3.5 WETLANDS

Wetlands are defined as areas that are saturated or inundated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands are biologically diverse and dynamic ecosystems; they can perform a variety of unique physical, chemical, and biological functions that benefit both human and biological environments. These functions can include flood storage and retention, stream base flow maintenance and groundwater support, water quality improvement, shoreline protection, and biological support for fish and wildlife habitat (Hruby et al. 1999). Wetland areas are also used for a broad range of recreational, educational, and aesthetic activities including bird watching and hunting. Many factors can affect a wetland's capacity to perform specific functions, such as the size of the wetland, the landscape and basin location, vegetation diversity, and the level of disturbance.

STUDY AREA AND METHODOLOGY

The study area for the evaluation of potential impacts on wetlands includes the 166-acre proposed project site and the 100-acre wetland mitigation site. Potential impacts to wetlands were also studied for the area within 300 feet of the Anacortes Subdivision. This distance was determined based on the wetland site assessment requirements in the Skagit County Code (SCC). Other select laws, regulations, and guidance applicable to wetlands associated with the proposed project are summarized in Table 3.5-1. The cumulative impacts study area is Water Resource Inventory Area (WRIA) 3, Lower Skagit Samish (Figure 3.5-1). WRIA 3 is the watershed that provides water quality functions to Padilla Bay and Fidalgo Bay.

Figure 3.5-1 Wetland Study Area for Cumulative Impacts

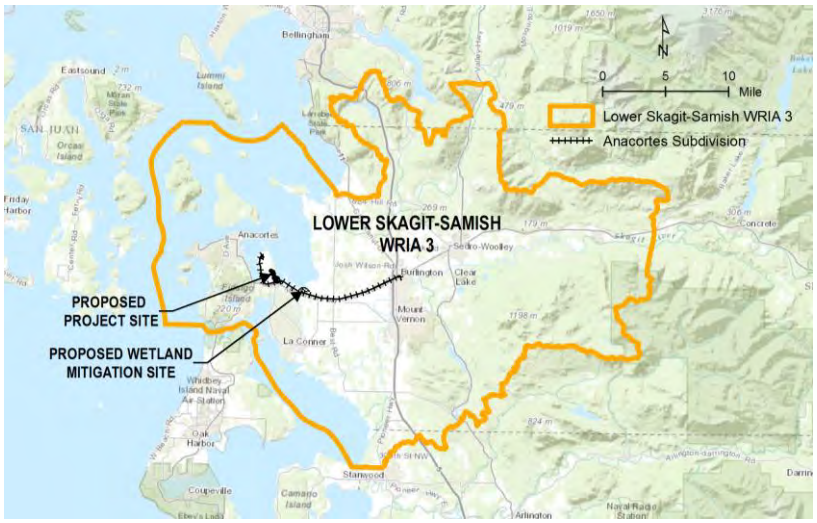


Table 3.5-1 Laws, Regulations, and Guidance for Project-Related Wetlands

Laws, Regulations, and Guidance	Description
Federal	
Clean Water Act (CWA) (33 USC 1251 et seq.)	Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulates quality standards for surface water. Section 401(33 USC 1251) Water Quality Certifications are required for any activity that requires a federal permit or license to discharge any pollutant into waters of the United States. This certification attests that the responsible agency has reasonable assurance the proposed activity will meet its water quality standards. Section 404 (33 USC 1344) established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands.
The Federal Coastal Zone Management Act	Through the Federal Coastal Zone Management Act, coastal states with approved Coastal Zone Management Programs (CZMP) require projects operating under a federal permit or license to demonstrate consistency with the CZMPs. Federal Consistency allows states to review those projects that are likely to affect state coastal resources or uses.
State	
State Environmental Policy Act (SEPA) (RCW 43.21c; WAC 197-11)	Helps state and local agencies in Washington identify possible environmental impacts that could result from a proposed action, alternatives to the proposed action, and potential impact minimization and mitigation measures. Information learned through the review process can be used to change a proposal to reduce likely impacts and inform permitting decisions at the state and local levels.
Washington State Coastal Zone Management Program	Under Washington's Coastal Zone Management Program (WCZMP), projects that are likely to affect state coastal resources or uses must be consistent with the WCZMP's enforceable policies found in the Shoreline Management Act, the Ocean Resource Management Act, the Water Pollution Control Act, and the Clean Air Act and all state regulations that implement those Acts.

Laws, Regulations, and Guidance	Description
Washington State Shoreline Management Act (RCW 90.58)	Provides a statewide framework for managing, accessing and protecting shorelines of the state and reflects the strong interest of the public in shorelines and waterways for recreation, protection of natural areas, aesthetics and commerce.
Washington State Hydraulic Code (WAC 220-660)	A hydraulic project is the construction or performance of work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. Unless otherwise provided, any person who wishes to conduct a hydraulic project must get a construction permit called the hydraulic project approval (HPA) from the Washington Department of Fish and Wildlife (WDFW). The purpose of the HPA is to ensure that construction or performance of work is done in a manner that protects fish life.
Local	
Skagit County Critical Areas Ordinance (SCC 14.24)	This ordinance was developed under the directives of the Growth Management Act to designate and protect critical areas and to assist in conserving the value of property, safeguarding the public welfare and providing protection for these areas. Critical areas are defined as wetlands, aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas.
Skagit County Shoreline Master Program (SCC 14.26)	The Shoreline Master Program (SMP) is comprised of local land use policies and regulations designed to manage shoreline use. The SMP protects natural resources for future generations, provides for public access to public waters and shores, and plans for water dependent uses. It was created in partnership with the local community and Ecology and must comply with the Shoreline Management Act and Shoreline Master Program Guidelines.
Skagit County Grading Permit	A Fill and Grade Permit may be required for any grading work involving substantial ground disturbing activity (either fill or excavation) or any additional activity that affects drainage in the area.

Impacts on wetlands at the proposed project site were evaluated by overlaying the project footprint onto previously delineated wetland boundaries and wetland buffers (URS 2013). Wetland buffers are based on SCC 14.24.230. Potential impacts on wetlands at the proposed mitigation site and along the Anacortes Subdivision rail line were qualitatively evaluated using existing available information, including the Draft Mitigation Plan (AECOM 2016) and the National Wetland Inventory (NWI) database (USFWS 2016).

According to Skagit County, a critical area buffer (including wetland) is defined as "an area that is contiguous to and protects a critical area which is required for the continued maintenance, functioning, and/or structural stability of a critical area" (SCC 14.04.020).

How were wetland functions assessed at the proposed project and mitigation sites?

- Functions of individual wetlands at the proposed project and mitigation sites were assessed using the state wetland rating system developed by the Washington State Department of Ecology (Ecology).
- Wetland delineations conducted after January 1, 2015, must be assessed using the Washington State Rating System for Western Washington: 2014 Update (Hruby 2014).
- For wetland delineations conducted prior to January 1, 2015, Ecology accepts the 2004 rating system, the Washington State Wetland Rating System for Western Washington - Revised, Washington State Department of Ecology Publication # 04-06-025 (Hruby 2004).
- As of July 1, 2016, Skagit County requires the 2014 rating system to categorize wetlands for establishing wetland buffer widths and replacement ratios for wetlands (SCC 14.24.200).
- Both systems score wetlands based on a wetland's capacity to perform water quality treatment, hydrologic, and habitat support functions. These function scores provide a baseline measurement of wetland functions.
- Wetlands at the proposed project site were delineated in 2013; therefore, their functions were assessed using the 2004 rating system.
- The functional assessment at the proposed wetland mitigation site was conducted in the fall of 2013 and the summer of 2015. Therefore the wetlands at the mitigation site were assessed using both the 2004 and 2014 rating systems.
- The 2014 rating system includes a new scoring range that is based on a qualitative scale of functions ranging from high, medium, and low. The new system also assesses the landscape potential and value.

An evaluation of potential impacts on wetland functions and values at the proposed project and wetland mitigation sites was conducted by reviewing Shell's impact assessment (AECOM 2016). Wetland delineations and functional assessments at these sites are still preliminary and would be subject to review and verification by the Washington State Department of Ecology (Ecology) and the U.S. Army Corps of Engineers (USACE) as part of the Section 401 and 404 permitting process. Shell is required to work with both agencies to verify that wetlands were characterized and assessed appropriately. Potential impacts on wetlands along the Anacortes Subdivision (i.e., within 300 feet) were not based on formal wetland delineations or functional assessments.

AFFECTED ENVIRONMENT

See Appendix B for detailed descriptions of individual wetlands.

Proposed Project Site

Shell evaluated all areas within the proposed project site for the presence of wetlands in 2013 and identified a total of 23 wetlands (Appendix B, URS 2013). The locations of these wetlands and their buffers are shown in Figure 3.5-2; details are provided in Table 3.5-2.

The identified wetlands vary in size from less than 0.1 acre to more than 45 acres. Wetland D is the largest at the proposed project site. Ten wetlands (Wetlands E3, E4, E5, E6, O, Q, R, T, U, and W) are located in topographic depressions; three wetlands (Wetlands I2, BB, and CC) are associated with slopes. Eight wetlands (Wetlands A, D, E, J, S, V, Y, and Z) contain both depressional and slope HGM classes (*see sidebar*) but are primarily depressional wetlands and are rated as such. These wetlands receive direct precipitation and surface runoff from the surrounding grazed or developed land, and some receive channelized flow from ditches located on the proposed project site.

Approximately 7.45 acres of Wetland D contain numerous small depressions that are within upland areas and can remain inundated for more than two weeks. This portion of Wetland D is characterized as a mosaic wetland, or a "patchwork" of smaller wetlands that is typically considered one unit. The remaining two wetlands (Wetlands I1 and N) are intertidal estuarine wetlands that are either completely or partially influenced by tides. One stream (Stream S) flows into Wetland I1 at the southern end of the project site.

Wetland vegetation classes consist of palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO), and estuarine emergent (EEM) classes (*see sidebar*). Fifteen wetlands (Wetlands A, E3, E4, E5, E6, I2, J, O, R, U, V, Y, Z, BB, and CC) are classified as PEM, and seven (Wetlands D, E, I1, Q, S, T, and W) are PFO. Five of the forested wetlands (Wetlands D, E, I1, Q, and S) also include scrub-shrub, emergent, forested mosaic, and/or estuarine components. Wetland N is comprised of an EEM class and is located adjacent to Padilla Bay, north of the Anacortes Subdivision rail line.

What wetland classes occur at the project site?

Cowardin Classification (physical characteristics within)

Palustrine emergent (PEM)
Areas dominated by sedges, rushes, grasses, cattails, and bulrushes.

Palustrine scrub-shrub (PSS)
Areas dominated by woody vegetation less than 20 feet tall.

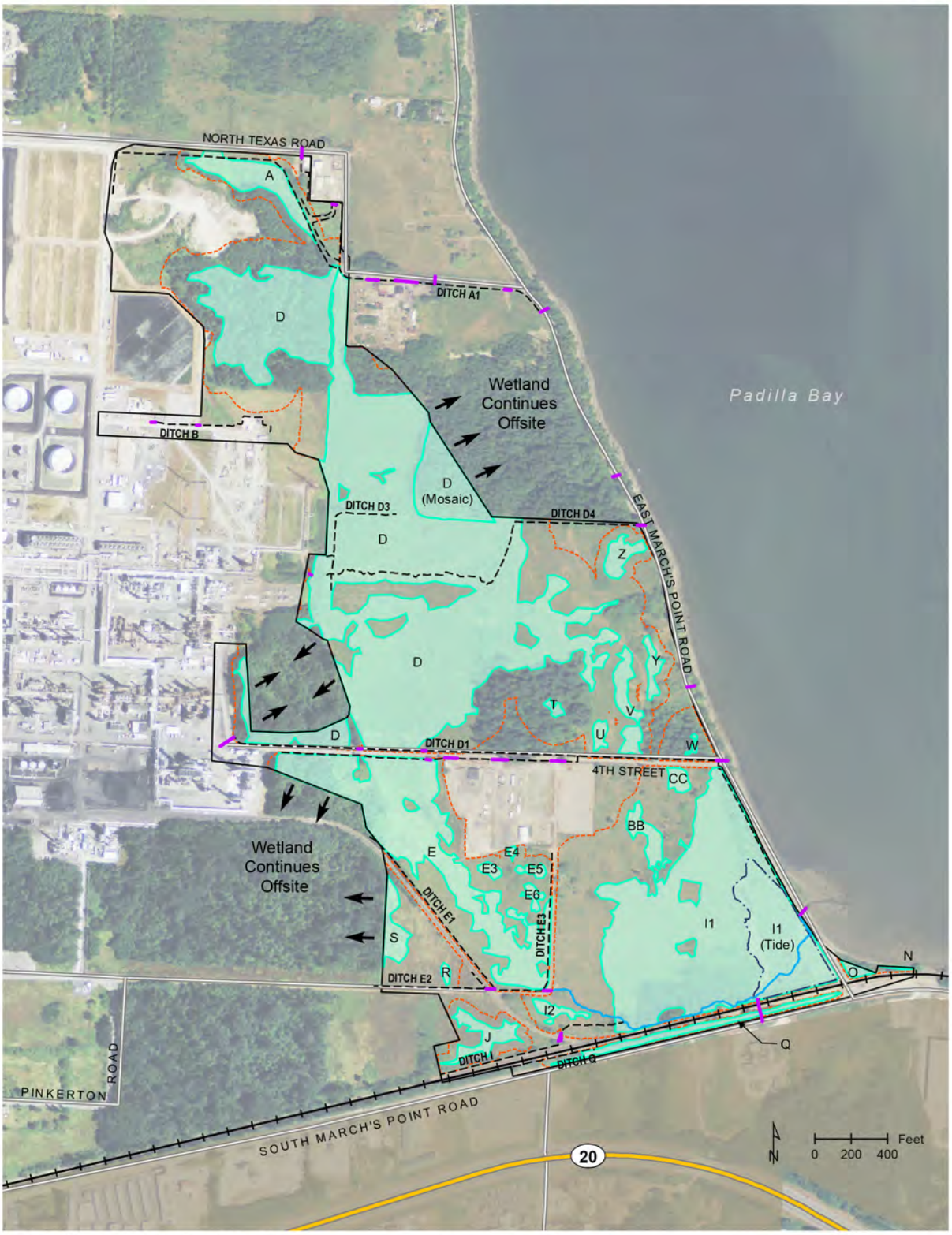
Palustrine forested (PFO)
Areas dominated by woody vegetation that is 20 feet or taller.

Estuarine emergent (EEM)
Areas characterized by erect, rooted, herbaceous hydrophytes (plants adapted to living in submerged water), excluding mosses and lichens.

Hydrogeomorphic (HGM) Classification (function and position)

Depressional
Wetlands that occur in topographic depressions and allow surface water to accumulate. Depression wetlands may have any combination of inlets and outlets or lack them completely.

Slope
Slope wetlands are associated with groundwater discharge to the surface lands or sites with saturated overflow with no channel formation. They normally occur on sloping land ranging from slight to steep.



DATA SOURCE: (AECOM 2015, NAIP 2013, Skagit County 2015, WSDOT 2015)

Wetland Study Area Boundary
Wetland Buffer
Tidal Marsh
Wetland
Existing Ditch
Existing Stream
Existing Culvert
Anacortes Subdivision
Local Road
State Highway

Figure 3.5-2
EXISTING WETLANDS AND BUFFERS – PROPOSED PROJECT SITE

Table 3.5-2 Wetlands in the Proposed Project Site

Wetland Name	Wetland Rating Ecology[1] /Local	Hydrogeomorphic Classification[2]	Cowardin Classification[3]	Approx. Size (acres)	Buffer Width (feet)[4]	Dominant Species[5]
A	IV	Depressional/Slope	Palustrine emergent	2.02	50	Tall fescue (*Festuca arundinacea*), soft rush (*Juncus effusus*), and reed canarygrass (*Phalaris arundinacea*)
D	III	Depressional/Slope	Palustrine forested/ Palustrine scrub-shrub/Palustrine emergent/ Forested Mosaic	45.86	150	Red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), Nootka rose (*Rosa nutkana*), salmonberry (*Rubus spectabilis*), Douglas spirea (*Spiraea douglasii*), Sitka willow (*Salix sitchensis*), colonial bentgrass (*Agrostis capillaris*), crested dogtail (*Cynosurus cristatus*), tall fescue, meadow foxtail (*Alopecurus pratensis*),and slough sedge (*Carex obnupta*)
E	III	Depressional/Slope	Palustrine forested/ Palustrine emergent	10.75	150	Red alder, black cottonwood, Pacific crabapple (*Malus fusca*), velvetgrass (*Holcus lanatus*), colonial bentgrass, tall fescue, crested dogtail, meadow foxtail, softrush (*Juncus effusus*), and white clover (*Trifolium repens*)
E3	IV	Depressional	Palustrine emergent	0.17	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, Kentucky bluegrass (*Poa pratensis*), and crested dogtail
E4	IV	Depressional	Palustrine emergent	0.05	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, Kentucky bluegrass, and crested dogtail
E5	IV	Depressional	Palustrine emergent	0.18	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, Kentucky bluegrass, crested dogtail

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Wetland Name	Wetland Rating Ecology[1] /Local	Hydrogeomorphic Classification[2]	Cowardin Classification[3]	Approx. Size (acres)	Buffer Width (feet)[4]	Dominant Species[5]
E6	IV	Depressional	Palustrine emergent	0.2	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, Kentucky bluegrass, crested dogtail
I1	II	Depressional/Slope/ Tidal Fringe	Palustrine forested/ Palustrine scrub-shrub / Palustrine emergent/ Estuarine intertidal emergent wetland	22.17	300	Black cottonwood, red alder, Pacific crabapple, Douglas spirea, Nootka rose, Sitka willow, velvetgrass, colonial bentgrass, creeping bentgrass (*Agrostis stolonifera*), tall fescue, crested dogtail, meadow foxtail, and softrush
I2	IV	Slope	Palustrine emergent	0.35	50	Velvetgrass, colonial bentgrass, creeping bentgrass, tall fescue, crested dogtail, meadow foxtail, softrush, and white clover
J	IV	Depressional/Slope	Palustrine emergent	0.92	50	Velvetgrass, colonial bentgrass, creeping bentgrass, tall fescue, meadow foxtail, and softrush
N	II	Tidal Fringe	Estuarine intertidal emergent wetland	0.04	300	Lyngbye's sedge (*Carex lyngbyei*)
O	III	Depressional	Palustrine emergent	0.18	150	Common cattail (*Typha latifolia*)
Q	III	Depressional	Palustrine forested/ Palustrine scrub-shrub	1.01	150	Pacific willow (*Salix lasiandra*), Sitka willow, Scouler's willow (*Salix scouleriana*), Douglas spiraea, Nootka rose, salmonberry, Pacific crabapple, and black twinberry (*Lonicera involucrata*)

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Wetland Name	Wetland Rating Ecology[1] /Local	Hydrogeomorphic Classification[2]	Cowardin Classification[3]	Approx. Size (acres)	Buffer Width (feet)[4]	Dominant Species[5]
R	IV	Depressional	Palustrine emergent	0.1	50	Velvetgrass, colonial bentgrass, creeping bentgrass, tall fescue, and meadow foxtail
S	II	Depressional/Slope	Palustrine forested/ Palustrine scrub-shrub/ Palustrine emergent	0.86	300	Black cottonwood, quaking aspen (*Populus tremuloides*), western red cedar, red alder, salmonberry, Douglas spirea, Nootka rose, Sitka willow, velvetgrass, tall fescue, meadow foxtail, and sweet vernal grass (*Anthoxanthum odoratum*)
T	III	Depressional	Palustrine forested	0.12	150	Black cottonwood, quaking aspen, western red cedar, red alder, salmonberry, Pacific crabapple, red elderberry (*Sambucus racemosa*), and Indian plum (*Oemleria cerasiformis*)
U	IV	Depressional	Palustrine emergent	0.24	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, and white clover
V	IV	Depressional/Slope	Palustrine emergent	1.07	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, and Kentucky bluegrass
W	III	Depressional	Palustrine forested	0.06	150	Black cottonwood, quaking aspen, Scouler's willow, salmonberry, Pacific crabapple, black twinberry, Indian plum, lady fern (*Athyrium filix-femina*), and fringe cup (*Tellima grandiflora*)
Y	IV	Depressional/Slope	Palustrine emergent	0.42	50	Velvetgrass, colonial bentgrass, tall fescue, meadow foxtail, white clover, and Kentucky bluegrass

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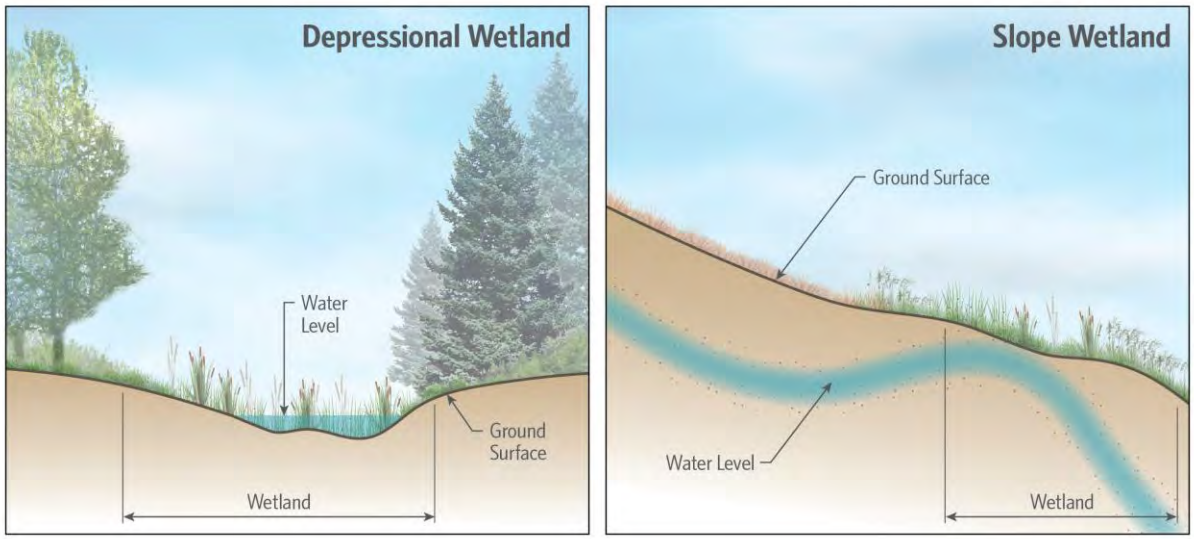
Wetland Name	Wetland Rating Ecology[1] /Local	Hydrogeomorphic Classification[2]	Cowardin Classification[3]	Approx. Size (acres)	Buffer Width (feet)[4]	Dominant Species[5]
Z	IV	Depressional/Slope	Palustrine emergent	0.64	50	Meadow foxtail, colonial bentgrass, tall fescue, white clover, and Kentucky bluegrass
BB	IV	Slope	Palustrine emergent	0.74	50	Velvet grass, colonial bentgrass, creeping bentgrass, tall fescue, white clover, and crested dogtail
CC	IV	Slope	Palustrine emergent	0.31	50	Velvet grass, colonial bentgrass, creeping bentgrass, tall fescue, white clover, and crested dogtail

Notes:

1. Ecology rating based on the 2004 rating system (Hruby 2004).
2. Hydrogeomorphic classifications are based on *A Hydrogeomorphic Classification of Wetlands* (Brinson 1993).
3. Source: Cowardin et al. 1979.
4. Buffer widths are based on SCC 14.24.230.
5. Source: AECOM 2016.

Figure 3.5-3 Hydrogeomorphic Classification System Features



Emergent wetlands on the project site are pastures that have been grazed by cattle. They are dominated by nonnative pasture grasses and forbs. Invasive species such as reed canarygrass (*Phalaris arundinacea*) and Canada thistle (*Cirsium arvense*) are also present in the pastures. As a result, species diversity in these emergent wetlands is low.

Forested wetlands on the project site consist of mixed coniferous and deciduous forests with shrub and herbaceous understory layers. Dominant trees in the wetlands include red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), and quaking aspen (*Populus tremuloides*). The understory shrub and herbaceous species present in the forested wetlands consist of Nootka rose (*Rosa nutkana*), salmonberry (*Rubus spectabilis*), Douglas spirea (*Spiraea douglasii*), Sitka willow (*Salix sitchensis*), Pacific crabapple (*Malus fusca*), black twinberry (*Lonicera involucrata*), slough sedge (*Carex obnupta*), lady fern (*Athyrium filix-femina*), and fringe cup (*Tellima grandiflora*). Mosaic wetlands are present in the forested community of Wetland D, and the mosaic area contains Himalayan blackberry (*Rubus armeniacus*) and evergreen blackberry (*Rubus laciniatus*) that are rooted in the upland hummocks.

Small areas of scrub-shrub community are also present in Wetlands D, I1, and S. These areas are primarily dominated by Nootka rose, salmonberry, Douglas spirea, and Sitka willow. The estuarine community in Wetland N is dominated by Lyngbye's sedge (*Carex lyngbyei*).

Wetlands can provide water quality, hydrologic, and wildlife support functions. Using the 2004 rating system (Hruby 2004), water quality, hydrologic, and wildlife support functions were assessed for all palustrine wetlands on the project site. The Ecology rating system does not rate functions of estuarine wetlands; therefore, functions of Wetland N and a tidal fringe portion of Wetland I1 were not assessed. Table 3.5-3 summarizes the level of functions that each palustrine wetland provides.

Table 3.5-3 Palustrine Wetland Functions in the Project Site[1]

Wetlands by HGM Class	Water Quality Function	Hydrologic Function	Habitat Function
Depressional Wetlands			
A	Low	Low	Low
D	Moderate	Low	Moderate
E	Low	Low	Moderate
E3	Low	Low	Low
E4	Low	Low	Low
E5	Low	Low	Low
E6	Low	Low	Low
I1[2]	Moderate	Low	Moderate
J	Low	Low	Low
O	High	Moderate	Low
Q	Moderate	Low	Low
R	Low	Low	Low
S	Moderate	Low	Moderate
T	High	Low	Low
U	Low	Low	Low
V	Low	Low	Low
W	Moderate	Low	Low
Y	Low	Low	Low
Z	Low	Low	Low

Wetlands by HGM Class	Water Quality Function	Hydrologic Function	Habitat Function
Slope Wetlands			
BB	Low	Low	Low
CC	Low	Low	Low
I2	Low	Low	Low

Notes:

1. Low, moderate, and high functional categories are based the wetland assessment conducted by URS (2013).
2. Applies only to the palustrine portion of Wetland I1.
3. Source: AECOM 2016.

All these wetlands have the opportunity to provide a water quality improvement function. However, this function is limited because grazing reduces or eliminates the opportunity for wetlands to slow down surface flows and trap pollutants. The project site has been used as grazing pasture for the last several decades (AECOM 2016). As a result, 15 wetlands are rated low for this function. Wetlands with moderate and high water quality functions (Wetlands D, I1, Q, S, W, and T) have a relatively smaller portion of grazed vegetation and/or a larger seasonal ponding area.

Wetlands in the project site have the potential to reduce flooding and erosion as they include some ponding areas and smaller contributing basins. However, because most of these wetlands have shallow depths of ponding with outlets, the majority of the wetlands provide reduced functions in this regard. Almost all the wetlands are rated low for hydrologic support functions, except for Wetland O. Wetland O scores moderate for this function because it lacks an outlet and has a capacity to retain surface water. Additionally, wetlands at the project site are not known to provide groundwater recharge into an underlying aquifer or freshwater seepage into Padilla Bay. A previous study documented that the vertical hydraulic conductivity is very slow at the project site due to the presence of a thick, dense clay layer (Landau Associates 1988, as cited in AECOM 2016). A geotechnical study and on-site shallow groundwater monitoring studies for this project also confirmed the presence of the clay layer (AECOM 2016).

Most wetlands in the project site provide habitat for wetland-associated species. Vegetation types, water regime, plant species diversity, habitat interspersion, connectivity to other habitats, presence of dense emergent and shrub vegetation, large downed woody debris, and snags contribute to the overall habitat function of wetlands. Eighteen wetlands provide low habitat functions because of their small size and disturbance from grazing and adjacent land use. Wetlands D, E, I1, and S provide a moderate level of habitat function due to their relatively large size, presence of multiple vegetation types, and multiple water regimes. Most of these wetlands have low opportunity to provide habitat for wildlife. The wetland buffers have been disturbed and livestock grazing has limited habitat connectivity.

Wetland Mitigation Site

Wetland information presented below is based on site reconnaissance conducted at the wetland mitigation site in the fall of 2013 and summer of 2015. Based on the site reconnaissance, the mitigation site has been determined to have hydric soils and hydrology. The entire area is considered a wetland with the exception of the existing gravel access road and dike (AECOM 2016).

Three wetlands (Wetlands A, B, and C) were identified within the mitigation site. These wetlands and their buffers are presented in Figure 3.5-4. These wetlands are bisected by gravel access roads but have similar characteristics; therefore, they were rated as one wetland unit (AECOM 2016). Table 3.5-4 summarizes the size, rating, and classification of wetlands. This wetland unit was rated using the 2004 and 2014 rating systems and categorized as Category III under both systems. Functions of this wetland unit are described below with the 2004 rating system to compare with the affected functions at the project site.

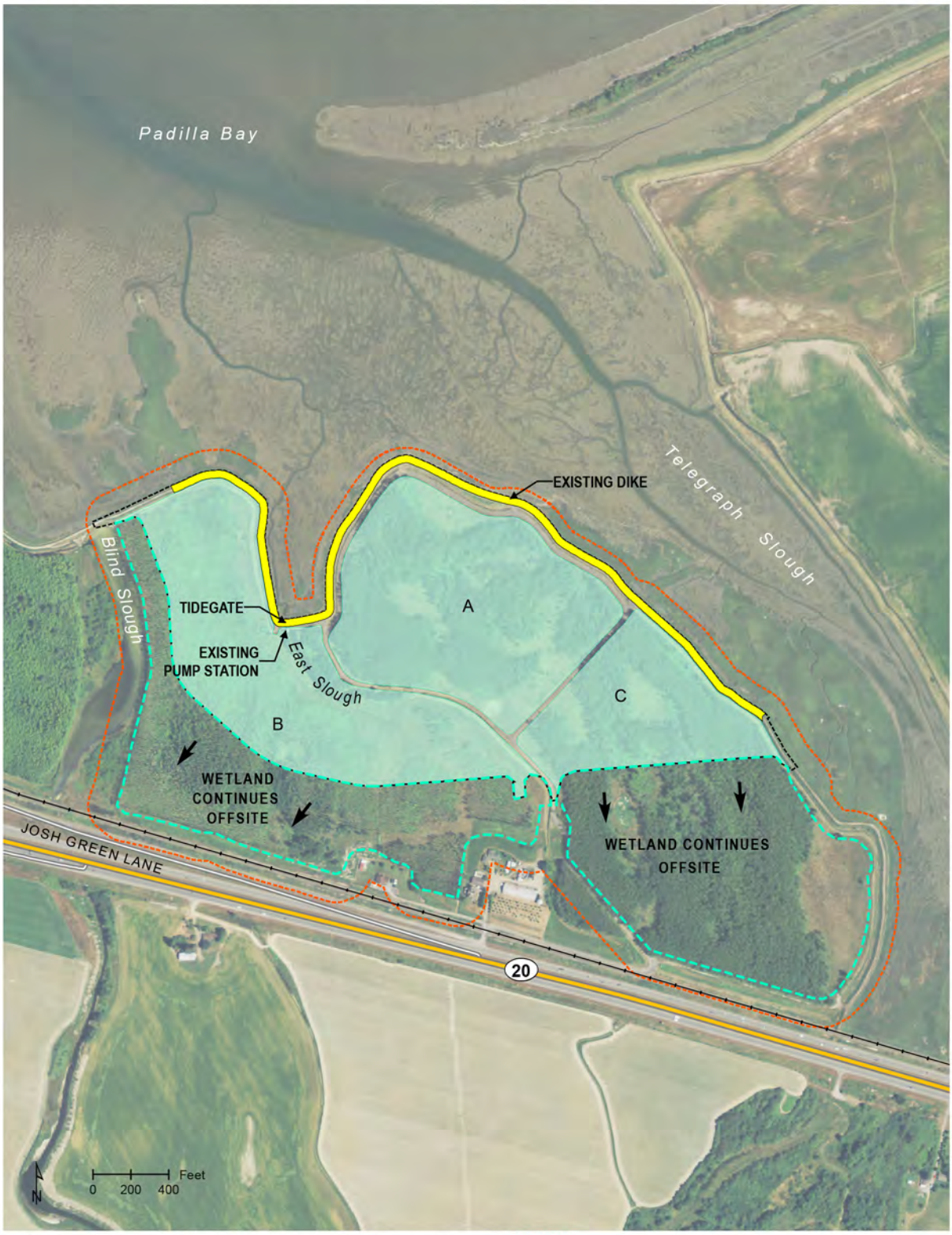
Table 3.5-4 Wetlands on the Mitigation Site

Wetland Name	Wetland Rating Ecology[1]/Local[2]	Hydrogeomorphic Classification[3]	Cowardin Classification[4]	Approx. Size (acres)[5]	Buffer Width (feet)[6]
A	III	Depressional	PEM/PSS/PFO	29.6	150
B	III	Depressional	PEM/PSS/PFO	58.3	150
C	III	Depressional	PEM/PSS/PFO	49.3	150

Notes:

1. Ecology rating based on the 2004 rating system (Hruby 2004).
2. Local ratings based on SCC 14.24.210.
3. Hydrogeomorphic classifications are based on *A Hydrogeomorphic Classification of Wetlands* (Brinson 1993).
4. Source: Cowardin et al. 1979.
5. Wetland size is estimated based on the exhibits prepared for the Draft Mitigation Plan (AECOM 2016) and aerial photographs.
6. Buffer widths based on SCC 14.24.230.

All three are depressional wetlands surrounded by an existing dike that separates the wetlands from Telegraph Slough and Padilla Bay. The land at the mitigation site has subsided since it was diked and farmed more than 100 years ago. As a result, all wetlands at the site are approximately 2 to 3 feet below the elevation of the top of the salt marsh that is present waterward of the dike. A remnant tidal channel, commonly known as East Slough, is located within the mitigation site. Because of the dike, this channel is no longer connected to the bay, and it largely serves as a drainage ditch. East Slough flows north along the access road, and the northern edge of Wetland B drains into a small ponded area at the base of the dike where a pump house and a tidegate are located. At low tide, water is pumped across the dike into Padilla Bay (AECOM 2016). Another small ditch is located on the northern end of the mitigation site that runs parallel to the dike and the access road. East Slough and the small drainage ditch do not appear to effectively drain the mitigation site, as evidenced by high groundwater levels.



DATA SOURCE: (AECOM 2016, NAIP 2013, Skagit County 2015, WSDOT 2015)

Proposed Wetland Mitigation Site
Wetlands
Off-site Wetland
Wetland Buffer (150')
Existing Dike
Anacortes Subdivision
Local Road
State Highway

Figure 3.5-4
EXISTING WETLANDS AND BUFFERS - WETLAND MITIGATION SITE

All three are depressional wetlands surrounded by an existing dike that separates the wetlands from Telegraph Slough and Padilla Bay. The land at the mitigation site has subsided since it was diked and farmed more than 100 years ago. As a result, all wetlands at the site are approximately 2 to 3 feet below the elevation of the top of the salt marsh that is present waterward of the dike. A remnant tidal channel, commonly known as East Slough, is located within the mitigation site. Because of the dike, this channel is no longer connected to the bay, and it largely serves as a drainage ditch. East Slough flows north along the access road, and the northern edge of Wetland B drains into a small ponded area at the base of the dike where a pump house and a tidegate are located. At low tide, water is pumped across the dike into Padilla Bay (AECOM 2016). Another small ditch is located on the northern end of the mitigation site that runs parallel to the dike and the access road. East Slough and the small drainage ditch do not appear to effectively drain the mitigation site, as evidenced by high groundwater levels.

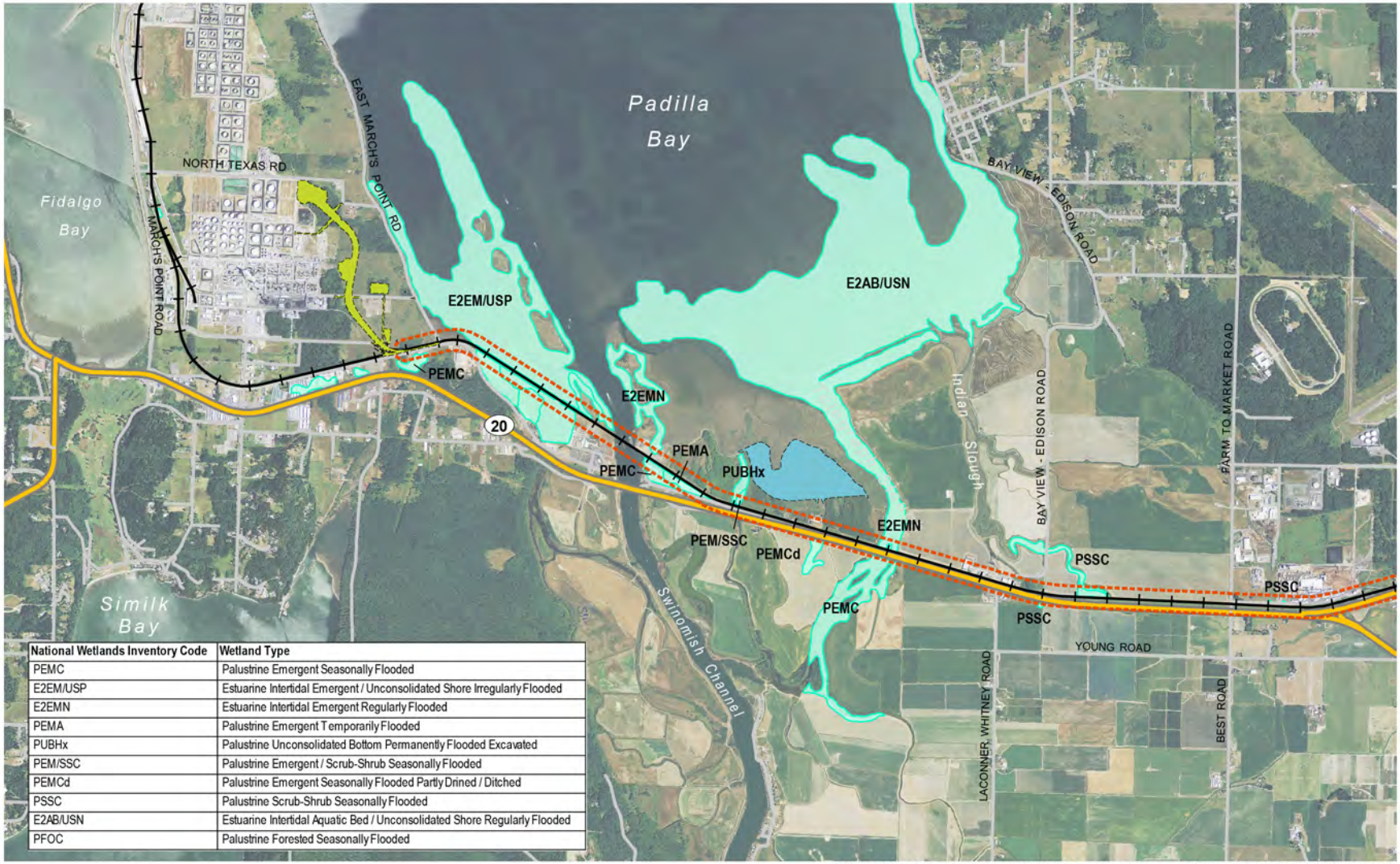
Wetland vegetation classes on the mitigation site consist of PEM, PSS, and PFO. The forested and scrub-shrub communities are primarily dominated by hybrid poplars (*Populus trichocarpa x P. deltoides*) and Himalayan blackberry. The understory of the poplar trees consists of black twinberry (*Lonicera involucrata*), paper birch (*Betula papyrifera*), and evergreen blackberry (*Rubus laciniatus*). The poplars were planted between 1997 and 1998, spaced 8 feet apart and in rows 11 feet apart. Willowherb (*Epilobium ciliatum*), velvetgrass (*Holcus lanatus*), colonial bentgrass (*Agrostis capillaris*), and sword ferns (*Polystichum munitum*) are also present in the wetlands.

Wetlands A, B, and C have a moderate potential to improve water quality due to the presence of dense vegetation and seasonal ponding areas. However, these wetlands do not provide this function because there are no significant sources of pollutants entering the wetlands. Also, Wetlands A, B, and C have some potential to store surface water because of their confined outlets and the subsidence. Wetlands A, B, and C, however, lack opportunity to reduce flooding and erosion downstream for two reasons: 1) flow coming into the wetlands is mostly controlled by a tidegate and, 2) they are located lower in the watershed. The presence of multiple vegetation classes and water regimes contributes to a moderate potential for habitat functions of Wetlands A, B, and C, though they contain few habitat features and have low native species diversity. Habitat support functions of these wetlands are limited by the presence of the flood control dikes and the access roads.

No wetland delineations have been conducted waterward of the existing dike. Based on the NWI database, the waterward portion of the existing dike is classified as an estuarine intertidal aquatic bed/unconsolidated shore (USFWS 2016). Estuarine wetlands according to the Cowardin system include intertidal areas of high marsh with rooted emergent vegetation and rocky intertidal areas. Based on the aerial photo interpretations, most of this area is likely tidal mudflats as there appears to be no vegetation. Estuarine wetlands would likely be limited to the vegetated area between tidal mudflats and the existing dike. This type of wetland likely provides foraging habitat for juvenile salmonids and shorebirds.

Anacortes Subdivision

The NWI database identified 15 wetlands along the Anacortes Subdivision rail line (Figures 3.5-5 and 3.5-6). Of the 15 wetlands, three are classified as estuarine wetlands. Those wetlands are associated with Padilla Bay, Swinomish Channel, Telegraph Slough, or Indian Slough, and contain salt-tolerant emergent vegetation. Only one wetland along the alignment consists of forested vegetation and five are dominated by scrub-shrub. The remaining six freshwater wetlands are dominated by herbaceous vegetation.



National Wetlands Inventory Code	Wetland Type
PEMC	Palustrine Emergent Seasonally Flooded
E2EM/USP	Estuarine Intertidal Emergent / Unconsolidated Shore Irregularly Flooded
E2EMN	Estuarine Intertidal Emergent Regularly Flooded
PEMA	Palustrine Emergent Temporarily Flooded
PUBHx	Palustrine Unconsolidated Bottom Permanently Flooded Excavated
PEM/SSC	Palustrine Emergent / Scrub-Shrub Seasonally Flooded
PEMCd	Palustrine Emergent Seasonally Flooded Partly Drined / Ditched
PSSC	Palustrine Scrub-Shrub Seasonally Flooded
E2AB/USN	Estuarine Intertidal Aquatic Bed / Unconsolidated Shore Regularly Flooded
PFOC	Palustrine Forested Seasonally Flooded

DATA SOURCE: (NAIP 2013, NWI 2015, Skagit County 2015, USGS 2015, WSDOT 2015)

Proposed Project Site
Proposed Wetland Mitigation Site
300-Foot-Wide Study Area
Wetland (NWI)
Anacortes Subdivision
Local Road
State Highway

N
0 2,000 4,000 Feet

Figure 3.5-5
ANACORTES SUBDIVISION (WEST)

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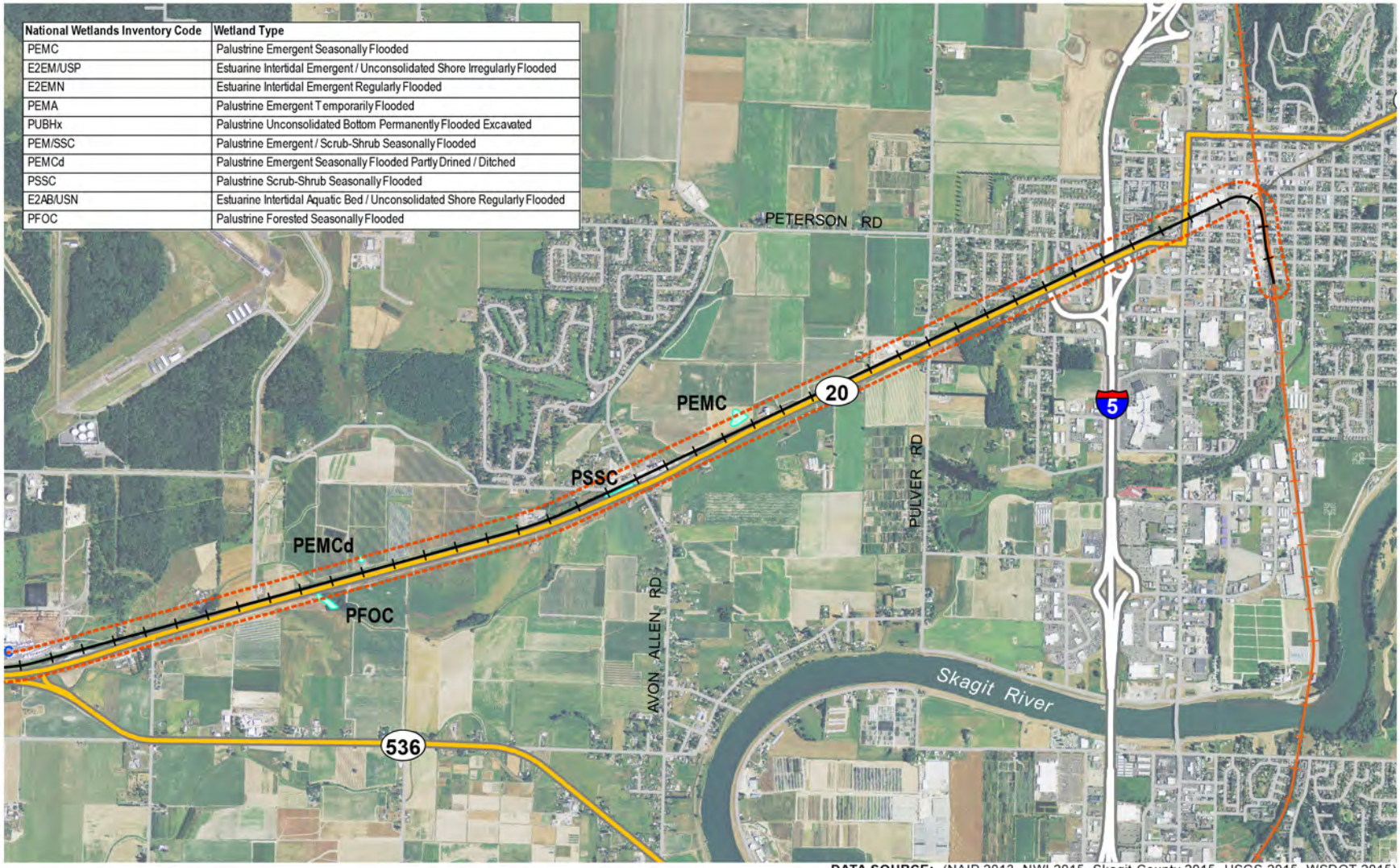

National Wetlands Inventory Code	Wetland Type
PEMC	Palustrine Emergent Seasonally Flooded
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PEMA	Palustrine Emergent Temporarily Flooded
PUBHx	Palustrine Unconsolidated Bottom Permanently Flooded Excavated
PEM/SSC	Palustrine Emergent / Scrub-Shrub Seasonally Flooded
PEMCd	Palustrine Emergent Seasonally Flooded Partly Drined / Ditched
PSSC	Palustrine Scrub-Shrub Seasonally Flooded
E2AB/USN	Estuarine Intertidal Aquatic Bed / Unconsolidated Shore Regularly Flooded
PFOC	Palustrine Forested Seasonally Flooded

DATA SOURCE: (NAIP 2013, NWI 2015, Skagit County 2015, USGS 2015, WSDOT 2015)

300-Foot-Wide Study Area
Wetland (NWI)
Anacortes Subdivision
Bellingham Subdivision
BNSF Railway
Local Road
State Highway
Interstate Highway

N
0 2,000 4,000 Feet

Figure 3.5-6
ANACORTES SUBDIVISION (EAST)

ENVIRONMENTAL IMPACTS

No Action Alternative

Because no construction or operation would take place under the no action alternative, there would be no impacts to wetlands or wetland buffers. Wetland conditions in the study area would remain the same unless affected by other projects in the future. Planting riparian buffers along Stream S and in Wetland I1 would not occur. The wetland mitigation site would remain in its current condition and would continue to be separated from Padilla Bay by a dike that prevents tidal flow onto the site.

Proposed Project

Direct Impacts

Permanent impacts to wetlands (and their buffers) include the loss of wetland and/or buffer areas as a result of filling or excavation; and diminished wetland functions through the loss of area or changes to surface or subsurface water flows, or through permanent changes to vegetation (e.g., ongoing clearing activities or shading). Permanent changes to wetlands and their buffers would result from construction of the new rail spur and associated facilities. After being filled, these wetlands could not perform particular functions such as storing stormwater, filtering pollutants, protecting stream banks and shorelines, or providing habitat for wildlife.

The term "temporary impacts" is used in this chapter because it has a specific definition with regard to wetland impacts. Temporary impacts are direct impacts that do not result in permanent changes to wetland areas or functions. For example, temporary grading and clearing, staging areas, temporary work areas, or temporary structures necessary to complete construction of permanent facilities, may cause temporary loss of wetland (or buffer) areas. These types of activities can result in loss or changes to wetland area, hydrology, vegetation, or structure. While temporary impacts are not of the same magnitude as permanent impacts, they may result in the short-term loss of wetland functions. Following construction, temporary impact areas would be restored to pre-construction conditions. Functions performed by affected wetland areas are expected to recover within a year.

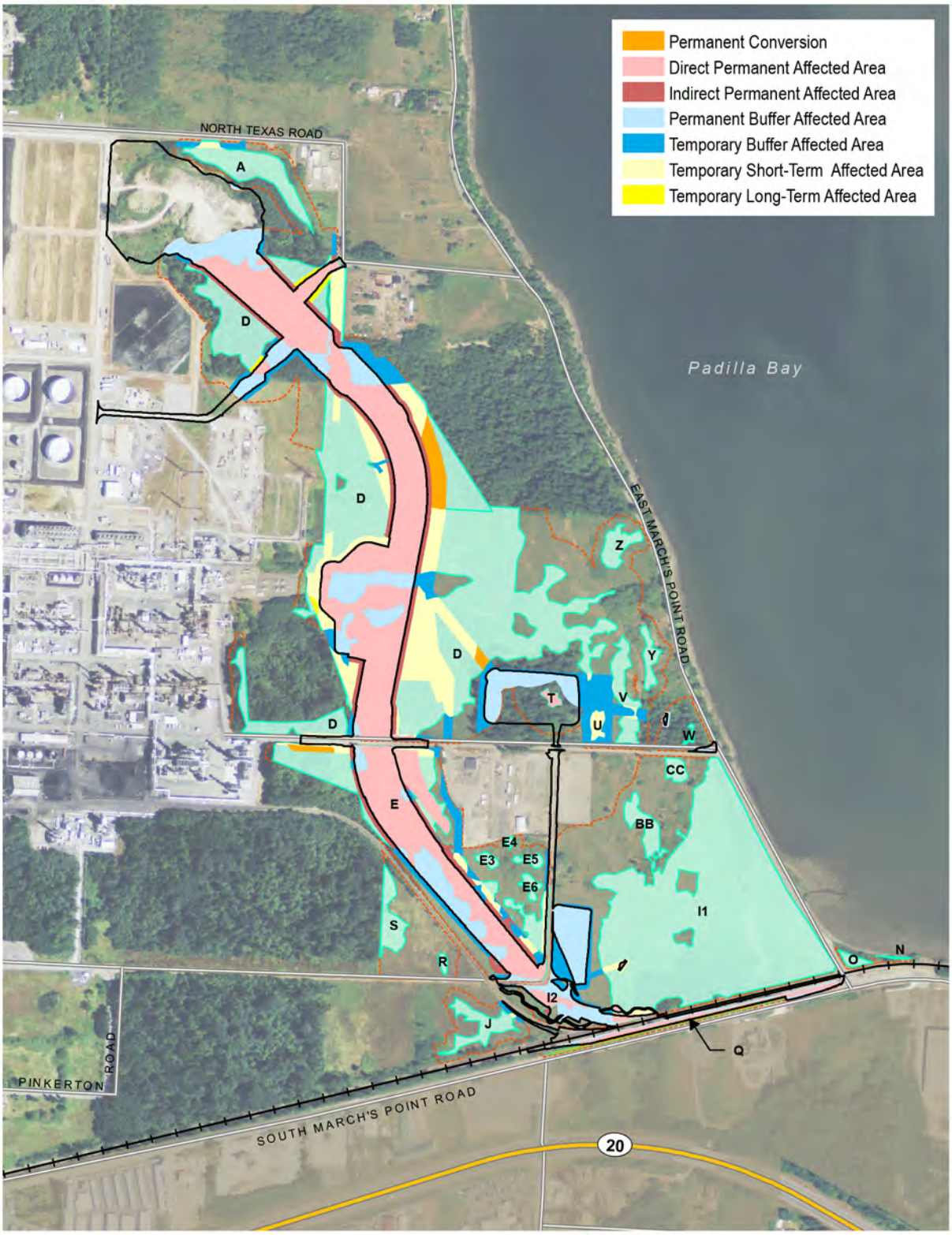
> Temporary impacts in the context of wetlands are direct impacts that do not result in the permanent filling of wetlands or in the permanent loss of wetland function. These impacts can be further divided into short term and long term. Typically, short-term temporary impacts are restored within a year following construction. Long-term impacts can be restored over some period of time, but not within a year (Ecology et al. 2006a).

The proposed project would permanently fill and/or excavate six of the 23 identified wetlands. Wetland T would be excavated to construct a proposed stormwater pond. Filling and grading portions of Wetlands D, E, I1, I2, and Q for the proposed rail tracks and associated facilities would also occur. Impacts on each wetland are shown on Figure 3.5-7 and listed in Table 3.5-5. In total, approximately 21.21 acres of wetlands would be filled. This would include 0.19 acre of

Category II wetlands, 20.71 acres of Category III wetlands, and 0.31 acre of Category IV wetlands. Nine depressional wetlands and one slope wetland would be affected.

In addition to the direct impacts associated with wetland filling, the project would also convert approximately 1.22 acres of the forested and scrub-shrub portions of Wetlands D, E, and Q into emergent habitats. The conversions would occur due to the relocation and construction of underground natural gas and water pipelines and be considered permanent impacts. These areas would have a permanent loss of habitat function due to the loss of forested and scrub-shrub vegetation communities. However, after the new emergent habitats are established, the capacity of these areas to treat runoff would likely be increased from their previous functions (Ecology et al. 2006a).

Both short-term and long-term temporary impacts would result from clearing or filling for construction access, constructing temporary access roads, and rerouting the existing power lines and pipelines. Short-term impacts would occur in portions of seven wetlands (Wetlands A, D, E, I1, J, U, and V), totaling 8.1 acres. The affected areas in the wetlands would consist mostly of pasture grasses. Following construction, these areas would be restored to pre-construction contours and reseeded with pasture species. Long-term temporary impacts would occur in approximately 0.23 acre of Wetland D. This area would be restored with native woody vegetation; however, there would be a temporal loss (over a year) of wetland functions until planted woody vegetation became established. Long-term temporary impacts would be compensated at the proposed wetland mitigation site.



DATA SOURCE: (AECOM 2015, NAIP 2013, Skagit County 2015, WSDOT 2015)

Project Site Location
Wetland
Wetland Buffer
Anacortes Subdivision
Local Road
State Highway

N Feet 0 200 400

Figure 3.5-7
IMPACTS TO WETLANDS AND BUFFERS – PROPOSED PROJECT SITE

Table 3.5-5 Wetland Impacts Summary

					Permanent Impact				Temporary Impact	
Wetland	Rating[1]	Cowardin[2]	HGM[3]	Wetland Size (acres)	Direct Permanent (acres)	Indirect Permanent (acres)	Percent Affected	Conversion (acres)	Long-term Temporary (acres)	Short-term Temporary (acres)
A	IV	Emergent	Depressional/Slope	2.02	--	--	--	--	--	0.09
D	III	Emergent	Depressional/Slope	38.41	10.43	1.75	42%	--	--	6.7
		Forested	Depressional/Slope		3.24	0.54		0.59	0.23	--
		Scrub-shrub	Depressional/Slope		--	--		0.13	--	--
E	III	Emergent	Depressional/Slope	7.45	5.86	0.93	98%	--	--	0.71
		Forested	Depressional/Slope		--	--		0.18	--	--
		Scrub-shrub	Depressional/Slope		0.37	0.14		--	--	--
I1	II	Emergent	Depressional/Slope	22.17	0.17	--	1%	--	--	0.28
		Forested	Depressional/Slope		0.02	--		--	--	--
I2	IV	Emergent	Slope	0.35	0.31	0.04	100%	--	--	--
J	IV	Emergent	Depressional/Slope	0.92	--	--	--	--	--	0.02
Q	III	Scrub-shrub	Depressional	1.01	0.69		68%	0.32	--	--
T	III	Forested	Depressional	0.12	0.12	--	100%	--	--	--

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					Permanent Impact				Temporary Impact	
U	IV	Emergent	Depressional	0.24	--	--	--	--	--	0.24
V	IV	Emergent	Depressional/Slope	1.07	--	--	--	--	--	0.06
Total				73.76	21.21	3.4	34%	1.22	0.23	8.1

1. Ecology rating based on the 2004 rating system (Hruby 2004).
2. Cowardin et al. 1979.
3. Hydrogeomorphic classifications are based on *A Hydrogeomorphic Classification of Wetlands* (Brinson 1993).
4. AECOM 2016.

Indirect Impacts

Indirect impacts result from activities inside or outside the wetland that do not cause direct loss of wetland area but affect wetland functions. Examples of indirect impacts include changes in surface or subsurface water movement, changes in wildlife movement patterns, loss of forested buffers, or loss of so much of an affected wetland area that the remaining portions no longer provide the same level of wetland function (Ecology et al. 2006a).

The proposed project would indirectly affect three wetlands (Wetlands D, E, and I2), totaling 3.4 acres. Small portions of Wetlands D and E would be isolated into smaller fragments, and these areas are not anticipated to provide the same functional levels after the proposed project is constructed. Deep excavation in Wetlands D and E are also expected to indirectly affect wetland hydrology in the remaining portions of these wetlands. The excavations would intercept surface and subsurface water, and drainage would be collected in new ditches and directed away from the remaining wetlands.

To determine the extent of wetland functional disturbance caused by these excavations, site soils and local hydrology were evaluated in a series of shallow groundwater monitoring wells. The wetland hydrology for Wetlands D and E is primarily supported by direct precipitation, surface runoff from adjacent areas, flow from channelized ditches, and shallow subsurface flow over restrictive or less permeable soil layers (AECOM 2016). Field observations and three years of shallow groundwater monitoring data (AECOM 2015) suggest that direct precipitation is the major source of hydrology for these wetlands, and that water input from surface runoff and lateral subsurface flow are considered relatively minor. Because of limited lateral drainage and the presence of a thick layer of soils above the less permeable soil layers, wetland hydrology in the early part of the growing season is considered to be sustained by a relatively small catchment area (AECOM 2016). For the impact analysis, approximately 25 feet upslope and downslope of the rail cut in Wetlands D and E were estimated to have indirect impacts.

Existing ditches (Ditch D3 and D4) also contribute hydrology for Wetland D, especially in the southern part of the forested mosaic area (Figure 3.5-2). Flow from these ditches would be redirected into a new ditch along the railroad tracks. However, this portion of Wetland D is expected to sustain wetland hydrology due to the presence of topographic depressions and a restrictive or less permeable soil layer; therefore, no indirect impacts are anticipated.

Because there is uncertainty about the extent of hydrology impacts, Shell would continue to monitor shallow groundwater wells before and after the construction in Wetlands D and E, including the forested mosaic area of Wetland D. Shell would be expected to adjust compensatory mitigation requirements if the indirect impact area is larger than anticipated.

More than 80 percent of Wetland I2 is proposed to be filled, and the remaining area of Wetland I2 is so small that it is not expected to retain wetland hydrology. As a result, the remaining 0.04 acre of Wetland I2 would be indirectly affected by filling.

Wetland Buffer Impacts

Regulatory buffers are intended to protect and maintain the wide variety of functions and values provided by wetlands, including sediment removal, phosphorus and nitrogen removal, toxic contaminants removal, microclimate influence, habitat maintenance, screening adjacent disturbances, and habitat connectivity. Factors that affect the performance of buffer functions include vegetation characteristics, slopes, soils, and buffer widths and lengths (Sheldon et al. 2005).

Permanent impacts to buffers generally result from the loss of vegetated buffer areas. The proposed project would permanently remove 5.2 acres of forested buffers in five wetlands (Wetlands A, D, T, U, and W) and 7.38 acres of grazed pasture wetland buffers at eight wetlands (Wetlands A, D, E, E5, E6, I1, J, and Q). Affected buffers are listed in Table 3.5-6 and shown in Figure 3.5-7. Affected forested buffers typically consist of red alder, black cottonwood, paper birch, bigleaf maple (*Acer macrophyllum*), Douglas fir (*Pseudotsuga menziesii*), and western red cedar. Wetlands I2 and T would be completely filled; therefore, construction activities in these areas would not have buffer impacts.

Temporary buffer impacts would occur in 11 wetlands (Wetlands A, D, E, E5, E6, I1, I2, J, T, U, and V) as a result of clearing to allow construction access and the rerouting and installation of underground gas and water pipelines (Table 3.5-6). The temporary affected area totals 6.76 acres, which includes 1.88 acres of forested and shrub buffers, and 4.88 acres of grazed pasture dominated by nonnative grasses. These temporary cleared areas would be restored to pre-construction contours and planted with native species to comply with permit requirements.

Table 3.5-6 Wetland Buffer Impact Summary

Wetland	Rating[1]	Vegetation	Permanent Impacts (acres)	Temporary Impacts (acres)
A	IV	Pasture	0.02	0.15
		Forest	0.02	0.05
D	III	Pasture	2.49	1.26
		Shrub	0	0.05
		Forest	5.06	1.64
E	III	Pasture	2.11	1.37
E5/E6		Pasture	0.03	0.07
I1	II	Pasture	2.32	0.76
J	IV	Pasture	0.02	0.09
Q	III	Pasture	0.39	0

Wetland	Rating[1]	Vegetation	Permanent Impacts (acres)	Temporary Impacts (acres)
U	IV	Pasture	0	0.77
		Forest	0	0.14
V	IV	Pasture	0	0.41
W	III	Forest	0.12	0
	Total		12.58	6.76

1. Ecology rating based on the 2004 rating system (Hruby 2004).

Affected Wetland Functions

The functions and values of identified wetlands within the project site were qualitatively evaluated using the 2004 rating system (Hruby 2004). Most wetlands in the project site scored low to moderate for water quality, hydrologic, and habitat support functions (Table 3.5-3), except for Wetland T. Wetland T scored high for water quality functions due to the presence of vegetation that can trap pollutants and lack of an outlet.

The depressional wetlands in the project site have the potential to improve water quality due to the presence of pollution sources such as grazing in or adjacent to the wetlands. The project would fill approximately 20.9 acres of depressional wetlands that can trap and retain sediments as well as remove nitrogen and pathogens. Temporary clearing would also result in a reduction of water quality functions. Filling depressional wetlands on the proposed project site also has the potential to reduce hydrologic functions by removing the storage capacity of the affected wetlands. However, these depressional wetlands already have a limited ability to reduce flooding because of their size, shallow depths of ponding, and locations in the watershed. The loss of water quality and hydraulic functions in the affected areas would be compensated for at the wetland mitigation site.

The proposed project would construct new stormwater facilities within the project site to provide water quality treatment and flow control. Stormwater facilities have been designed in accordance with local regulations and current guidance from Ecology. Rail operations could contribute petroleum-based by-products and heavy metals to adjacent wetlands. The proposed stormwater facilities would replace the storage and infiltration functions currently provided by the impacted wetlands. . Best management practices (BMPs) would also be used during construction-related activities to minimize water quality impacts. As a result, water quality and hydrologic functions of the remaining wetlands are not expected to be affected.

The affected depressional wetlands scored low to moderate for habitat functions because they all have varying water depths, a mixture of habitat types, and a variety of plant species. Filling activities associated with the project would result in a permanent loss of 20.9 acres of wetland habitat areas. Temporary clearing would result in a change of habitat and species interspersion

in the affected area; however, this habitat function is expected to recover after restoration. Additionally, fragmentation of Wetlands D and E into smaller wetlands would affect habitat connectivity.

Wetland I2 is the only slope wetland that would be affected by the project. Because slope wetlands do not retain large amounts of water, Wetland I2 has limited potential to provide water quality and hydrologic functions. Wetland I2 scored low for water quality functions because its sloped configuration provides limited potential to trap sediments and pollutants. Lack of dense vegetation and capacity to retain surface water also contribute to low hydrologic performance. Wetland I2 scored low for habitat functions due to its low habitat diversity and limited number of habitat features. The majority of Wetland I2 would be filled as a result of the project, and the remaining portion of Wetland I2 would not likely provide the functions that it currently provides.

Most of the wetlands in the project site have been grazed for decades, which has likely contributed to the low habitat diversity, water quality degradation, and soil compaction that currently exists. Estuarine wetland (I1) would be fenced off to protect from human disturbance. Removing cattle from the project site has relieved these systems from chronic degradation and would result in benefits to wetland functions for the remaining portions of Wetlands A, D, I1, J, and V, as well as the unaffected wetlands at other portions of the project site (Wetlands R, S, Y, and Z). These wetlands would be expected to develop more diverse plant communities and habitat conditions over time. Water quality within the wetlands and nearby receiving waters may also improve. Such water quality improvements may help these wetlands support a more diverse assemblage of invertebrates and wetland-dependent wildlife. For impacts on wildlife use within wetlands, please refer to Chapter 3.6 – Vegetation and Terrestrial Wildlife.

Wetland Mitigation Site

Direct Impacts

The proposed mitigation site is located approximately 2 miles east of the project site at the south end of Padilla Bay.

Wetlands in the proposed mitigation site would be converted from depressional wetlands to tidal salt marsh wetlands by breaching and removing the existing dike. Prior to dike removal, poplar trees and Himalayan blackberries would be cut and removed, and the surface elevation of the subsided area inside the existing dike would be raised to match elevations of the adjacent salt marsh area. Appropriate fill would be imported from the project site to raise the site elevation by approximately 2 feet to create a marsh plain. After the dike is removed, increased salinity is expected to alter the plant community of the mitigation site. This conversion is expected to result in an increase of ecological function for the wetlands by restoring estuarine processes including tidal flow, channel formation, connection to existing channels, and sediment and detritus transport and accretion.

Construction of a setback dike would be required to protect the existing structures such as buildings, natural gas pipelines, roads, and the Anacortes Subdivision located south of the proposed wetland mitigation site. The new setback dike would be larger than the existing dike to meet current design standards, and it would cover approximately 7.4 acres, which is 2.6 acres larger than the existing dike (AECOM 2016). The partial or full removal of the existing dike would restore approximately 4.8 acres to tidal influence. It is anticipated that temporary impacts to the wetlands at the wetland mitigation site would be minimal and short term.

Over time, the establishment of tidal processes is expected to increase hydrologic and habitat functions within the mitigation site by restoring tidal regime and establishing salt-tolerant species.

Indirect Impacts

Over time, the establishment of tidal processes is expected to increase hydrologic and habitat functions within the mitigation site by restoring tidal regime and establishing salt-tolerant species. Hydrologic functions would be greatly improved by reconnecting the wetland mitigation site with Padilla Bay, and restoring natural hydrology and tidal exchange. Conversion from a palustrine system to an estuarine emergent system, and connecting to mudflats and adjacent subtidal estuarine habitats, would increase foraging habitat for shorebirds and juvenile fish that use Padilla Bay. As a result, the mitigation site would have beneficial impacts on wetlands.

Anacortes Subdivision

Wetlands adjacent to the Anacortes Subdivision could be exposed to pollutants from accidental drips and leaks of crude oil due to additional rail operations. However, the rail line is currently managed with BNSF Railway standard operation and maintenance measures, which include inspections and spill response plans. Proper implementation of these procedures would minimize the potential for impacts to wetlands along the Anacortes Subdivision.

Cumulative Impacts

As described above, the proposed project would have a direct impact on 21.2 acres of wetlands. In the cumulative impacts study area (Figure 3.5-1), there are two reasonably foreseeable future actions (see Table 3.0-2 in chapter 3.0 for additional project details) with the potential to impact wetlands: the Tesoro Clean Products Upgrade Project which, would impact about 0.0105 acres (Tesoro 2015), and the Old Highway 99N overpass of BNSF Railway, which would impact about 0.071 acre (Skagit County 2016). Together, the proposed project and these reasonably foreseeable future actions would contribute to a cumulative impact on wetlands due to filling of wetlands and the permanent loss of wetland functions.

Historically, there has also been significant agricultural, industrial, commercial, and residential development in the study area. It is assumed that with this growth and construction, wetlands have been affected. As described below, the impacts from the proposed project would be mitigated by the creation of an approximately 73-acre wetland mitigation site. Mitigation would also be required for the impacts from the reasonably foreseeable future actions through

mitigation plans. Because the mitigations plans are required to achieve the goal of no net loss of wetlands, the potential cumulative impacts would be minimized.

MITIGATION MEASURES

Avoidance and Minimization

Shell has incorporated engineering and operational measures into the design of the proposed project to avoid and minimize wetland impacts including:

- The proposed project has been designed to avoid direct impacts to Padilla Bay and its adjacent wetlands by shifting the alignment of the rail spur to the south. The original design for the facility would have impacted Padilla Bay and the adjacent salt marsh. However, the project has been redesigned for the remaining unavoidable impacts to occur to Category 4 (low quality, grazed pasture) wetlands. Seventy-nine percent of permanent impacts and 97 percent of temporary impacts would occur in 27.6 acres of pastured and grazed wetlands.
- Upon completion of construction at the proposed project site, herbaceous wetland and upland areas would be replanted with native grass and forb species. To accommodate rerouted pipelines and retaining walls, approximately 1.22 acres of temporarily affected forested and scrub-shrub wetlands would be converted to emergent wetlands. Approximately 0.23 acre of forested wetland and 2.11 acres of forested wetland buffer would be restored with native trees and shrubs.
- In the buffer surrounding wetland I1 (Figure 3.5-2), where Stream S flows into a salt marsh, the fence below the ordinary high water mark would be moved to provide protection from future disturbance and to create a 200-foot-wide buffer. Within that new buffer, approximately four acres would be planted with native trees and shrubs. Buffer plantings are anticipated to improve water quality by reducing erosion and water temperatures, and by providing food inputs for organisms in the wetland.
- Access roads planned to serve the unloading tracks would be located, where possible, to coincide with existing access roads to minimize soil disturbance, avoid wetlands, and minimize impacts to terrestrial wildlife. The original design for the facility included additional impacts to these resources that were avoided through design revisions.
- Rail track spacing at the facility has been minimized and the facility has been designed with an overhead platform to minimize soil disturbance, avoid wetlands, and minimize impacts to terrestrial wildlife.

Specific design measures that would minimize the potential for impacts from a release of oil at the proposed rail unloading facility are described in further detail in Chapter 3.3 – Surface Water.

Impacts to wetlands would also be minimized by the implementation of the BMPs required as part of the NPDES Construction Stormwater Permit, CWA Section 404 Individual Permit, CWA Section 401 Water Quality Certification, Hydraulic Project Approval, Skagit County Grading Permit, Hydraulic Project Approval, and Shoreline Substantial Development Permit. For

example, erosion control mats, silt fences, and straw bales would be installed as part of the NPDES Construction Stormwater Permit. They will help to stabilize exposed soils to prevent sediment runoff into adjacent wetlands.

Mitigation

Construction of the proposed project would require compensatory mitigation to offset the permanent loss of wetland functions. The overall goal of the proposed mitigation is to achieve no net loss of wetland functions and values resulting from the project.

Shell would provide compensatory mitigation for 25.83 acres of permanent wetland impacts, 0.23 acre of long-term temporary impacts, and 12.58 acres of permanent wetland buffer impacts at the proposed wetland mitigation site located at the south end of Padilla Bay.

Water quality within the project site is anticipated to improve since the elimination of cattle grazing, enhancing stormwater infrastructure, and planting along the riparian area of Stream S/Wetland I1. On-site mitigation for other affected wetland functions was not possible as available areas for wetland mitigation are extremely limited on the peninsula because of refinery development and proximity to Padilla Bay. Shell conducted an extensive search for mitigation candidate sites within the Skagit Delta/Padilla Bay watershed using the relevant federal, state, and local regulations and guidelines, including the *Compensatory Mitigation for Losses of Aquatic Resources* (USACE and USEPA 2008a), the *Selecting Wetland Mitigation Sites Using a Watershed Approach* (Hruby et al. 2009), and SCC 14.24.250.

Given the landscape and watershed setting of the project site, compensatory mitigation was determined to be best achieved through off-site and *out-of-kind mitigation*. In 2015, Shell selected the proposed location for compensatory mitigation (AECOM 2016) in an area at the south end of Padilla Bay. The selected site is currently diked off from Padilla Bay, preventing tidal influence to the site. Blind Slough and East Slough are present at the site; however, because of the dike, both sloughs are not tidally connected to the bay. This site is one of the potential restoration areas identified by the Washington Department of Fish and Wildlife (WDFW) and USACE (PSNERP 2012). The proposed mitigation site is located in the same watershed (Water Resource Inventory Area [WRIA] 3: Lower Skagit – Samish) as the impacted wetlands. Both impacted wetlands at the project site and wetlands at the mitigation site drain into Padilla Bay.

Shell proposes to compensate for the loss of wetland functions through off-site and out-of-kind mitigation. A joint guidance from Ecology, USACE, and USEPA provides typical mitigation ratios for compensatory mitigation projects, but these ratios are only to be used for in-kind wetlands. Because the proposed mitigation compensates for freshwater wetland impacts with the re-establishment of estuarine wetland (out-of-kind), there are no recommended ratios provided by the guidance. As a result, Shell is proposing mitigation ratios that are specific for this project. These ratios are currently under review by Ecology the USACE.

Shell is proposing to reestablish nearshore ecosystem processes on the site, including tidal hydrology, erosion and accretion of sediments, tidal channel formation and maintenance, and detritus import and deposition. Over time, the site is expected to develop estuarine, intertidal habitats including mudflat, salt marsh, tidal and dendritic channels, and upland riparian areas that resemble the adjacent nearshore habitat. Restoring tidal processes is expected to result in large functional uplift to existing wetland communities and improve habitat for fish and wildlife as well as aquatic organisms.

Concurrent mitigation is a compensatory mitigation that is implemented at approximately the same time as the authorized activities that result in wetland impacts (Ecology et al. 2006a).

The wetland mitigation site is approximately 100 acres, and Shell is proposing to restore approximately 73 acres of the site to tidal estuary by lowering the existing dike down to approximately 8 feet and breaching the dike at the existing pump station. The site is expected to reestablish a range of estuarine habitats from salt marsh to marine riparian zone. Out of 73 acres, approximately 40.06 acres of the site would be used for compensatory mitigation, and the remaining 32.94 acres would be reserved for unanticipated wetland or buffer impacts during or after construction of the project (AECOM 2016). Figure 3.5-8 shows the extent of the *concurrent mitigation* area and reserve mitigation area. Any unaccounted impacts would be compensated within the reserved area.

All unavoidable, permanent impacts to wetlands and buffers would be compensated for at the wetland mitigation site. Unavoidable impacts include 25.83 acres of permanent wetland impacts, 0.23 acre of long-term temporary impacts, and 12.58 acres of permanent wetland buffer impacts. Although permanent buffer impacts would not be mitigated at the project site due to limited opportunity for buffer enhancement on-site, the wetland mitigation site would create transitional habitat buffer areas between the restored marsh plain and the new setback dike (Figure 3.5-8). The transitional buffer area habitat would be approximately 40 to 60 feet wide. Because USACE and Skagit County Dike District 12 require any dikes to remain vegetation free, the 15-foot setback dike would be seeded with native grass and is prohibited from having woody vegetation. The proposed buffer widths at the mitigation site have been reviewed by Ecology and Skagit County.

To reestablish approximately 73 acres of estuarine wetland habitats, fill material would be imported from undisturbed areas including soils from forested wetlands and upland forest areas at the project site. Fill material to be used at the mitigation site would be limited to freshly excavated soils. All soils would be tested for physical and chemical properties prior to use; contaminated material would not be used. Based on the Hazardous Materials Discipline Report prepared by Shell, no soil contamination is anticipated to be present in the project site (AECOM 2016). If soil contamination were found, soils would be removed and handled in accordance with applicable regulations. Until construction of the setback dike is complete and the existing dike is breached, the clean fill material would be seeded with leguminous plants such as clovers and lupines.

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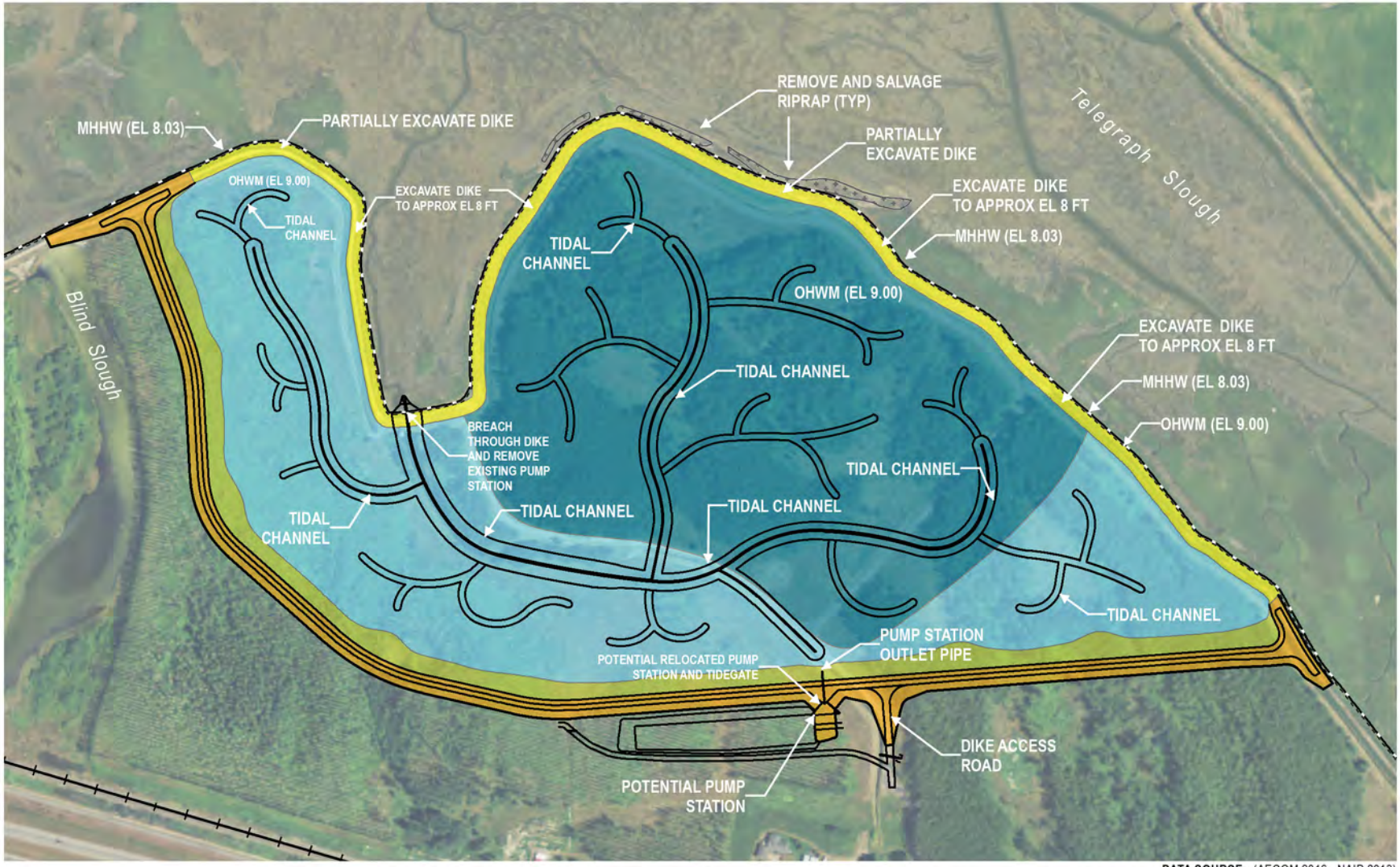


DATA SOURCE: (AECOM 2016, NAIP 2013)

Existing Dike
New Setback Dike
Transitional Habitat Slope/Buffer Area
Concurrent Mitigation Area
Reserve Mitigation Area
MHHW
OHWM

N
0 200 400 Feet

Figure 3.5-8
DRAFT MITIGATION SITE PLAN

The Draft Mitigation Plan proposes to establish a range of estuarine wetland habitat including mudflat, low marsh, mid marsh, high marsh, transitional habitat slope/buffer, and upland areas. Each habitat type is corrected with a specific range of elevations. The mitigation site would be graded to match these established elevations for the habitat types. Grading of the filled areas would be sloped gently toward new channels throughout the site to provide natural drainage. New channels would be excavated to support tidal hydrology and fish access. The mitigation site would add over 11,000 feet of new channels that range from 15 to 77 feet wide (AECOM 2016).

After the clean fill material is exposed to tidal hydrology, natural recolonization with native plant species is expected to occur in the marsh plain area, which could take several years. The high marsh plain and transitional habitat slope/buffer areas would be seeded with a mix of native grass and rush species. The transitional habitat slope/buffer area would also be planted with native woody and herbaceous plants.

The existing dike would be lowered along its entire length, except at the dike breach location. The majority of the existing dike would be lowered to approximately 8 feet (mean higher high water) to match the existing bayside marsh plain. Portions of the existing north-facing dikes would be only partially removed to protect against wave erosion. Breaching of the dike would occur during the last phase of construction. The new 16-foot setback dike would be built approximately 500 to 1,000 feet south of the existing dike to protect adjacent properties.

Construction at the mitigation site would begin concurrently with that of the rail unloading facility and is expected to take approximately four years to complete. The mitigation site would be monitored and maintained by Shell for at least 15 years after construction is complete. Monitoring, maintenance, and contingency plans are provided in the Draft Mitigation Plan (AECOM 2016), and these plans would be described in a final mitigation report and submitted with the appropriate permits for the proposed project.

The site would be protected through a license agreement between Shell and Triton America that would be approved by the permitting agencies so that no building construction or other activities that may interfere with proposed mitigation would occur. The license would also place the mitigation site into a conservation easement in perpetuity. Ownership of the site would be retained by Triton America, and Shell would work with Triton America and regulatory agencies to establish appropriate long-term protective measures for the wetland functions established at the site. For installation of the new dike, Triton America would execute an easement or other legal documents for access and maintenance rights to Skagit County Dike District #12.

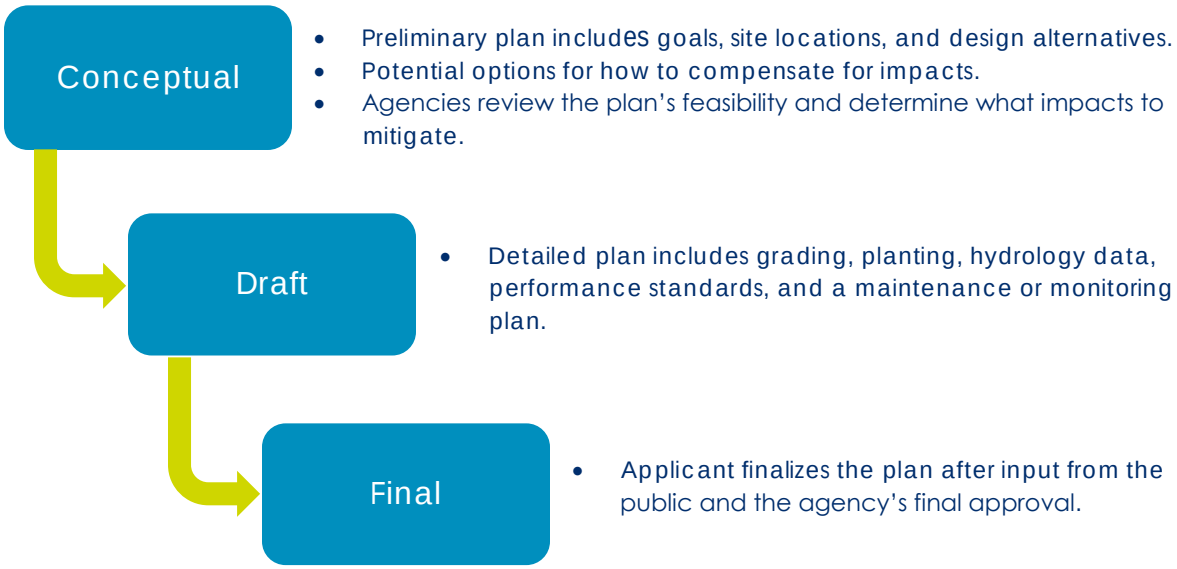
Developing a mitigation plan has several phases before it can be approved by regulatory agencies (Figure 3.5-9). Details are as follows:

- Phase 1: Develop a conceptual mitigation plan that would include wetland impact areas, wetland functions being affected, mitigation requirements and goals, site locations, and design alternatives. The conceptual mitigation plan would provide agencies an opportunity to understand the project impacts and compensation requirements, and assist them in identifying the feasibility of the proposal. After submitting the conceptual mitigation report,

regulatory agencies would provide feedback to the applicant to help develop a detailed mitigation plan.

- Phase 2: Revise the conceptual mitigation report and develop a draft mitigation plan based on agency comments. The draft would typically include the completed wetland mitigation site design such as grading, planting, hydrology data, proposed functional assessment, performance standards, and a maintenance or monitoring plan. The Draft Mitigation Plan for the proposed project is available on the project website: www.shellraileis.com (AECOM 2016).
- Phase 3: Develop a final mitigation plan after input from the public and agency approval and submit with appropriate permits (Ecology et al. 2006b).

Figure 3.5-9 Developing a Mitigation Plan



Shell has prepared a Draft Mitigation Plan (AECOM 2016) and is currently working with Ecology and USACE to finalize it. Additional analysis and surveys, including a topographic survey, a geotechnical investigation to finalize the design of the setback dike, excavation of the pilot channel waterward of the dike, and groundwater monitoring for the mitigation site to determine water levels and salinity would be necessary to further develop and finalize the mitigation plan.

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