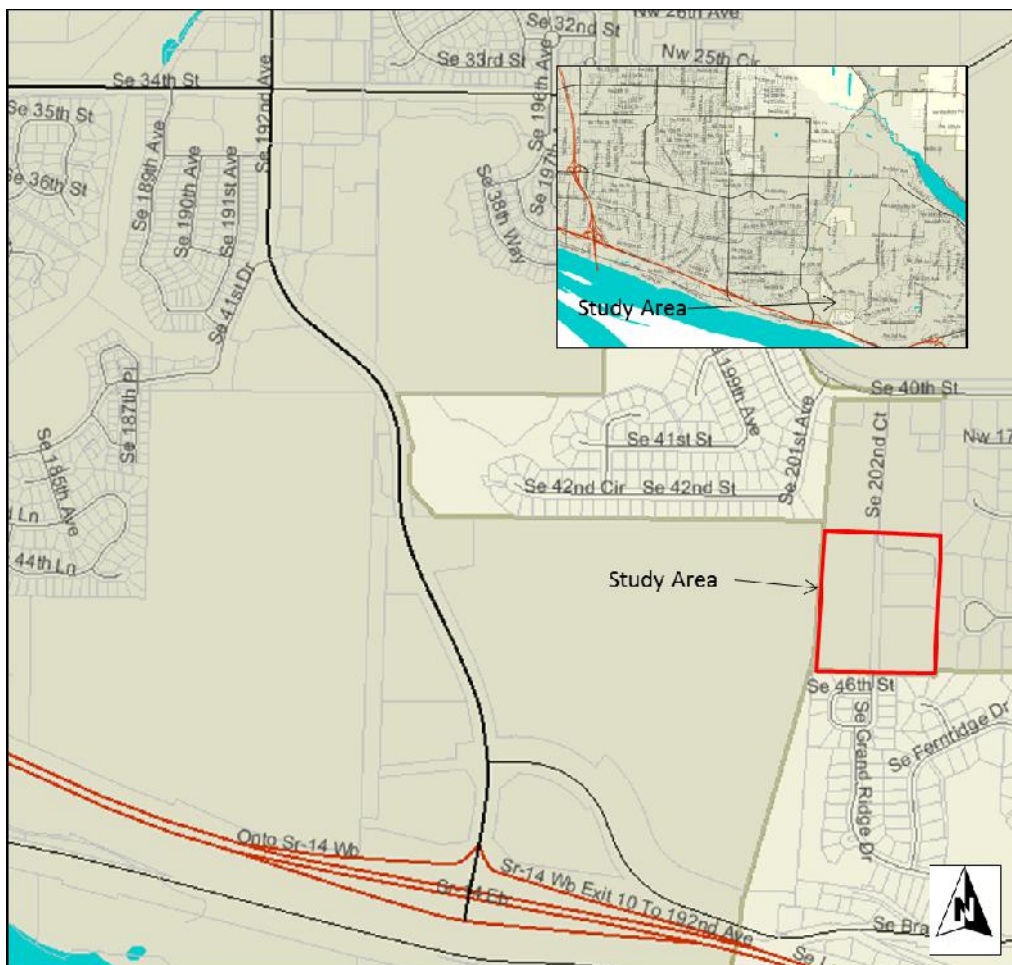
- *Wetland Delineation and Assessment Report* (Barnes 2013)
- *Wetlands in Washington State*, Volume 1 (Sheldon et al. 2005)
- *Wetlands in Washington State*, Volume 2 (Granger et al. 2005)
- *Wetland Mitigation in Washington State*, Part 1 (Ecology et al. 2006)
- *Wetland Mitigation in Washington State*, Part 2 (Ecology et al. 2006)



## 1.2 Project Location

The project is located in the southeast portion of Clark County, Washington within the urban growth boundary of the City of Camas (Figure 1). Specific project location characteristics area as follows:

- tax parcels 125601000, 125648000, 125647000, & 125636000
- northeast 1/4 of section 8, township 3N, range 3E;
- south of SE 40th Street and north of SE 46<sup>th</sup> Street;
- latitude 45° 44' 9.7002" N, longitude -122° 30' 18.0138" W
- Water Resource Inventory Area (WRIA) 28
- Columbia Slope Watershed



**Figure 1. Project vicinity map.**

### **1.3 Project Purpose and Description**

The applicant, Lennar Northwest, Inc., is proposing a 32 lot residential subdivision on 11.03 acres (according to survey by Olson Engineering, Inc.) in the R-7.5 zone. The project includes the construction of roads, a stormwater facility and other related infrastructure improvements. The project will consist of the construction of 32 single-family residences. The proposed wetland impacts are associated with the siting of two residential lots (13 and 14) in the northwest portion of the subdivision.

The development is consistent with the intent of the Comprehensive Plan and therefore will not deprive the region of other viable, planned economic use of the land. The development of the site will create jobs in the construction industry and provide residences for workers moving into the region.

### **1.4 Project Schedule**

Upon issuance of permits, project construction is expected to begin in July 2013. It is, as yet, undetermined how long construction will last but will likely be less than 3 years in duration.

The proposed wetland mitigation will begin in the summer of 2013 and dependent upon site conditions after the grading activities are completed, the sites will be planted during the 2013-2014 planting season.

### **1.5 Responsible Parties**

Construction oversight and monitoring will be administered by Cascadia Ecological Services, Inc. (CES). Maintenance of the mitigation site may also be administered by CES but could also be provided by other grounds maintenance crews with oversight given by CES staff. Ownership of the wetland mitigation areas will be retained by the Breckenridge Homeowner's Association.

## **Chapter 2. Existing Conditions**

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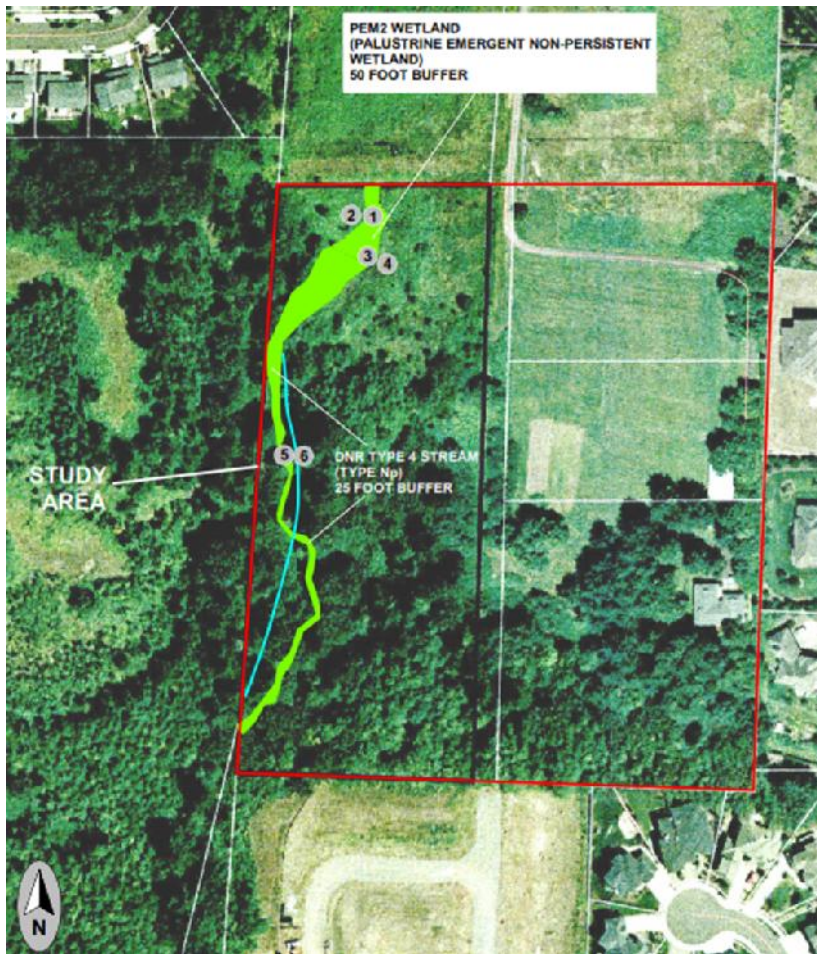
### **2.1 Landscape Setting**

The 11.12-acre study area is located near the south terminus of SE 202nd Court in Camas, Washington (Figure 1). Approximately half of the property is forested. The northeast portion consists of grassland. The majority of the northwest corner is dominated by scrub-shrub areas and extensive thickets of blackberries.

A seasonal drainage originates from emergent slope wetlands in the north portion of tax parcel 125601-000 and is classified as Np (non-fish bearing) stream by the Clark County

GIS. The stream flows from north to south through the west portion of tax parcel 125601-000 and flows off-site at the southwest corner

According to U.S. Geological Survey (USGS) mapping, the site topography slopes from a high point of 422 feet above mean sea level near the northeast corner of the study area to approximately 316 feet above mean sea level at the southwest corner.



**Figure 2. Existing Site Conditions.**

According to the Clark County Soil Survey (USDA 1974), the following soil mapping units are present on this site:

- Hesson clay loam, 0 to 8 percent slopes (HcB)
- Olympic clay loam, 8 to 20 percent slopes (OLD)
- Powell silt loam, 8 to 20 percent slopes (PoD)

#### **2.1.1. Wetlands**

The project site contains one slope wetland located wholly within the west portion of Tax Parcel 125601000. The wetlands are rated as Category 4 slope wetlands according to the

Washington Department of Ecology Western Washington Wetland Rating System (Hruby 2004).

The slope wetlands receive seasonal hydrology from sidehill seeps and also a storm pipe that is located along the north side of Tax Parcel 125648-000. An old gravel road bed extends west from SE 202nd Court in the north portion of the study area. This gravel road has effectively inhibited flow across the natural north-south drainage through the study area creating an emergent wetland on the property to the north. However, due to the pervious nature of the roadbed, water from the off-site wetland seeps through the roadbed onto the property into a small emergent wetland. This wetland tapers in shape as it continues to the south and enters into a defined stream channel which flows across the southwest portion of the site.

CES completed a wetland delineation and assessment report for the project area in April 2013 (Barnes 2013).

#### **2.1.2. Buffers/Uplands**

Buffers and upland areas in the vicinity of the Category 4 wetlands are dominated by extensive thickets of Himalayan blackberry (*Rubus armeniacus*) and Douglas hawthorn (*Crataegus douglasii*) in the north section. The south portion of the wetland is located within upland forest which is dominated by Douglas fir (*Pseudotsuga menziesii*), red alder (*Alnus rubra*), and big-leaf maple (*Acer macrophyllum*) forest. The understory vegetation consists of beaked hazelnut (*Corylus cornuta*), oso-berry (*Oemleria cerasiformis*), stinging nettle (*Urtica dioica*), miner's lettuce (*Claytonia perfoliata*), trailing blackberry, Himalayan blackberry (*Rubus ursinus*), vine maple (*Acer circinatum*), swordfern (*Polystichum munitum*), and northern bracken fern.

### **2.2 Land Use History**

The study area property contains four parcels, only one of which contains a single-family home and outbuildings. The remainder of the site is vacant grassland or forested. The landowner has maintained the grassland areas by mowing them during the summer months.

An archaeological evaluation was completed for the project in 2006 by Applied Archeological Research (Finley 2006). According to the findings of the report, the proposed construction activities are unlikely to impact any archaeological deposits and no further archaeological work is necessary.

### **2.3 Watershed Context**

The proposed wetland mitigation site is located in the Columbia Slope Watershed (CSW). The CSW is a 25 square mile watershed, located in southern Clark County, and consists of

a narrow band of hillsides that drain to the Columbia River within the cities of Vancouver and Camas. There are only two named creeks in this watershed, Fisher and Joseph's Creeks, but the area has numerous springs in gravel deposits along the hillsides (Clark County 2010).

## **Chapter 3. Wetland and Wetland Buffer Impact Assessment**

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### **3.1 Existing Conditions of Wetlands to be Impacted**

The north section of the Category 4 slope emergent wetlands are proposed to be impacted by this project. Site topography in this area slopes from north to south at a grade of approximately 1-3%. The wetlands are dominated by nootka rose (*Rosa nutkana*), Douglas' meadowsweet (*Spiraea douglasii*), lady fern (*Athyrium filix-femina*), lamp rush (*Juncus effusus*), birdsfoot trefoil (*Lotus corniculatus*), fringed willowherb (*Epilobium watsonii*), Fuller's teasel (*Dipsacus fullonum*), common velvetgrass (*Holcus lanatus*), and curly dock (*Rumex crispus*).

Wetland hydrology on the property is driven by seasonal high groundwater and sidehill seeps which daylight in the emergent wetlands along the north portion of Tax Parcel 125601000.

Additional detail regarding the Category 4 slope wetlands can be found in the *Wetland Delineation and Assessment Report* (Barnes 2013).

Wetlands were classified using:

- USFWS system (Cowardin et al. 1979)
- Hydrogeomorphic Classification system (Brinson 1993)
- *Washington State Wetlands Rating System for Western Washington* (Hruby 2004)
- Local Jurisdiction Critical Areas Ordinance, Chapter 16.53 - Wetlands (City of Camas, 2013)

### **3.2 Wetland Impacts**

#### **3.2.1. Permanent Wetland Impacts**

The proposed project will result in unavoidable permanent impacts to 0.12 acres of Category 4 slope wetlands (Tables 2 and 5).

The wetland impact area will be filled with structural soil derived from native borrow material produced by on-site excavation. The material will be suitable to be used for fill per the recommendation of the Geotechnical Report by GeoDesign Inc.

This wetland is regulated by the USACE and the City of Camas.

**Table 2. Wetland size, classification, and area impacted by the proposed project.**

Wetland <sup>A</sup>	Wetland Classification				Wetland Size (acre)	Wetland Impact Area (acre)			
	Cowardin <sup>B</sup>	HGM	Ecology <sup>C</sup>	Local Jurisdiction <sup>D</sup>		Permanent	Percent Impacted	Temporary	Indirect
<b>C4</b>	PEM	Slope	4	4	~1 Acre	0.12	12	0	0
<b>Total</b>					<b>~1 acre</b>	<b>0.12</b>	<b>12</b>	<b>0</b>	<b>0</b>

A) Wetland name

B) Cowardin, et al. (1979) or National Wetland Inventory (NWI) Class based on vegetation: PUS = Palustrine Unconsolidated Shore; PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested.

C) Ecology rating according to Hruby (2004).

D) List local jurisdiction ordinance.

**Table 3. Permanent wetland impact summary by classification.**

Wetland Classification	Class	Wetland Impact Area (acre)	Percent of Total Wetland Area
USFWS (Cowardin et al. 1979)	PEM	0.12	12
	<b>Total</b>	<b>0.12</b>	<b>12</b>
City of Camas	IV	0.12	12
	<b>Total</b>	<b>0.12</b>	<b>12</b>
Hydrogeomorphic Class	Slope	0.12	12
	<b>Total</b>	<b>0.12</b>	<b>12</b>

**Table 4. Impacted wetland functions.**

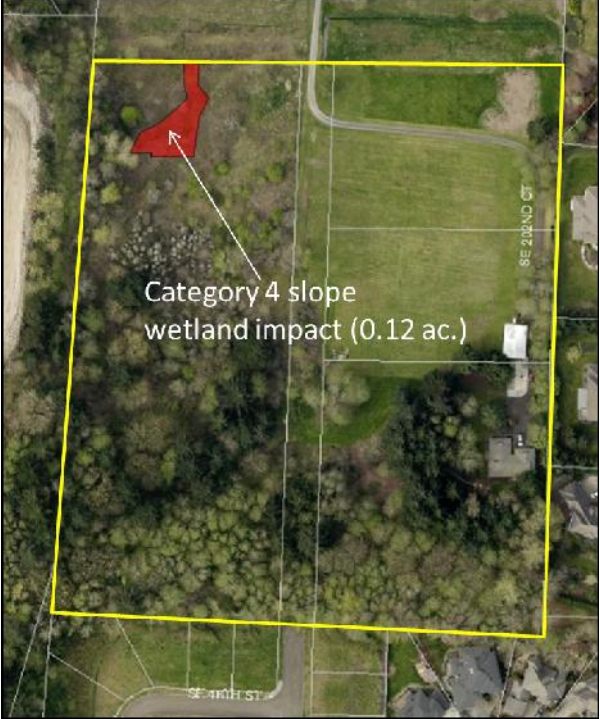
Function/Value <sup>a</sup>	Wetland
	B
Flood Flow Alteration	-
Sediment Removal	+
Nutrient and Toxicant Removal	+
Erosion Control & Shoreline Stabilization	-
Production & Export of Organic Matter	-
General Habitat Suitability	+
Habitat for Aquatic Invertebrates	-
Habitat for Amphibians	+
Habitat for Wetland-Associated Mammals	+
Habitat for Wetland-Associated Birds	+
General Fish Habitat	X
Native Plant Richness	-
Educational or Scientific Value	-
Uniqueness and Heritage	-

a “-” means that the function is not present; “X” means that the function is present and is of low quality; and “+” means the function is present and is of high quality.



### 3.3 Wetland Impacts Summary Sheets

Table 5. Category 4 impact summary.

Wetland Impacts Summary Sheet		
 <p>Category 4 slope wetland impact (0.12 ac.)</p>	Local Jurisdiction	City of Camas
	WRIA	Salmon-Washougal 28
	Ecology Rating (Hruby 2004)	Category 4
	Local Jurisdiction Rating	Category 4
	Local Jurisdiction Buffer Width	50 feet
	Wetland Size	~ 1 ac.
	Cowardin Classification	PEM
	HGM Classification	Slope
	Wetland Rating System Pts.	
	Water Quality Score	2
	Hydrologic Score	5
	Habitat Score	<u>16</u>
	<b>Total Score</b>	<b>23</b>



## Chapter 4. Mitigation Strategy

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### 4.1 Avoidance and Minimization of Wetland Impacts

The Applicant has avoided and minimized impacts to wetlands and wetland buffers to the greatest extent practicable. However, due to the topography and design constraints of the site and number of developable lots required to make the project financially feasible, the small Category 4 wetland impact is necessary.

Compensatory mitigation will replace wetland area and functions lost as a result of these unavoidable impacts.

### 4.2 Compensatory Mitigation

#### 4.2.1. Regulatory Requirements

##### Wetland Mitigation Requirements

The proposed project will impact Category 4 slope wetlands. As compensation for those impacts, wetland creation and enhancement will occur within and adjacent to existing Category 4 slope wetlands on the property.

**Table 6. Proposed mitigation ratios for Breckenridge Subdivision.**

Category and Type of Wetland Impacts	Wetland Creation	Wetland Enhancement
Category IV	1.21:1	1.13:1

This project was previously approved by the City of Camas in 2006. The 2006 mitigation plan called for wetland enhancement at a ratio of 4:1 within the existing wetlands. Because the overall wetland impacts have increased, there is less available area remaining for wetland enhancement. Therefore, a combination of wetland creation and enhancement is proposed for this revised site plan layout as shown in Table 7.

**Table 7. Proposed mitigation areas (acres).**

Direct Wetland Impacts		Creation of a Category 4 Wetland		Enhancement of a Category 4 Wetland	
Ecology Wetland Category	Area (acres)	Ratio	Proposed Creation Area (acres)	Ratio	Proposed Enhancement Area (acres)
Category 4	0.12	1.21:1	0.15	1.13:1	0.14
<b>Total</b>	<b>0.12</b>		<b>0.15</b>		<b>0.14</b>

### **Wetland Buffer Mitigation Requirements**

Upon completion of the proposed wetland mitigation work, the wetlands will continue to be classified as Category 4 wetlands. According to the requirements of the City of Camas, a 50 foot wetland base buffer is required to protect water quality functions based on a high intensity land use matrix. The lower forested section of the wetlands which is confined to a stream channel requires a 25 foot base buffer.

Buffer averaging is proposed to the south of Lot 14 and north of Lot 15 in order to allow for the construction of a cul-de-sac road and trail which will access a stormwater detention facility. The Category 4 wetland buffer will be reduced to 25 feet as allowed in Section 16.53.050.C.1.c. and 16.53.050.C.2. of the *City of Camas Critical Areas Ordinance*. The total area of buffer reduction is this area is 6,673 square feet. To compensate for the buffer loss, the area will be averaged, or added to the existing 25 foot buffer in the southwest portion of the site. This will result in an overall increased wetland buffer area of 0.84 acres on-site.

The forest understory area is currently dominated, especially at the edges, by Himalayan blackberry which competes with native shrub species and provides reduced habitat value. As part of the overall mitigation strategy, blackberries will be eradicated from the forest understory to allow for regeneration of native plant species.

#### **4.2.1.1. Project Mitigation Proposal**

The proposed project will permanently impact 0.12 acres of Category 4 PEM slope wetland. The existing wetland currently provides low functioning water quality, hydrologic, and moderate habitat functions.

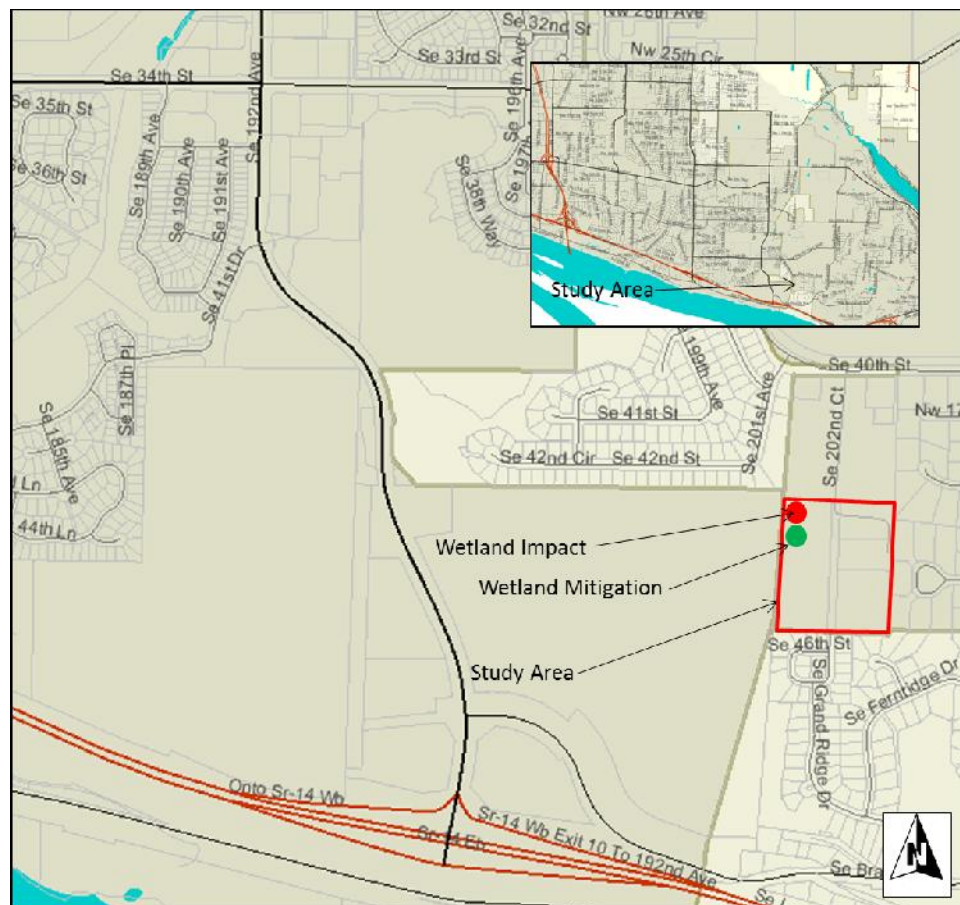
To satisfy the Governor's Executive Order 89-10, *Wetland Mitigation in Washington State* (Ecology et al. 2006a), and City of Camas CAO requirements, the Applicant will create 0.15 acres of new Category 4 (slope) wetland, enhance 0.14 acres of existing Category 4 (slope) wetland, and eradicate non-native blackberries in the wetland buffer. The created and enhanced wetlands will provide functions exceeding the impacted wetlands and will include additional surface water storage, sediment removal, nutrient and toxicant removal, organic matter production and export, general habitat suitability, habitat for aquatic invertebrates,

amphibians, wetland-associated birds, and increased native plant richness. The mitigation site upland buffers will range between 25 and 54 feet in width.

## Chapter 5. Compensatory Wetland Mitigation

## 5.1 Site Location

The Category 4 wetland mitigation site is located on the same property as the project. The property is owned by the Applicant.



**Figure 3. Map showing the location of the mitigation site in relation to the project impact site.**

### 5.1.1. Landscape Position

The mitigation wetlands are located within the same landscape position as the impacted wetlands in the Columbia Slope Watershed. The topography of the property slopes steeply from north to south. The northern portion of the site where the impact/mitigation wetlands are located is a gentler gradient than the south portion. At a point

approximately 350 feet south of the north property boundary, the wetlands enter a narrow forested swale with a defined channel that extends to the southwest portion of the project area before flowing off-site through residential areas eventually to the Columbia River.

#### **5.1.2. Ecological Connectivity**

The Category 4 wetlands originate within the project area and are fed by seasonal high groundwater and sidehill seeps. Hydrology from the wetlands feed a seasonal stream which flows through the south portion of the project area. As the stream leaves the project area, it continues to flow through a steep forested ravine west of the Grand Ridge Subdivision and east of a large rock quarry. At State Route 14, the stream passes underneath in a culvert and flows to the Columbia River within a short distance through additional residential areas. The existing forested area which contains the stream is protected by the City of Camas and will remain so upon completion of this project.

#### **5.1.3. Historic and Current Land Use**

The wetlands on this property have been left in a fallow, or undisturbed condition and are dominated by grasses and shrubs. Over time, much of the north portion has been encroached upon by thickets of blackberries.



### **5.2 Rationale for Site Selection**

The remaining Category 4 wetlands were selected as mitigation for project wetland impacts given their location in the watershed, same HGM class (slope), and the processes that they will provide which will be lost by the removal of the impacted wetland including surface water storage, sediment removal, nutrient and toxicant removal, organic matter production and export. The created wetlands will provide a greater area of surface water flow storage once the grading is completed to create topographical areas where seasonal ponding can occur. The wetland buffers are currently dominated in many areas by Himalayan blackberries which provides an opportunity for their eradication and regeneration of existing native plant species.

### **5.3 Mitigation Site Existing Conditions**

Refer to sections 2.1.1 and 2.1.2 for a description of the existing wetlands and upland areas. Proposed mitigation is to occur on-site within these locations.

**Table 9. Category 4 wetland mitigation site wetland summary.**

Location		Wetland is in the north portion of Tax Parcel 125648000	
	Local Jurisdiction	Clark County	
	WRIA	28	
	Ecology Rating (Hruby 2004)	Category 4	
	City of Camas Rating	Category 4	
	City of Camas Buffer Width	50 feet	
	Wetland Size	~ 1 acre	
	Cowardin Classification	PEM	
	HGM Classification	Slope	
	Wetland Rating System Pts.		
	Water Quality Score	2	
	Hydrologic Score	5	
	Habitat Score	16	
	Total Score	23	
Dominant Vegetation	nootka rose ( <i>Rosa nutkana</i> ), Douglas' meadowsweet ( <i>Spiraea douglasii</i> ), lady fern ( <i>Athyrium felix-femina</i> ), lamp rush ( <i>Juncus effusus</i> ), birdsfoot trefoil ( <i>Lotus corniculatus</i> ), fringed willowherb ( <i>Epilobium watsonii</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), common velvetgrass ( <i>Holcus lanatus</i> ), and curly dock ( <i>Rumex crispus</i> )		
Soils	Hesson clay loam, 0 to 8 percent slopes (HcB)		
Hydrology	Seasonal saturation to surface and areas of ponding		
Rationale for Local Rating	Ecology Wetland Rating System		
Functions of Entire Wetland	The existing wetland provides wetland functions including sediment and nitrogen removal, flood storage, and a low level of general habitat suitability.		
Buffer Condition	The general buffer width is in accordance with regulatory requirements and dominated by non-native herbaceous and woody vine vegetation.		



Please refer to the Breckenridge Subdivision Habitat Study (Barnes 2006). In general, the project area contains open grassland, scrub-shrub, riparian wetland, and conifer/hardwood upland forest. No plants listed as endangered, threatened, or species of concern were found on the project site.



Refer to Mitigation Site Plan Sheets (**Appendix E**).

Native emergents will be seeded upon completion of the grading to introduce additional herbaceous plant species to the existing emergent wetlands which will increase the diversity of the plant community.

Wildlife habitat will be enhanced once the native plant species are established providing structure, food, and nesting opportunities for amphibians, waterfowl, songbirds, and

mammals. Increased density and cover of woody vegetation will reduce the capacity of blackberries to dominate the wetland edges due to shade and competition by the native plant species.

Since the existing wetlands exhibits a range of saturated and seasonally ponded conditions, it will serve as a reference elevation for grading the created wetlands. Planting of the wetlands with native trees and shrubs will be completed during the planting season following construction.

#### **5.4.1. Site Hydrology**

Hydrology in the Category 4 wetlands is driven by seasonally high groundwater levels. As observed by CES staff yearly since 2006, the wetlands exhibit saturated conditions to the surface with areas of seasonal ponding during the rainy season (October to May).

Grading will occur adjacent to the existing wetlands to create small bermed depressions which will allow for additional areas of seasonal ponding. Because the grading is to occur adjacent to the existing wetlands creating depressional areas to hold back water, hydrology will not decrease over the current condition.

#### **5.4.2. Invasive Species Control Strategy**

Invasive plants refer to invasive, alien, or non-native plant species that pose a potential threat to existing native plant stands on the project site by displacing them due to their aggressive growth habits and rapid establishment. The target plant species for this site is listed below.

##### Himalayan blackberry (*Rubus armenicus*)

Himalayan blackberry (HBB) is a European species that is highly invasive and difficult to control. Originally introduced for fruit production, it is now naturalized and widespread throughout the Pacific Northwest.

This invasive blackberry species out-competes native understory vegetation and prevents the establishment of native trees that require sun for germination such as Pacific Madrone, Douglas fir and Western White Pine. Dense, impenetrable blackberry thickets can block access of larger wildlife to water and other resources.

HBB is abundant along rivers and wetland edges, often blocking access to these areas. In addition, blackberry lacks the deep, bank stabilizing roots of native wetland shrubs and trees (King County 2004).

Mowing of the existing HBB thickets followed by spot herbicide applications to new growth is the preferred method of control on this site. Upon completion of the cutting of the HBB canes in the spring prior to berry seed production, they should be arranged in scattered piles and left for cover in the forest understory for wildlife species. HBB canes

may also be mulched with mechanically and spread on the ground surface within the mitigation area.

In the fall it will be necessary to revisit the areas where the HBB canes were removed as resprout is likely to occur. Individual spot application in upland areas away from water sources to the resprouted canes with Garlon 3a (triclopyr amine formulation) and Roundup (glyphosate) is an effective treatment that has been used and accepted by the City of Portland Bureau of Environmental Services and City of Portland Department of Parks and Recreation Natural Resources Division (Soll 2004). Removal of resprouted canes in the vicinity of aquatic areas shall be accomplished by hand by grubbing the root mass from the ground.

Upon completion of the removal activities, large areas of exposed soils are likely to exist especially where larger blackberry thickets occurred. Overseed these areas with sterile straw or "Re-Green" to help reduce erosion of disturbed soil.

#### **5.4.3. Grading Design**

Access to the mitigation site will be provided from the cul-de-sac road and trail leading to the stormwater facility located along the east side of the wetland buffer. Prior to construction, silt fencing and other erosion control measures will be installed to prevent sediment or other pollutants from entering the existing wetlands. Silt fencing will be removed from the project area after the first year of project monitoring as determined by the wetland biologist.

Excavation of the created wetlands is expected to be completed primarily with an excavator. The wetlands will be constructed by removing material and placing it in a dump truck that will haul it to an upland disposal area. The material to be removed is expected to consist mainly of native soil. To ensure that the correct elevations are reached, a laser level will be frequently used by the excavation contractor during the excavation. Using the laser level, elevations in the newly constructed wetlands will be matched to elevations in the existing adjacent wetlands.

#### **5.4.4. Planting Design**

A summary of the planting plan is given in Tables 11 and 12. Upon completion of planting, the mitigation wetlands will mature into a matrix of PEM and PSS wetlands. Plantings will be installed in the appropriate hydrological regimes after the site has been graded which will support optimal growth and survival as determined by the wetland biologist. The proposed plant communities are consistent with those found in adjacent and nearby wetlands. It is expected that natural revegetation from an existing seed bank in the wetlands and natural recruitment from nearby sites will occur.



**Table 11. Plant list proposed for wetland creation area.**

Common Name	Scientific Name	Indicator Status	Community Composition	Required Number to be Planted
<b>Scrub-shrub Wetland Community (PSS)</b>				
Sitka willow	<i>Salix sitchensis</i>	FACW	25%	25
Scouler's willow	<i>Salix scouleriana</i>	FAC	25%	25
Red-osier dogwood	<i>Cornus sericea</i>	FACW	25%	25
Twinberry	<i>Lonicera involucrata</i>	FAC	25%	25
Nootka rose	<i>Rosa nutkana</i>	FAC	25%	25
<b>Total</b>				<b>125</b>

**Table 12. Plant list proposed for wetland enhancement area.**

Common Name	Scientific Name	Indicator Status	Community Composition	Required Number to be Planted
<b>Scrub-shrub Wetland Community (PSS)</b>				
Sitka willow	<i>Salix sitchensis</i>	FACW	20%	20
Scouler's willow	<i>Salix scouleriana</i>	FAC	20%	20
Red-osier dogwood	<i>Cornus sericea</i>	FACW	20%	20
Twinberry	<i>Lonicera involucrata</i>	FAC	20%	20
Nootka rose	<i>Rosa nutkana</i>	FAC	20%	20
<b>Total</b>				<b>100</b>

Wetland Creation Area - Plant graded and otherwise disturbed soils within the emergent portions of the wetlands with the following seed mix and overlay with weed-free straw mulch upon completion of grading. Complete seeding activities in late fall (mid-October to late November prior to the rainy season to facilitate germination.

Wetland Prairie Mix

35% Slough Sedge

25% Small Fruited Bulrush

20% Saw Beaked Sedge

10% Slender Rush

10% Creeping Spike Rush

Application rate: 6-12 lbs./acre

**5.4.5. Site Protection**

As the local regulatory permitting agency for this project, the City of Camas will require a financial surety of 105% of the total cost of the initial project mitigation installation to ensure mitigation success. Initial installation and financial surety shall be in place prior to final plat approval. The monitoring and financial surety program will run a period of five years with annual submittal of monitoring reports required.

**5.4.6. Implementation Schedule**

Expected site construction activities are to occur as described below. Planting of emergent areas within both mitigation areas is dependent upon ground conditions after the rains begin in the fall season after grading is completed. If the ground conditions are determined to be compacted enough to allow for planting of woody plant species, the work will be completed at that time. If conditions are not suitable, the planting will be deferred until the following planting season.

Mitigation Area #1

*Summer to Fall 2013* – Grading of the wetland creation area to achieve desired elevations.

*Fall 2013* – Seeding of wetland creation area emergent zones and disturbed portions of the upland buffer.

*Winter 2014* – Planting of the creation and enhancement wetlands with woody vegetation as outlined in Tables 11 and 12.

The sequence of activities to complete the mitigation includes staking of the wetland creation area as necessary, establishment of erosion control measures, excavation, transplanting of plant and soil material, seeding of bare soil areas in fall, and planting of native shrubs and trees during the dormant season, which generally extends from November through March.

Project mitigation monitoring will be initiated during the growing season following the initial planting of the mitigation areas.

## **5.5 Ecological Benefits**

### **5.5.1. Wetland Functions**

The mitigation design will create new and enhance existing Category 4 wetlands that will improve water quality, hydrologic, and habitat functions. The mitigation area will increase surface water storage, stabilize sediment, and provide primary production. The mitigation site, once fully developed, will support a healthy cover of emergent and scrub-shrub vegetation which will improve wildlife habitat conditions in the wetlands.

Table 15 shows which functions and values will be present at the mitigation wetland, as well as which type of mitigation provides which functions. Table 16 compares, in more specific terms, the characteristics of the wetland and buffer areas of the impacted versus mitigation sites.

**Table 15. Wetland functions provided by various areas of the mitigation site.**

Function/Value	Wetland Mitigation Area <sup>a</sup>	
	Creation	Rehabilitation
Flood Flow Alteration	-	-
Sediment Removal	+	+
Nutrient and Toxicant Removal	+	+
Erosion Control & Shoreline Stabilization	-	-
Production & Export of Organic Matter	+	+
General Habitat Suitability	+	+
Habitat for Aquatic Invertebrates	+	+
Habitat for Amphibians	+	+
Habitat for Wetland-Associated Mammals	+	+
Habitat for Wetland-Associated Birds	+	+
General Fish Habitat	-	-
Native Plant Richness	+	+
Educational or Scientific Value	-	-
Uniqueness and Heritage	-	-

<sup>a</sup> "-" means that the function will not be present; "X" means that the function will be present is of low quality; and "+" means the function will be present and will be of high quality.

**Table 16. Comparison of the typical wetland functions at impacted wetlands and mitigated wetlands.**

Function/Value	Comparison of Typical Wetland Functions Provided	
	Impacted Wetland	Mitigation Site
Flood Flow Alteration	Low Quality	Low Quality
Sediment Removal	High Quality	High Quality
Nutrient and Toxicant Removal	High Quality	High Quality
Erosion Control & Shoreline Stabilization	Not Present	Not Present
Production & Export of Organic Matter	High Quality	High Quality
General Habitat Suitability	High Quality	High Quality
Habitat for Aquatic Invertebrates	High Quality	High Quality
Habitat for Amphibians	High Quality	High Quality
Habitat for Wetland-Associated Mammals	High Quality	High Quality
Habitat for Wetland-Associated Birds	High Quality	High Quality
General Fish Habitat	Not Present	Not Present
Native Plant Richness	High Quality	High Quality
Educational or Scientific Value	Not Present	Not Present
Uniqueness and Heritage	Not Present	Not Present

## Chapter 6. Wetland Mitigation Goals, Objectives, and Performance Criteria

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The proposed mitigation site will be monitored for 10 years to demonstrate that the intended goals and objectives are established. Goals describe the overall intent of mitigation efforts, and objectives describe individual components of the mitigation site in detail. Performance measures and performance standards describe specific on-site characteristics that indicate a function is being provided. Performance measures are used to guide management of the mitigation site. Performance standards are used to evaluate compliance with regulatory permits in the final year of monitoring. Contingency plans describe what actions can be taken to correct site deficiencies.

An adaptive management process will be used to improve mitigation success. Adaptive management involves learning from monitoring and implementing management activities, such as implementing parts of the site management or contingency plans. Information from monitoring is used to direct subsequent site management activities. As part of the adaptive management process, mid-course corrections may necessitate a change in vision for the site if nature takes its course and things turn out differently than planned. A change in vision may require renegotiation with regulators for a new set of performance standards.

### 6.1 Goals

The goal of the mitigation is to achieve a net gain in wetland functions and values in the Columbia Slope Watershed despite the net loss of 0.12 acres of wetlands as listed below:

- Improve water quality conditions
- Improve habitat conditions
- Provide additional flood storage in wetlands
- Restore wetlands degraded by past land use activities and reduce cover of non-native blackberries

## 6.2 Objectives

### Wetland Enhancement Area

1. Provide enhancement of 0.14 acres of existing wetland area planting native shrubs.
2. Improve habitat functions by increasing the number of vegetation strata; canopy closure over the wetlands; the number of native plant species; and the number of plant assemblages.
3. Improve buffer condition; increase the diversity of plant communities in areas currently dominated by blackberries.

### Wetland Creation Area

1. Increase wetland area at the mitigation site by excavating upland area to create wetland on 0.15 acres.
2. Improve hydrologic functions by increasing flood storage capacity through creation of wetlands; extend wetland hydroperiod; and increase cover of woody vegetation.
3. Improve habitat functions by increasing the number of vegetation strata; canopy closure over the wetlands; the number of hydrologic regimes; the number of native plant species; the number of plant assemblages; improve buffer condition.

## 6.3 Performance Criteria

The performance standards described below provide benchmarks for measuring achievement of the goals and objectives of the mitigation site. Mitigation activities are intended to meet these performance standards within a specified time frame. The performance standards are based on function characteristics described in *Method for Assessing Wetland Functions* (Hruby et al. 1999). These performance standards measure structural attributes that provide a reasonable indication of wetland functions. Methods to monitor each performance standard are described in general terms.

### **Hydrologic Performance Criteria**

The hydrologic performance measures/standards help to document and verify that wetland area and ground elevations are established according to the criteria specified during the design. These directly relate to objectives in Section 6.2.

### ***Performance Measures***

#### ***Years 1, 2, 3, 5, and 7***

The soils in the created and enhanced wetlands will be saturated to the surface, or standing water will be present within 12 inches of the surface for at least 4 consecutive weeks (10 percent) of the growing season in years when rainfall meets or exceeds the 30-year average.

### ***Performance Standard (final year of monitoring)***

The wetland mitigation site will be delineated using current methods to assure that the mitigation site contains 0.3 acres of wetlands (wetland enhancement and creation areas combined).

### **Wetland Vegetation Performance Criteria**

The wetland vegetation performance criteria directly relate to objectives in Section 6.2.

### **Performance Measures**

#### ***Years 1-2***

Native, wetland (facultative and wetter) woody species (planted and volunteer) will achieve an average density of at least 4 plants per 100 square feet in the scrub-shrub communities of the created and enhanced wetland areas.

#### ***Year 3***

Aerial cover of native, wetland (facultative and wetter) herbaceous plant species will be at least 30 percent in the emergent community of the created and enhanced wetlands. Aerial cover of native woody species (planted and volunteer) in the scrub-shrub communities will be at least 20 percent.

#### ***Year-5***

Aerial cover of native, wetland (facultative and wetter) herbaceous plant species will be at least 50 percent in the emergent community of the created and enhanced wetlands. Aerial cover of native, wetland (facultative and wetter) woody species will be at least 35 percent in the scrub-shrub communities of the created and enhanced wetlands.

#### ***Year-7***

Aerial cover of native, wetland (facultative and wetter) herbaceous plant species will be at least 70 percent in the emergent community of the created and enhanced wetlands. Aerial cover of native, wetland (facultative and wetter) woody species will be at least 50 percent in the scrub-shrub communities of the created and enhanced wetlands.

#### ***All years***

County-listed Class-A noxious weeds will be eradicated within created and enhanced wetlands as they are discovered during monitoring.

### **Performance Standards**

#### ***Year 10***

Aerial cover of native, wetland (facultative and wetter) herbaceous plant species will be at least 70 percent in the emergent community of the created and enhanced wetlands. Aerial



cover of native woody species will be at least 70 percent in the scrub-shrub communities in the created and enhanced wetlands.

County-listed Class-A noxious weeds will be eradicated and will not exceed 10 percent aerial cover in the created and enhanced wetlands.

**Table 17. Hydrologic performance standards by monitoring year.**

Monitoring Area	Performance Standard	Monitoring Measure	Monitoring Schedule	Contingency
SS (Scrub-shrub wetlands)  EM (Emergent wetlands)	Soils saturated to the surface, or standing water will be present within 12 inches of the surface for at least 4 consecutive weeks (10 percent) of the growing season in years when rainfall meets or exceeds the 30-year average.	During the time period of March 1 to October 31, or the growing season, the hydrology of the emergent wetland mitigation area shall range at minimum from saturated at the surface to ponded or flooded for 30 consecutive days.	Years 1, 2, 3, 5, and 7.	Consult with the USACE to remediate hydrological conditions through additional site grading to achieve proper depths to seasonal groundwater.

**Table 18. Wetland vegetation performance standards by monitoring year.**

SS (Scrub-shrub wetlands)	Achieve an average density of at least 15 native woody plants per 1000 square feet.	Comprehensive count of failed plantings.	Years 1 and 2	Replace failed plantings.
	Aerial cover of native woody species (planted and volunteer) will be at least 20 percent.	Visual Estimate	Year 3	Replace failed plantings.
	Aerial cover of native woody species (planted and volunteer) will be at least 35 percent.	Visual Estimate	Year 5	Replace failed plantings.
	Aerial cover of native woody species (planted and volunteer) will be at least 50 percent.	Visual Estimate	Year 7	Replace failed plantings.
	Aerial cover of native woody species (planted and volunteer) will be at least 70 percent.	Visual Estimate	Year 10	Replace failed plantings.
EM (Emergent wetlands)	Wetlands: Cover shall be 30%	Visual Estimate	Year 3	Seed bare soil areas.
	Wetlands: Cover shall be 50%	Visual Estimate	Year 5	Seed bare soil areas.
	Wetlands: Cover shall be 70%	Visual Estimate	Years 7 through 10	Seed bare soil areas.

## 6.4 Monitoring

Vegetation monitoring will occur and be reported annually so that progress toward meeting performance standards can be evaluated and adaptive management implemented, if necessary. Because this plan includes the implementation of slow developing habitats (i.e. scrub-shrub wetlands), a ten-year monitoring period with monitoring completed and documented in years 1, 2, 3, 5, 7, and 10 will be required.

The site will be evaluated during the summer following plant installation to assess survival rates and document the presence of non-native invasive species. Informal (qualitative) assessments of the mitigation sites will be completed in years 4, 6, 8 for adaptive management purposes only. Monitoring will be designed to determine if the performance measures or performance standards have been met. Monitoring reports will be submitted for review and comment to the recipients listed in Table 19 by April following the formal monitoring activities conducted the previous year.

Due to the small number of mitigation plantings for this project, a total plant count will be completed during each monitoring to determine the number of live and dead plants. If it is determined that the coverage percentages are not being met, plants will be replaced during

the following planting season. Sampling will be conducted the same season each year, during the growing season when vegetation is more easily identifiable.

**Table 19. Wetland mitigation monitoring report recipients.**

Permitting Agency or Organization	Contact Name and Address
U.S. Army Corps of Engineers	Steve Manlow 2108 Grand Boulevard Vancouver, Washington 98661
City of Camas	Sarah Fox 616 NE 4 <sup>th</sup> Avenue Camas, WA 98607

#### **6.4.1. Contingency Plan**

It is anticipated that the mitigation goals will be accomplished with the construction and installation of the mitigation design as shown on the grading and planting plans. Contingency actions, however, may be needed to correct unforeseen problems. Contingency revisions typically require coordination with the permitting agencies.

As necessary, contingency measures (site management or revisions to performance criteria with permitting agency agreement) will be implemented to meet performance measures and performance standards. The following describes potential situations that may occur and the potential contingencies that might be implemented to correct the problem. Because not all site conditions can be anticipated, the contingencies discussed below do not represent an exhaustive list of potential problems or remedies.

##### **Hydrology**

Hydrologic problems occurring on a mitigation site are typically the result of either insufficient water or excessive water. Insufficient water can occur seasonally during drought conditions or can be a long-term problem. Long-term problems can be the result of altered surface water flows for mitigation sites reliant on surface water flows as the primary source of hydrology. For groundwater driven mitigation sites, typical long-term hydrologic problems that result in either excessive or insufficient hydrology can occur from a design based on insufficient groundwater data, the establishment of incorrect final grade elevations, or an unperceived soil condition that alters groundwater flows. Hydrologic contingency measures will be implemented based on observed conditions or monitoring data. Steps to address insufficient or excessive hydrology are the following:

- Clearly identify the source of the problem.
- Consult with the resource agencies to determine an appropriate course of action.
- Adjust elevations or install water management structures to achieve appropriate hydrologic conditions.

## **Vegetation**

Problems related to vegetation include plant mortality, and poor growth resulting in low plant cover. These problems could be the result of insufficient site management, particularly watering in the first few growing seasons, animal browse, competition from invasive species, incorrect plant selection, altered site conditions, and vandalism. Contingencies for plant mortality and poor plant cover may include the following:

- Plant replacement – Additional planting may be required to meet plant survival and plant cover requirements. Plant species will be evaluated in relation to site conditions to determine if plant substitutions will be required.
- Weed control – Control of non-native invasive species may be required to meet survival and plant cover requirements. Weed control methods could include mechanical or hand control, mulching, or herbicide application.
- Herbivore control – If plant survival or vegetation cover standards are not met because of animal browse, the wildlife responsible will be identified and appropriate control measures will be attempted. This could include plant protection, fence installation, or the use of repellents. However, some pestilent and invasive wildlife species are difficult to avoid. Implementing precautionary measures with design and placement will minimize unwanted species but likely not eliminate them. Wildlife damage and manipulation to plantings and structures should be expected to occur and, with exceptions, it may be necessary to accept the situation and allow the vegetation to mature under these conditions. Occasionally it may be necessary to dissuade or exclude destructive wildlife species. Native species such as beaver may initially have perceived damaging effects on the expected outcome of a mitigation site; however, the site modifications that result from their activities can create functions and habitats suited to several other species.
- Vandalism – To prevent vegetation disturbance from vandalism, additional fence installation and sensitive area signage may be installed.

## **6.5 Site Management**

The mitigation site will be managed annually for 10 years. Site management activities shall include noxious weed control and may include mulching, fertilizing, supplemental watering, maintaining access, repairing damage from vandals, correcting erosion or sedimentation problems, or litter pickup.

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## Appendix A — Mitigation Site Wetland Memo

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Description of Category 4 wetlands on-site Breckenridge Subdivision Wetland Delineation and Assessment Report (Barnes 2013)

Based on the categorizations given in the Washington State Wetland Rating System for Western Washington (Hruby 2004; see Appendix B), the study area contains slope wetlands which are defined as wetlands which originate at the base or midslope of the gently undulating terrace slopes on this site where groundwater “daylights” and begins running along the surface, or immediately below the soil surface. Water in these wetlands flows only in one direction (down the slope) and the gradient is steep enough that the water is not impounded. The “downhill” side of the wetland is always the point of lowest elevation in the wetland.

The slope wetlands receive seasonal hydrology from a wetland on the property to the north and also a storm pipe that is located along the north side of Tax Parcel 125648-000. An old gravel road bed extends west from SE 202nd Court in the north portion of the study area. This gravel road has effectively inhibited flow across the natural north-south drainage through the study area creating a emergent wetland on the property to the north. However, due to the pervious nature of the roadbed, water from the off-site wetland seeps through the roadbed onto the study area into a small emergent wetland. This wetland tapers in shape as it continues to the southwest and enters into a defined stream channel which flows across the southwest portion of the site.

The emergent wetland area in the north study area is located between large thickets of Himalayan blackberry (*Rubus armeniacus* - FACU) and Douglas hawthorn (*Crataegus douglasii* - FAC). The dominant vegetation in the wetlands is nootka rose (*Rosa nutkana* - FAC), Douglas’ meadowsweet (*Spiraea douglasii* - FACW), lady fern (*Athyrium felix-femina* - FAC), lamp rush (*Juncus effusus* - FACW), birdsfoot trefoil (*Lotus corniculatus* - FAC), fringed willowherb (*Epilobium watsonii* - FACW), Fuller’s teasel (*Dipsacus fullonum* - FAC), common velvetgrass (*Holcus lanatus* - FAC), and curly dock (*Rumex crispus* - FAC). The emergent wetland transitions into a narrow incised stream channel as the topography steepens in the southwest portion of the study area (Photo 1). The stream corridor averages less than three feet in width along most of its length. Little to no wetland vegetation exists in the stream channel and the stream banks are dominated by upland plant species.

Generally, soils in the wetlands are a dark gray silty clay loam (generally 10YR 3/1) with common distinct dark reddish-brown mottles (generally 10YR 3/4). Soils were saturated to the surface and the stream contained flow at the time of the site visit. Other hydrology indicators in the wetland areas included redoximorphic features such as iron concretions and oxidized rhizospheres within 10 inches of the soil surface. Wetland hydrology is being influenced to some degree by off-site drainage alterations which are directing point source stormwater flows onto the northeast corner of Tax Parcel 125601-000.

## **Appendix B — Mitigation Site Plan Sheets**

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**Figure 1. Project and Mitigation Vicinity Map**

**Figure 2. Existing Site Conditions**

**Figure 3. Proposed Wetland Impacts**

**Figure 4. Existing Site Topographic Contours and Cross-Sections**

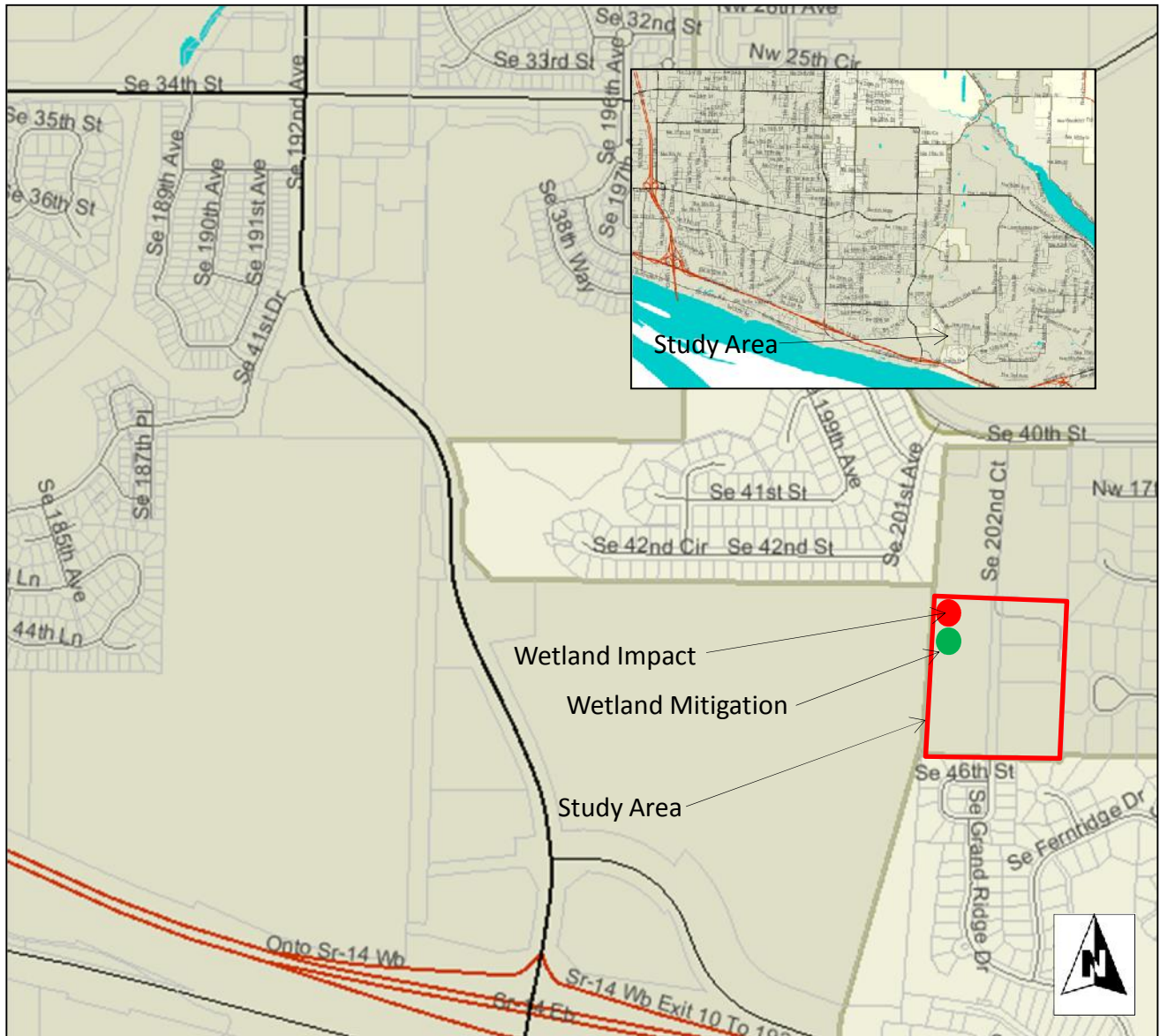
**Figure 5. Proposed Wetland Topography – Wetland Creation Area**

**Figure 6. Cross-Section Profiles**

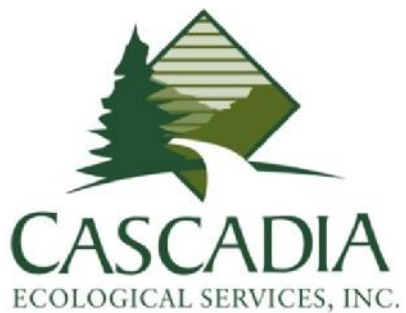
**Figure 7. Wetland Buffer Averaging Areas**

**Figure 8. Wetland Creation and Enhancement Areas**





Graphic Source: Clark County GIS  
 Lat/Long: 45.589386,  
 --122.465195  
 NE 1/4,S08,T1N,R3E



**FIGURE 1**  
**PROJECT AND MITIGATION VICINITY MAP**  
**WETLAND MITIGATION PLAN**  
**PROJECT: BRECKENRIDGE SUBDIVISION**  
**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**  
**APPLICANT: LENNAR NORTHWEST, INC.**  
**SCALE: 1" = 600'**  
**DATE: 5/7/13**

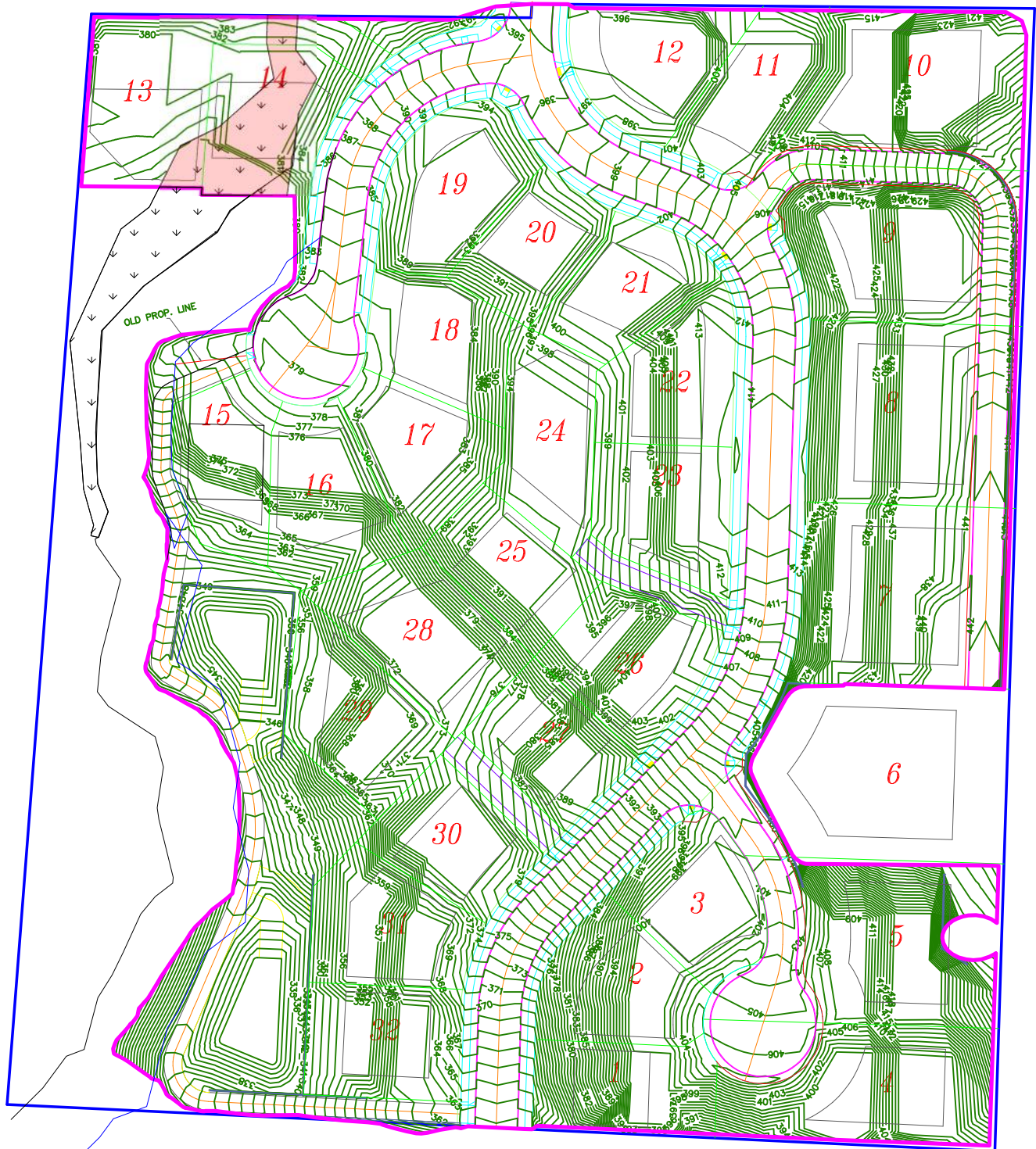




**FIGURE 2**  
**EXISTING SITE CONDITIONS**  
**WETLAND MITIGATION PLAN**  
**PROJECT: BRECKENRIDGE SUBDIVISION**  
**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**  
**APPLICANT: LENNAR NORTHWEST, INC.**  
**SCALE: 1" = 100'**  
**DATE: 5/7/13**







**FIGURE 3**

**PROPOSED WETLAND IMPACTS**

**WETLAND MITIGATION PLAN**

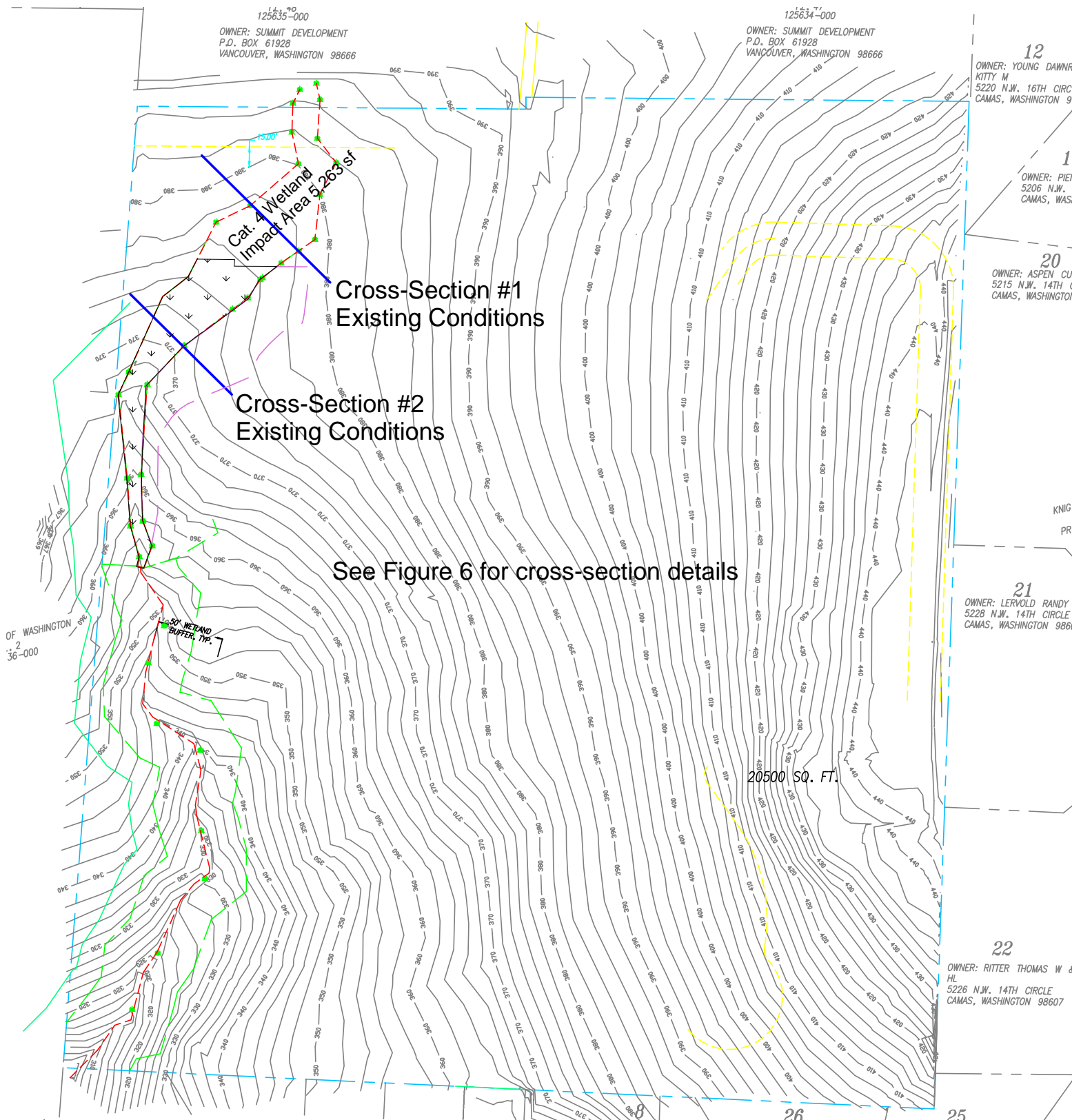
**PROJECT: BRECKENRIDGE SUBDIVISION**

**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**

**APPLICANT: LENNAR NORTHWEST, INC.**

**SCALE: 1" = 100'**

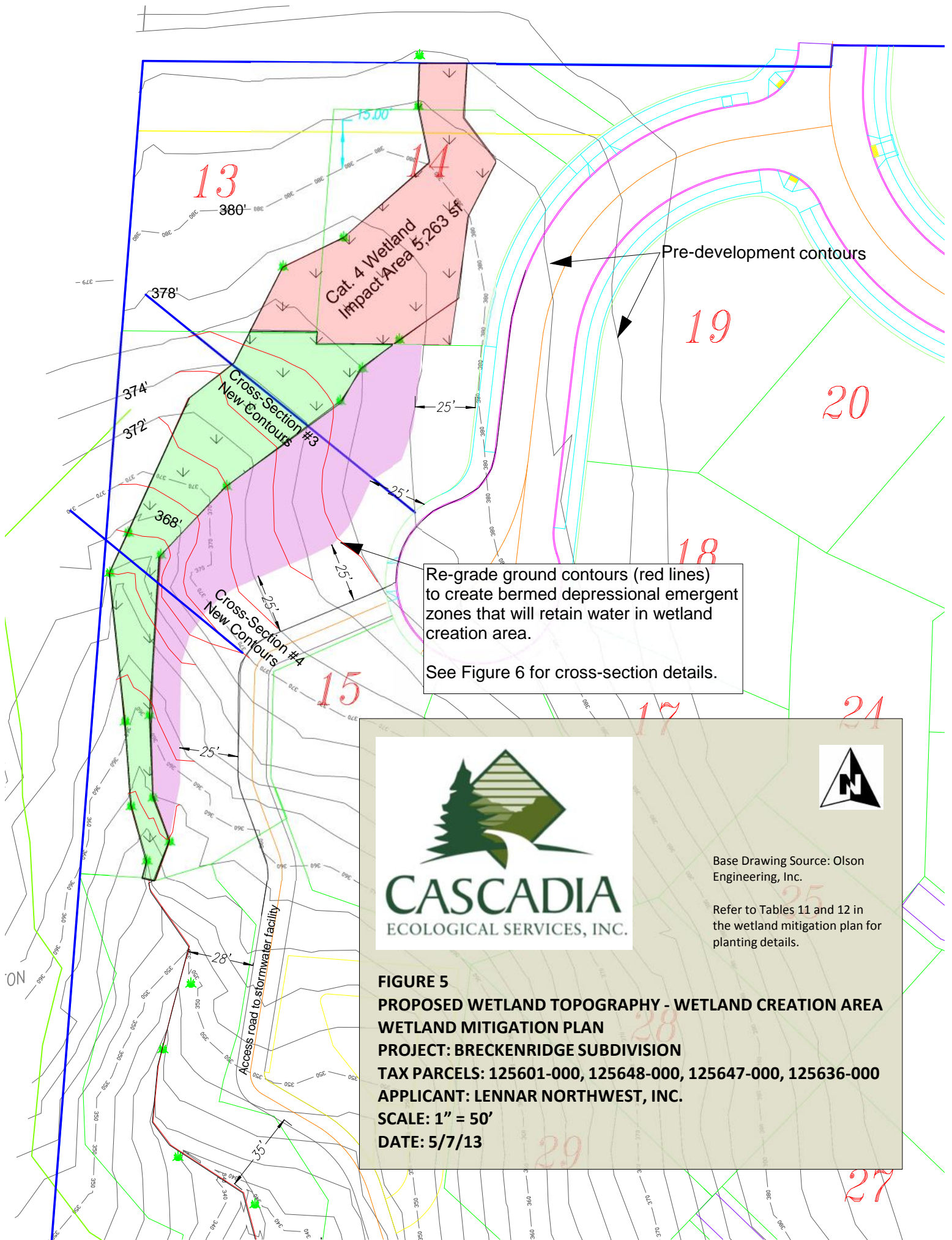
**DATE: 5/7/13**



**FIGURE 4**  
**EXISTING SITE TOPOGRAPHIC CONTOURS AND CROSS-SECTIONS**  
**WETLAND MITIGATION PLAN**  
**PROJECT: BRECKENRIDGE SUBDIVISION**  
**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**  
**APPLICANT: LENNAR NORTHWEST, INC.**  
**SCALE: 1" = 100'**  
**DATE: 5/7/13**







Re-grade ground contours (red lines) to create bermed depressional emergent zones that will retain water in wetland creation area.

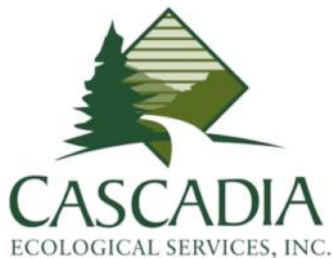
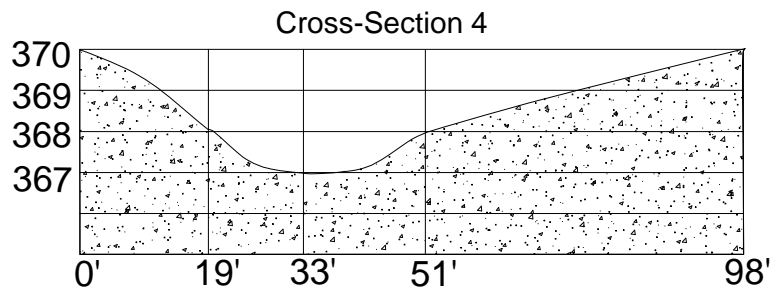
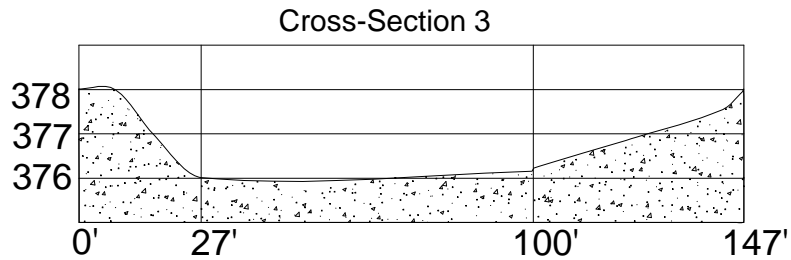
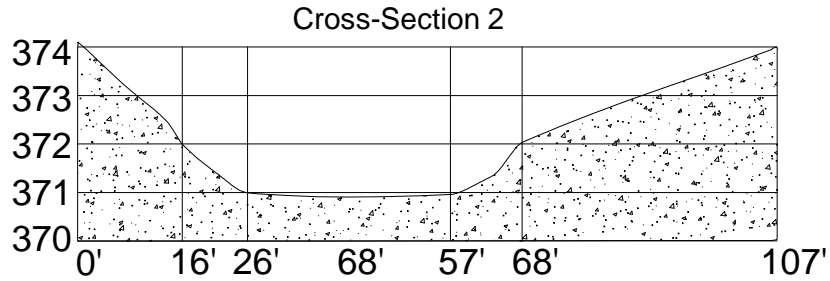
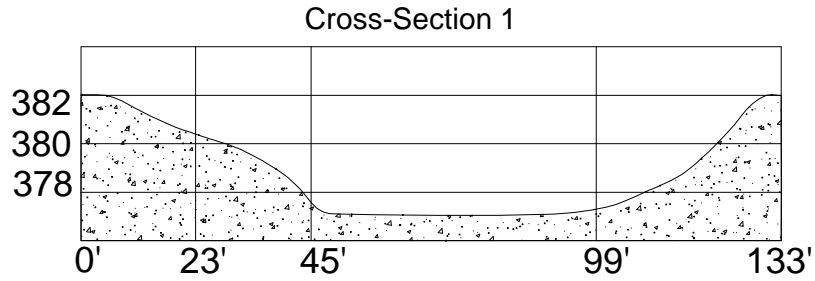
See Figure 6 for cross-section details.



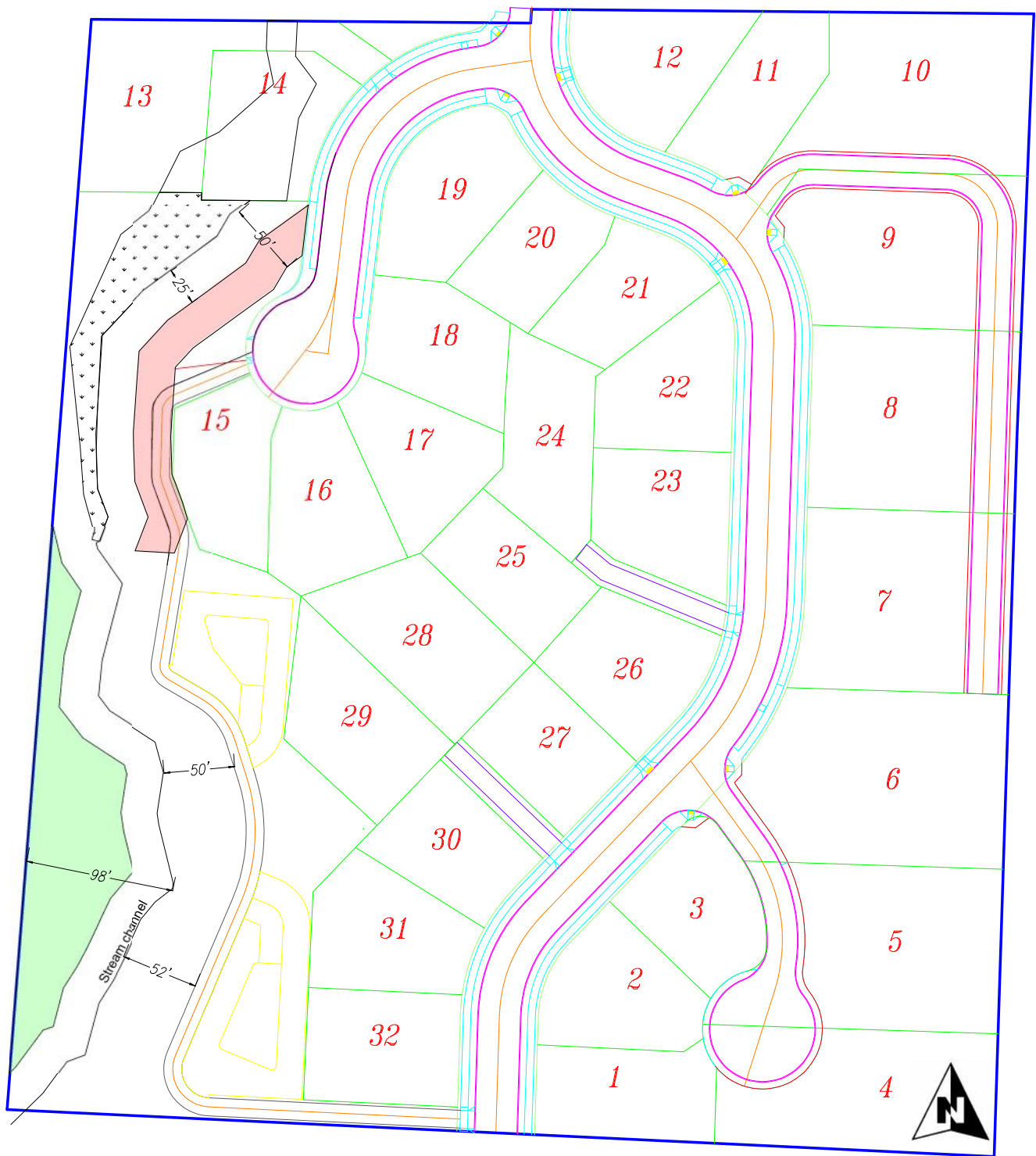
Base Drawing Source: Olson Engineering, Inc.

Refer to Tables 11 and 12 in the wetland mitigation plan for planting details.

**FIGURE 5**  
**PROPOSED WETLAND TOPOGRAPHY - WETLAND CREATION AREA**  
**WETLAND MITIGATION PLAN**  
**PROJECT: BRECKENRIDGE SUBDIVISION**  
**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**  
**APPLICANT: LENNAR NORTHWEST, INC.**  
**SCALE: 1" = 50'**  
**DATE: 5/7/13**



**FIGURE 6**  
**CROSS-SECTION PROFILES**  
**WETLAND MITIGATION PLAN**  
**PROJECT: BRECKENRIDGE SUBDIVISION**  
**TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000**  
**APPLICANT: LENNAR NORTHWEST, INC.**  
**SCALE: NTS**  
**DATE: 5/7/13**



Category 4 Slope Wetlands - 5,995 sf



Wetland Buffer Deficit Area  
6,567 sf



Wetland Buffer Compensation Area  
12,310 sf



#### FIGURE 7

#### WETLAND BUFFER AVERAGING AREAS

#### WETLAND MITIGATION PLAN

PROJECT: BRECKENRIDGE SUBDIVISION

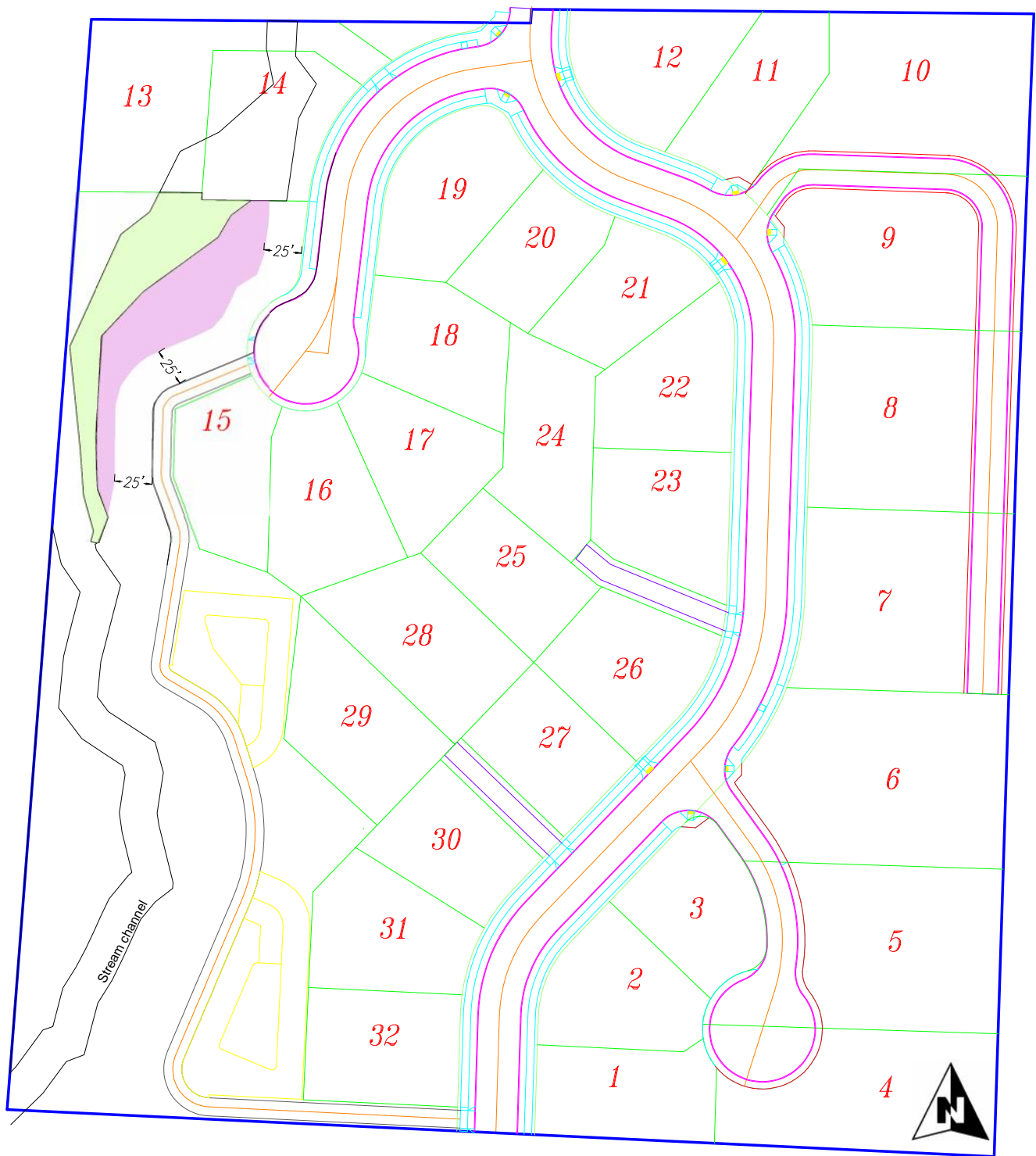
TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000

APPLICANT: LENNAR NORTHWEST, INC.

SCALE: 1" = 100'

DATE: 5/7/13

Base Drawing Source: Olson  
Engineering, Inc.



Wetland Enhancement Area - 5,995 sf



Wetland Creation Area - 6,567 sf



# FIGURE 8

## WETLAND CREATION AND ENHANCEMENT AREAS

### WETLAND MITIGATION PLAN

PROJECT: BRECKENRIDGE SUBDIVISION

TAX PARCELS: 125601-000, 125648-000, 125647-000, 125636-000

APPLICANT: LENNAR NORTHWEST, INC.

SCALE: 1" = 100'

DATE: 5/7/13

Base Drawing Source: Olson  
Engineering, Inc.



## **Appendix C — Wetland Rating Form for Anticipated Mitigation Site Conditions at the end of Monitoring**

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Wetland name or number C4

### 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): Category 4 Wetland Date of site visit: 4/18/13

Rated by Jim Barnes Trained by Ecology? Yes ☒ No ☐ Date of training 11/23/11

SEC: 8 TOWNSHIP: 1N RANGE: 3E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 4 Estimated size 1 ac.

### SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ☐ II ☐ III ☐ IV ☒

Category I = Score  $\geq 70$

Category II = Score 51-69

Category III = Score 30-50

Category IV = Score  $< 30$

Score for Water Quality Functions

2

Score for Hydrologic Functions

5

Score for Habitat Functions

16

TOTAL score for Functions

23

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ Does not Apply ☒

Final Category (choose the "highest" category from above)

IV

### Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics	Wetland HGM Class used for Rating
Estuarine	Depressional
Natural Heritage Wetland	Riverine
Bog	Lake-fringe
Mature Forest	Slope
Old Growth Forest	Flats
Coastal Lagoon	Freshwater Tidal
Interdunal	
None of the above	Check if unit has multiple HGM classes present <input type="checkbox"/>

Wetland name or number C4

**Does the wetland unit 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.

<b>Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)</b>	<b>YES</b>	<b>NO</b>
SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered <b>animal or plant</b> species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		✓
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered <b>animal</b> 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 I Natural Heritage Wetlands (see p. 19 of data form).		✓
SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>		✓
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.		✓

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

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

## Classification of Wetland Units in 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 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 the 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 unit **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) at least 20 acres (8 ha) in size;

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

☒ NO – go to 4

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

4. Does the entire wetland unit **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 type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*

NO - go to 5

☒ YES – The wetland class is **Slope**

Wetland name or number C4

S Slope Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality		(only 1 score per box)
S	S 1. Does the wetland unit have the <u>potential</u> to improve water quality?	(see p.64)
S	S 1.1 Characteristics of average slope of unit: Slope is 1% or less (a 1% slope has a 1 foot 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	Ø
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions) YES = 3 points NO = 0 points	Ø
S	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 4  2
S	Total for S 1 Add the points in the boxes above	2
S	S 2. Does the wetland unit 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. 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 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — <input checked="" type="checkbox"/> 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 1
S	TOTAL - Water Quality Functions Multiply the score from S1 by S2 Add score to table on p. 1	2

Comments



Wetland name or number C4

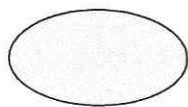
S Slope Wetlands		Points
HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion		(only 1 score per box)
	<b>S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?</b>	(see p.68)
S	<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually &gt; 1/8in), or dense enough, to remain erect during surface flows)</p> <p>Dense, uncut, <b>rigid</b> vegetation covers &gt; 90% of the area of the wetland. points = 6</p> <p>Dense, uncut, <b>rigid</b> vegetation &gt; 1/2 area of wetland points = 3</p> <p>Dense, uncut, <b>rigid</b> vegetation &gt; 1/4 area points = 1</p> <p>More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0</p>	3
S	<p>S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows:</p> <p>The slope wetland has small surface depressions that can retain water over at least 10% of its area.</p> <p>YES points = 2</p> <p>NO points = 0</p>	2
S	Add the points in the boxes above	5
S	<p><b>S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?</b></p> <p>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.</p> <p>— Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p>— Other _____</p> <p>(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)</p> <p>YES multiplier is 2 NO multiplier is 1</p>	(see p. 70)
S	<p><b>TOTAL - Hydrologic Functions</b> Multiply the score from S 3 by S 4</p> <p>Add score to table on p. 1</p>	5

Comments

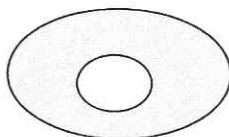
[illegible]

**H 1.4. Interspersion of habitats** (*see p. 76*)

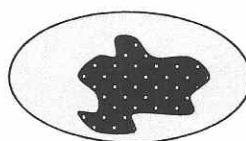
Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



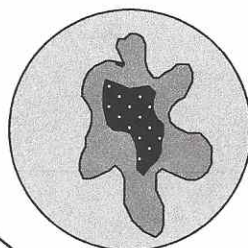
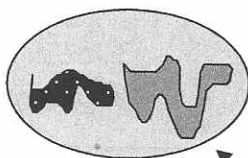
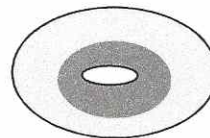
None = 0 points



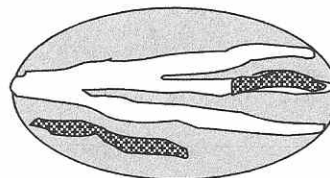
Low = 1 point



Moderate = 2 points



High = 3 points



[riparian braided channels]

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

Figure 42**H 1.5. Special Habitat Features:** (*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.

- ☒ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).
- ☒ Standing snags (diameter at the bottom > 4 inches) in the wetland
- ☐ 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)
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present (*cut shrubs or trees that have not yet turned grey/brown*)
- ☐ At least ¼ 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*)
- ☐ 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.

2

**H 1. TOTAL Score** - potential for providing habitat  
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

8

Comments



<p><b>H 2. Does the wetland unit have the opportunity to provide habitat for many species?</b></p> <p><b>H 2.1 Buffers</b> (<i>see p. 80</i>)  <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <ul style="list-style-type: none"> <li>— 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water &gt;95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) <b>Points = 5</b></li> <li>— 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water &gt; 50% circumference. <b>Points = 4</b></li> <li>— 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water &gt;95% circumference. <b>Points = 4</b></li> <li>— 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water &gt; 25% circumference. <b>Points = 3</b></li> <li>✓ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for &gt; 50% circumference. <b>Points = 3</b></li> </ul> <p style="text-align: center;"><b>If buffer does not meet any of the criteria above</b></p> <ul style="list-style-type: none"> <li>— No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland &gt; 95% circumference. Light to moderate grazing, or lawns are OK. <b>Points = 2</b></li> <li>— No paved areas or buildings within 50m of wetland for &gt;50% circumference. Light to moderate grazing, or lawns are OK. <b>Points = 2</b></li> <li>— Heavy grazing in buffer. <b>Points = 1</b></li> <li>— Vegetated buffers are &lt;2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) <b>Points = 0.</b></li> <li>— Buffer does not meet any of the criteria above. <b>Points = 1</b></li> </ul> <p style="text-align: right;">Aerial photo showing buffers</p>	<p><b>Figure</b> <u>4</u></p> <p style="text-align: center; font-size: 2em;">3</p>
<p><b>H 2.2 Corridors and Connections</b> (<i>see p. 81</i>)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor</i>).  <b>YES = 4 points</b> (<i>go to H 2.3</i>)      <del>NO</del> = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? <b>OR a Lake-fringe wetland</b>, if it does not have an undisturbed corridor as in the question above?  <b>YES = 2 points</b> (<i>go to H 2.3</i>)      <del>NO</del> = H 2.2.3</p> <p>H 2.2.3 Is the wetland:  within 5 mi (8km) of a brackish or salt water estuary OR  within 3 mi of a large field or pasture (&gt;40 acres) OR  within 1 mi of a lake greater than 20 acres?  <del>YES</del> = <b>1 point</b>      <b>NO = 0 points</b></p>	<p style="text-align: center; font-size: 2em;">1</p>

Total for page 4

H 2.3 Near or adjacent to other priority habitats listed by WDFW (*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>*)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

\_\_\_ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).

\_\_\_ **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*).

\_\_\_ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

\_\_\_ **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%; 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.

\_\_\_ **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*).

✓ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

\_\_\_ **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*).

\_\_\_ **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.

\_\_\_ **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*).

\_\_\_ **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.

\_\_\_ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

\_\_\_ **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.

\_\_\_ **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.

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

*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)*

Wetland name or number C4

<p><b>H 2.4 Wetland Landscape</b> (choose the <b>one</b> description of the landscape around the wetland that best fits) (see p. 84)</p> <p>There are at least 3 other wetlands within ½ 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</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake <b>with</b> disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3
<p><b>H 2. TOTAL Score</b> - opportunity for providing habitat Add the scores from H2.1, H2.2, H2.3, H2.4</p>	8
<p>TOTAL for H 1 from page 14</p>	8
<p><b>Total Score for Habitat Functions</b> – add the points for H 1, H 2 and record the result on p. 1</p>	16