WETLAND MITIGATION BANK USE PLAN

Crude by Rail East Gate Project

Prepared for:

Shell Puget Sound Refinery
8505 South Texas Road
Anacortes, WA 98248

December 17, 2013

URS

1501 Fourth Avenue, Suite 1400
Seattle, WA 98101-1616
(206) 438-2700

33764101

EXECUTIVE SUMMARY

Shell Puget Sound Refinery (PSR) near Anacortes, Washington, proposes to build a rail spur from the existing adjacent Burlington Northern Santa Fe (BNSF) mainline onto Shell PSR property with equipment to pump oil from rail cars into the refinery. The purpose of the project is in support of the fundamental purpose and need of the Shell PSR to provide fuel to the Pacific Northwest region. The proposed facility includes rail tracks, unloading pads, pumping facilities, pipelines, stormwater facilities, security fencing, spill containment areas, firewater system, and access roads within the existing Shell PSR property. The new facility will be more than 1 mile long to facilitate unit trains (approximately 102 oil tank rail cars each). A *Wetland Delineation Report and Critical Areas Assessment* for the project area was prepared in November 2013 (URS 2013a).

Unavoidable direct and indirect permanent wetland impacts resulting from the project total **25.29** acres, including **19.16** acres of Category III emergent (pasture) wetlands, **3.92** acres of Category III forested wetlands, **1.51** acres of Category III scrub-shrub wetlands, **0.59** acre of Category IV emergent wetlands, **0.09** acre of Category II emergent wetlands, and **0.02** acre of Category II forested wetlands. Permanent conversion of Category III forested and scrub-shrub wetlands to emergent wetlands total **0.35** and **0.06** acre, respectively. Long-term temporary impacts to Category III forested wetlands total **0.24** acre. Short-term temporary impacts to emergent wetlands total **6.74** acres, including **6.24** acres of Category III wetlands, **0.37** acre of Category II wetlands, and **0.13** acre of Category IV wetlands. Permanent and temporary wetland buffer impacts total **14.70** acres and **4.47** acres, respectively. One stream occurs in the project area. Approximately **175 linear feet (LF)** of channel will be rerouted, and **50 LF** will be placed in a culvert. Portions of ten ditches will also be rerouted or placed into culverts.

No threatened or endangered species or their habitat will be adversely affected by the project. There are no historical or cultural places or objects listed on or recommended eligible for national, state, or local preservation registers on the site.

The project has been located and designed to avoid and minimize wetland and environmental impacts to the maximum extent feasible. Associated facilities are located in upland areas where possible. Due to the predominance of wetlands in the project vicinity, limited site alternatives near the refinery, and the design requirements of a rail offloading facility, permanent wetland impacts are unavoidable. However, most of the high-quality forested wetlands will be avoided, as well as all estuarine wetlands. The largest impacts occur to low quality, grazed pasture wetlands.

Permanent wetland and buffer impacts will be compensated for by the purchase of credits at a certified mitigation bank in Skagit County. Credit-debit ratios will follow guidance in the approved mitigation banking instrument of the selected bank. These ratios are set at **1:1** (mitigation bank credits to project impact area) for direct and indirect permanent impacts to Category III wetlands, **1.25:1** for Category II wetlands; and **0.85:1** for Category IV wetlands. The ratio for wetland conversion impacts and long-term temporary impacts is generally **0.5:1**. All short-term temporary wetland and buffer impacts will be restored on site within 6 months of completion of the project and will not require compensatory mitigation.

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1.0 PROJECT DESCRIPTION

1.1 Project Components

Shell Puget Sound Refinery (PSR) proposes to build a rail spur from the existing adjacent Burlington Northern Santa Fe (BNSF) mainline onto Shell PSR property with equipment to pump oil from rail cars into the refinery. Shell PSR anticipates that it would receive approximately one unit train per day. Each unit train would include approximately four locomotives, with approximately 102 oil tank rail cars containing crude oil. The facility is being designed to receive a maximum of six unit trains per week, for a total of approximately 612 incoming fully loaded oil cars and 612 outgoing empty tank cars on a weekly basis.

The project scope generally includes the following components:

- Arrival/departure rail track
- Unloading area with two tracks and a concrete containment pad
- Bad order railcar tracks with repair facilities
- Personnel operations building, with appurtenant facilities and limited parking
- Perimeter inspection/security road
- Pumps and below- and above-ground pipelines to connect the proposed project to the existing storage tanks
- New road connections
- Relocation of segments of the Olympic Pipeline, the Kinder Morgan Pipeline, and Puget Sound Energy (PSE) power lines
- New electrical power substation
- Oil/water separator facilities and containment for a single-car spill
- Stormwater facilities

The rail for the crude unloading facility would extend from the existing BNSF rail line and spur (near South March Point Road) in a northwesterly direction to North Texas Road. The rail facility would consist of approximately 8,000 feet of unloading tracks with a concrete unloading pad, approximately 1,300 feet of track for temporary storage of rail cars that are taken out of service for repair and maintenance, and about 7,200 feet of train-staging track. Rail ingress and egress would be provided via a connection to the existing BNSF mainline located to the southeast, which would require modifications to the BNSF rail configuration.

The crude oil transfer station would include vent headers, a containment area, drain connections and collection header, and tank car grounding. An operations shelter, storage shed, electrical structure, and a small employee parking lot would also be constructed in proximity to the crude oil transfer facility.

The proposed project would also include various site preparation activities including, but not limited to, clearing and grading; installation and construction of associated infrastructure

improvements, such as stormwater infrastructure; and extension of existing services and utilities, including electricity, sanitary sewer, potable water, etc. Two existing pipelines and some PSE power lines would have segments relocated. Two ponds are proposed to provide permanent stormwater control. An oil/water separator pond would also be provided on the west side of the rail adjacent to the new facilities.

On-site mobilization / construction would begin as early as January 2015 and is estimated to be completed by December 2015.

1.2 Project Purpose

The purpose of the project is in support of the fundamental purpose and need of the Shell PSR to provide a variety of fuels to the Pacific Northwest region. The Shell PSR receives crude oil by ship from Alaska's North Slope. This crude oil supply is in a gradual decline. In its place, there is now an increased availability of mid-continent crude and other crudes of opportunity. The crude brought in by rail would replace some supply currently brought in by ship and would serve to maintain current production, not increase capacity. At this time, the only practicable transportation means for transporting crude oil from the mid-continent to the Shell PSR is by the use of rail.

BNSF owns and operates the existing mainline that runs adjacent to the Shell PSR. The railroad line, also known as the Anacortes Subdivision, formerly terminated farther to the west in Anacortes. Today, the railroad line ends on the western side of the peninsula and just south of North Texas Road, south of the adjacent Tesoro Anacortes Refinery, and is actively used by Shell, Tesoro, and other neighboring industries. Shell PSR currently receives an average of three trains per week with an average of 15 cars in each trip.). Existing rail facilities at the refinery are not designed to receive and unload unit trains or crude shipments. To accommodate the volume of railcars of crude from rail, Shell PSR proposes to construct a rail facility that would allow a train to safely and efficiently move off the adjacent BNSF rail line into an unloading facility at the refinery. Development of the rail facility must address the following basic needs: the facility must accommodate unit trains of crude oil; the facility must meet BNSF, Washington State Department of Transportation, and Federal Railroad Administration rail design criteria; the site must be in proximity to the refinery and the existing BNSF rail line; and the site must also meet basic industry and refinery-specific safety and security requirements.

1.3 Project Location

The Shell PSR is located at 8505 South Texas Road, Anacortes, WA 98221 in western Skagit County on March's Point, along the southwestern edge of Padilla Bay (**Figure 1**). The study area for the proposed Crude by Rail East Gate project is approximately 166 acres and is bordered on

Source: Google Earth Pro

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Scale in Feet

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Figure 1

Project Site Location

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Crude by Rail East Gate
Shell Puget Sound Refinery

the north by North Texas Road, on the south by South March Point Road, on the west by developed areas of the refinery (northern two-thirds) and undeveloped forest and pasture (southern one-third), and on the east by mainly grazed pasture, undeveloped forest, and East March Point Road. The project study area is shown in **Figure 2**.

The project area is located on Parcel P33502 in the following Sections, Townships, and Ranges:

- NW ¼, Section 3, Township 34 N, Range 2 E
- NE ¼, Section 4, Township 34 N, Range 2 E
- NE and SE ¼, Section 33, Township 35 N, Range 2 E
- SW ¼, Section 34, Township 35 N, Range 2 E

The project area is in the Lower Skagit/Samish Water Resources Inventory Area (WRIA) #3.

Legend
- Study Area Boundary
- Wetland
- Wetland Mosaic
- Wetland Continues Beyond Study Area Boundary
- Ditch
- Culvert
- Stream/Swale
- Flow Direction
- Sample Plot
- Monitoring Well

Note
Ditches and streams outside of study area are approximate.

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SCALE IN FEET

Wetland Name	Acres	Rating	County Buffer Width
A	2.02	IV	50
D	38.41	III	150
D (Mosaic)	7.45	III	150
E	10.75	III	150
E3	0.17	IV	50
E4	0.05	IV	50
E5	0.18	IV	50
E6	0.20	IV	50
I1	2.48	II	300
I2	0.35	IV	50
J	0.13	IV	50
N	0.04	II	300
O	0.18	III	150
Q	1.01	III	150
R	0.10	IV	50
S	0.86	II	300
T	0.12	III	150
U	0.24	IV	50
V	1.07	IV	50
W	0.06	III	150
Y	0.42	IV	50
Z	0.64	IV	50

Acreages only include the wetland area within the study area.
Total mosaic area is 10.64 acres, 70% (7.45 acres) is wetland.

J:\GIS\Projects\SHELL\Puget Sound Refinery\SubTasks\Crude Rail\Wetland\Mitigation\Report\Figure 2 (Existing Site Plan).dwg
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Figure 2
Wetland, Stream, and Ditch Locations
Wetland Mitigation Bank Use Plan
Crude by Rail East Gate
Shell Puget Sound Refinery

2.0 EXISTING CONDITIONS OF WETLANDS AND BUFFERS

2.1 Description of the Development Site

The project site is mostly within the Shell PSR property boundaries, though outside of the main process areas and security fence. A small portion of the southern project area is on BNSF property. The refinery was built in 1958. Prior to that time most of the March's Point peninsula was used for small-scale agriculture. The project area has been used as grazed pasture during the last several decades and is currently leased for this use. Patches of mixed conifer-deciduous forest also occur in the north half of the project site. The site is zoned by Skagit County for industrial use.

Fourth Street, a gated refinery access road, bisects the southern half of the project site. South Texas Road, a gravel access road, crosses the project site near the south end. Two buried pipelines (Kinder Morgan Pipeline and Olympic Pipeline) occur within the project area. Electrical transmission lines are also present on the south half of the project area. A refinery security fence is present along much of the west side and north end. Numerous barbed wire fences are present throughout the site. A clean spoils pile (approximately 50 feet tall by 750 feet long by 500 feet wide) is present near the north end of the project site. Thirteen ditches and one stream occur in the project area. All of these eventually drain into Padilla Bay. The stream is fish-bearing in its lower reach where there is tidal influence. An existing compensatory wetland mitigation site (1.20 acres) is present just south of 4th Street.

A cultural resources survey was conducted for this project by URS Corporation (2013b). A copy of this report is on file at the Washington State Department of Archaeology and Historic Preservation (DAHP). No archaeological sites or historic structures were identified in the initial project area. The project area was subsequently expanded based on design considerations and included a portion of the BNSF rail right-of-way. Survey of the expanded study area identified three previously unrecorded archaeological sites and one historic rail line segment within the project area (URS 2013c). URS recommended these historic resources are not significant and not eligible for listing in the National Register of Historic Places. A Determination of Eligibility will be sent to DAHP for review. An additional archaeological site occurs next to the project area. The project was re-routed to avoid the site, and it will not be directly affected or altered by the proposed project. URS has prepared and will implement an Archaeological Resources Monitoring Plan and Inadvertent Discovery Plan for the project, and a professional archaeologist will be present for the duration of major ground-disturbing activities.

A biological assessment has been prepared for the project site (URS 2013d). Several federally listed threatened or endangered species are present in Padilla Bay. The project is not likely to adversely affect any listed species or their critical habitat.

A hazardous materials discipline report has also been prepared to identify the potential presence of soil and groundwater contamination from sites along and adjacent to the proposed rail alignment (URS 2013e). No direct evidence was identified that the refinery operation has impacted the environmental conditions within the project area.

2.2 Existing Wetlands and Buffers

Wetlands and other aquatic resources on and adjacent to the project site have been recently delineated. Complete delineation methodology, wetland, buffer, stream and ditch descriptions, ratings, and field data sheets are provided in the *Wetland Delineation Report and Critical Area Assessment* (URS 2013a). Other critical areas as defined by the Skagit County Code (SCC) 14.24 are also addressed in this report. Wetlands and other aquatic resources in the project vicinity are shown on **Figure 2**. Twenty-one wetlands were delineated, ranging in size from 0.04 to 45.73 acres (within the delineation study area). Total on-site wetland acreage is 66.93 acres, which is approximately 40 percent of the delineation study area of 166 acres. Individual wetland characteristics are summarized in **Table 1**.

Table 1: Wetlands in the Project Vicinity

Wetland Name	Wetland Category	Cowardin Classification	HGM Classification	Hydrologically Isolated?	Wetland Size (acres)[1]	Buffer Width (feet)
A	IV	Emergent	Depressional / Slope	No	2.02	50
D	III	Forested/Scrub-shrub/Emergent	Depressional / Slope	No	38.41	150
D	III	Forested Mosaic	Depressional / Slope	No	7.45	150
E	III	Forested/Emergent	Depressional / Slope	No	10.75	150
E3	IV	Emergent	Depressional	No	0.17	50
E4	IV	Emergent	Depressional	No	0.05	50
E5	IV	Emergent	Depressional	No	0.18	50
E6	IV	Emergent	Depressional	No	0.20	50
I1	II	Forested/Scrub-shrub/Emergent/Estuarine	Depressional / Slope /Tidal Fringe	No	2.48	300
I2	IV	Emergent	Slope	No	0.35	50
J	IV	Emergent	Depressional / Slope	No	0.13	50
N	II	Estuarine Emergent	Tidal Fringe	No	0.04	300
O	III	Emergent	Depressional	No	0.18	150
Q	III	Forested/Scrub-shrub	Depressional	No	1.01	150
R	IV	Emergent	Depressional	No	0.10	50
S	II	Forested/Scrub-shrub/Emergent	Depressional / Slope	No	0.86	300
T	III	Forested	Depressional	Yes	0.12	150
U	IV	Emergent	Depressional	No	0.24	50
V	IV	Emergent	Depressional / Slope	No	1.07	50
W	III	Forested	Depressional	No	0.06	150
Y	IV	Emergent	Depressional / Slope	No	0.42	50
Z	IV	Emergent	Depressional / Slope	No	0.64	50

[1]Includes only the area of the wetlands within the study area and only the wetland portion of the wetland/upland mosaics.

3.0 AVOIDANCE AND MINIMIZATION OF WETLAND IMPACTS

The proposed plan is designed to mitigate wetland impacts by following the standard mitigation sequence (Ecology et al. 2006). This sequence and a brief summary of how each mitigation component will be accomplished are provided below. Shell PSR also looked at several project location alternatives which are discussed in the Alternatives Analysis (URS 2013f). Two major layout configuration alternatives were also assessed in the Alternatives Analysis. The discussion below pertains to the proposed layout, known as the two-track option.

3.1 Avoidance

Wetlands are present over much of the project site, so avoiding all wetland impacts is not feasible. Approximately 40 percent of the project study area is wetlands, with additional wetlands extending beyond the study area. The current site design avoids direct permanent impacts to 68 percent of the wetland area within the delineated study area, including the highest quality wetlands.

- The project has been re-designed to completely avoid the fish-accessible mid to lower reaches of Stream S, which parallels the existing BNSF tracks. All of its wooded riparian area and the tidal salt marsh portion of Wetland I1 will also be avoided.
- The project has been re-designed to avoid all permanent impacts west of the existing Shell railroad spur, including a large Category II forested wetland (Wetland S) and its buffer.
- The project has been re-designed to avoid all direct impacts to Padilla Bay or its adjacent wetlands by avoiding rail impacts east of the March Point Road intersection. The previous design would have impacted approximately 1,700 feet along the edge of Padilla Bay.
- The southern stormwater pond will be entirely located in upland and the northern stormwater pond is located in an area that is mostly upland.
- A spill prevention plan will be prepared that will avoid the potential for wetlands to be affected if a spill occurs during operation.

3.2 Minimization

- The project design locates most unavoidable rail impacts in low-quality, grazed pasture wetlands. Seventy-seven percent of permanent impacts and 97 percent of temporary impacts are to pasture wetlands.
- Mechanical facilities have been located in uplands as much as possible.
- The proposed bridge on 4th Street that would span the rail contains retaining walls rather than sloped sides to minimize permanent wetland impacts.

- The stormwater pond adjacent to 4th Street has been narrowed to allow for more clearance between an eagle nest tree and construction activity.
- Access roads planned to serve unloading track have been moved where possible to coincide with existing Shell access roads.
- Rail track spacing has been reduced, necessitating less area of impact to wetlands across the site.
- The unloading area has been optimized both in track spacing and use of an overhead platform in lieu of mobile equipment to connect vents. The platform requires less space and reduces the overall width of the unloading area.
- An erosion and sediment control plan will be prepared for the project and will include measures to reduce water quality impacts.

3.3 Restoration

- A 25-foot-wide temporary impact corridor has been designated adjacent to all permanent wetland impacts (**Figure 3**). Temporary impacts are generally related to roads or clearing for construction access. These areas are mainly in the grazed pasture wetlands. All temporary construction impacts (topography and vegetation, in particular) will be restored within 6 months of project completion.
- Any temporary fill or structures utilized during construction will be removed and the areas reseeded or replanted as necessary.
- The water conveyance function of all jurisdictional ditches will be restored on site through either placing the ditch in a culvert or rerouting the ditch.

3.4 Monitoring

- All temporary wetland and buffer impact areas will be monitored after project completion to ensure that site restoration is successful.
- Pre- and post-project monitoring of shallow groundwater will be utilized to determine if additional compensation is required for indirect wetland impacts resulting from the deep trenching through Wetlands D and E. Existing monitoring well locations are shown on **Figures 3** and **4**. The wells were installed on April 10, 2013. They provide two elevation transects upslope and downslope of the proposed cut. Replacement or additional wells will be installed as necessary based on construction impacts. Groundwater monitoring will continue through the project construction and monitoring phases to provide at least two pre-construction seasons and three to five post-construction seasons. A comparison of pre- and post-construction water regimes, and upslope and downslope water regimes, should allow for a fairly robust confirmation of indirect wetland impacts.
- Currently estimated indirect impacts are accounted for in the impact analysis and will be compensated for by the purchase of mitigation bank credits. Should additional indirect project impacts become evident during the monitoring period, they will be assessed and mitigated for through purchase of additional bank credits.

Wetland Impact Categories

- Direct Permanent - Existing Mitigation Site
- Direct Permanent - Forest
- Direct Permanent - Pasture
- Direct Permanent - Shrub
- Indirect Permanent - Forest
- Indirect Permanent - Pasture
- Indirect Permanent - Shrub
- Temporary Long-Term - Forest
- Temporary Short-Term - Pasture
- Permanent Conversion - Forest
- Permanent Conversion - Shrub

Wetland Buffer Impact Categories

- Permanent
- Temporary

Legend
- Study Area Boundary
- Wetland
- Wetland Mosaic
- Wetland Continues Beyond Study Area Boundary
- Ditch
- Culvert
- Stream/Swale
- Flow Direction
- Monitoring Well

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SCALE IN FEET

North Texas Road
Ditch A1
Ditch A2
A
Clean Spoils Pile
Ditch B
MW-5
MW-6
MW-7
Sheet Flow
Ditch D3
(Mosaic)
Channel
Drainage Channel (Typ)
Access Road(Typ)
Permanent Grading Limits (Typ)
Temporary Grading Limits (Typ)
Tracks (Typ)
Detention Pond
Z
D
Inlet Pipe to Stormwater Basin
Y
V
W
Stormwater Basin
Discharge Pipe
Ditch D1
4th Street
Ditch D2
E
Padilla Bay
Shell Railroad Spur
E4
E5
E3
E6
Overhead Power Lines
Ditch E1
Stormwater Basin
Ordinary High Water Mark
I1 Tidal
Salt Marsh
O
N
S
Shell Railroad Spur
Inlet Pipe
Discharge Pipe
Stream 'S' to be Relocated in this Area
Culverts
R
South Texas Road
South Texas Road
Culvert
I1
I1
J
J
BNSF Railroad
Ditch C
Storm March Point Road

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Figure 3
Wetland and Buffer Impacts
Wetland Mitigation Bank Use Plan
Crude by Rail East Gate
Shell Puget Sound Refinery

4.0 Unavoidable Wetland Impacts

The project will result in the loss or diminishment of wetland and buffer area and functions either through direct permanent filling, excavation or land clearing activities, temporary clearing for construction access, or through indirect effects on wetland hydrology or other functions. Impacts are summarized by wetland and project activity in **Table 2**. Wetland impacts on the development site are shown on **Figure 3**. One intermittent stream and ten ditches will be rerouted and/or placed into pipes.

4.1 Direct Permanent Wetland Impacts

Seven of the 21 delineated wetlands will be permanently impacted in all or some of their area. **Wetland U** (0.24-acre) and **Wetland T** (0.12-acre) would be excavated in their entirety for a proposed stormwater detention pond. Most of **Wetland Q** (0.81-acre) and **Wetland I2** (0.31-acre), and a small portion of **Wetland I1** (0.11-acre) would be filled for the rail alignment. Approximately 46 percent (4.92 acres) of **Wetland E** (Appendix A, Photo #4) would be impacted by excavation for the rail alignment. In addition, an existing 1.2-acre mitigation area within and adjacent to the project impact area in Wetland E will be vacated. Approximately 30 percent (13.70 acres) of **Wetland D** (Appendix A, Photo #3), the largest wetland on the site, would be impacted through excavation for the rail alignment and construction of access roads and various support facilities. The total area of direct permanent wetland impacts is **21.41 acres**. This is approximately 32 percent of the total wetland area (66.93 acres) in the study area. All direct permanent impacts will be compensated for by purchase of mitigation bank credits.

Permanent wetland conversion impacts totaling **0.41-acre** will occur where underground natural gas and water pipelines are rerouted or constructed through the forested and scrub-shrub portions of **Wetlands D** and **E**. These areas will be permanently converted to emergent wetlands. Permanent conversion impacts will be compensated for by purchase of mitigation bank credits at one-half the ratio of permanent impacts.

4.2 Indirect Permanent Wetland Impacts

Wetlands in the project area will also be indirectly impacted by the proposed development (**Figure 3**). **Table 2** lists indirect impacts by wetland and activity. **Wetlands Q** and **I2** have direct impacts from fill that will eliminate most of their wetland area. The small remaining unfilled areas (0.20-and 0.04-acre, respectively) are not likely to retain wetland hydrology and are therefore considered indirect permanent impacts. Direct excavation impacts to **Wetlands D** and **E** will isolate small wetland fragments that are also counted as indirect permanent impact areas. Deep excavation through Wetlands D and E is also anticipated to indirectly affect wetland hydrology of adjacent areas (discussed below). Total indirect permanent wetland impacts are anticipated to be approximately **3.88 acres**. These impacts will be compensated for by purchase of mitigation bank credits using the same ratios as direct permanent impacts.

Table 2: Summary of Impacts by Wetland and Project Activity

Wetland Name	Wetland Rating Category	Vegetation Class of the Impact Area	Project Activity	Wetland Impact Area (Acres)	Type of Impact
D	III	Emergent	Excavation	10.51	Direct Permanent
				1.76	Indirect Permanent
			Clearing/Access/Pipeline Reroute and Installation	5.66	Short-Term Temporary
		Scrub-Shrub	Water Pipeline Installation	0.06	Conversion
		Forested[1]	Excavation	3.19	Direct Permanent
				0.61	Indirect Permanent
			Clearing/Access	0.24	Long-Term Temporary
			Pipeline Reroutes/ Water Pipe Installation	0.17	Conversion
E	III	Emergent	Excavation	4.57	Direct Permanent
				1.12	Indirect Permanent
			Clearing/Access/Pipeline Reroutes/Road Improvements	0.58	Short-Term Temporary
			Vacating of Existing Wetland Mitigation Area	1.20	Direct Permanent
		Scrub-Shrub	Excavation	0.35	Direct Permanent
				0.15	Indirect Permanent
		Forested	"Oily Water" Pipeline Installation	0.18	Conversion
I1	II	Emergent	Fill	0.09	Direct Permanent

Wetland Name	Wetland Rating Category	Vegetation Class of the Impact Area	Project Activity	Wetland Impact Area (Acres)	Type of Impact
			Clearing/Access	0.37	Short-Term Temporary
		Forest	Fill	0.02	Direct Permanent
I2	IV	Emergent	Fill/Excavation	0.31	Direct Permanent
				0.04	Indirect Permanent
J	IV	Emergent	Clearing/Access	0.02	Short-Term Temporary
Q	III	Scrub-Shrub	Fill	0.81	Direct Permanent
				0.20	Indirect Permanent
T	III	Forested	Excavation (pond)	0.12	Direct Permanent
U	IV	Emergent	Excavation (pond)	0.24	Direct Permanent
V	IV	Emergent	Excavation (pond and outlet pipe)	0.11	Short-Term Temporary
				21.41	**Direct Permanent**
				3.88	**Indirect Permanent**
				0.41	**Conversion**
			Project Totals	**0.24**	**Long-Term Temporary**
[1]Only the wetland area is given, which represents approximately 70 percent of the forested mosaic areas of Wetland D.				**6.74**	**Short-Term Temporary**

Figure 4 shows cross-sections of the proposed rail cut through Wetland D. The trench will be approximately 5 to 10 feet deep and 175 feet wide (top of slope). Excavation will extend to 500 feet wide in the location of the proposed mechanical systems. The Wetland D mosaic will have the deepest excavation. The cut generally runs perpendicular to the direction of slope and will intercept surface and subsurface waters that currently feed downslope wetlands. Upslope

wetlands may also be partially drained. Drainage will be directed into new ditches on either side of the railroad tracks and routed into stormwater detention ponds. The largest pond is on the north side of 4th Street, approximately 500 feet downslope of the cut. Treated outfall from this pond will be directed toward Wetland W through a level spreader.

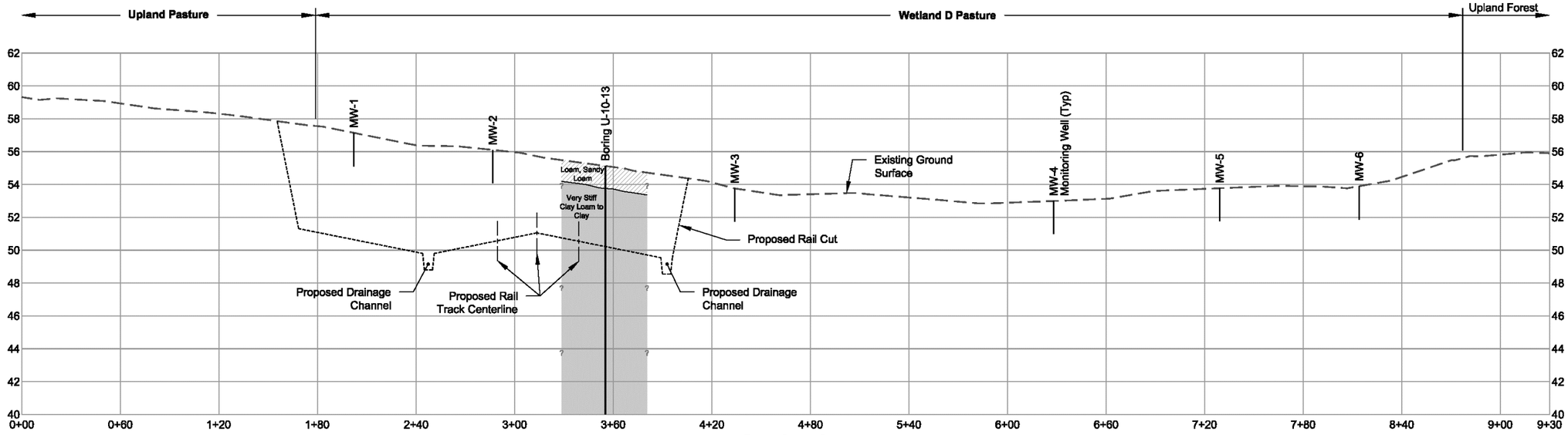
In order to anticipate the extent of indirect impacts for purposes of this bank use plan, indirect impact zones were estimated based on best professional judgment and qualitative analysis of existing wetland catchments, soils, and groundwater movement. Quantitative assessments of lateral drainage effects (such as scope and effect equations) were also evaluated but were found to not be sensitive enough to specific site conditions.

Wetlands in the project area receive water through direct precipitation, surface runoff, channelized ditch flow, and shallow subsurface flow over restrictive or less permeable soil layers. The relative contribution of each varies across the site with the size and conditions of the wetlands and catchment areas. In the area of the proposed rail cut through Wetland D, approximately 1 to 2 feet of loamy soils overlay fine-textured soils with slow permeability. Slope gradient in this area is very low, approximately 1 to 2 percent. As a result, water inputs from surface runoff and lateral subsurface flow are expected to be relatively minor compared to direct precipitation. Winter and early spring precipitation is effective in recharging the upper foot or two of soil above the restrictive layer. When precipitation declines and evapotranspiration increases later into the growing season, the shallow perched water table drops fairly quickly.

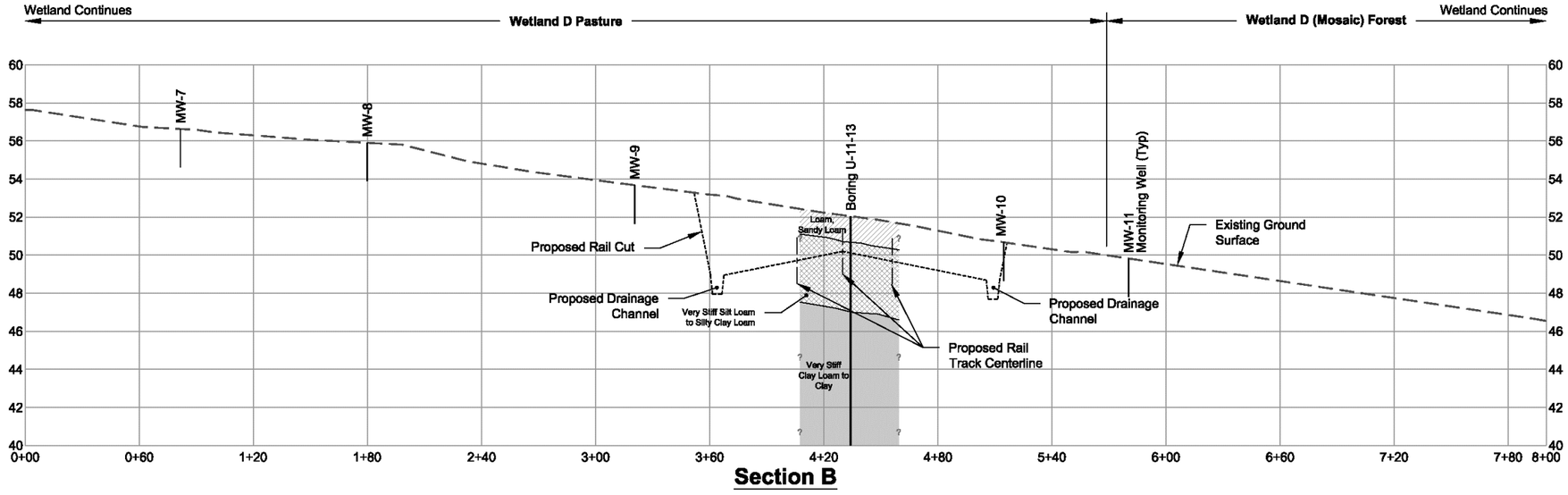
The thin soils above the slowly permeable layer, combined with limited lateral drainage, means that a relatively small catchment area is necessary to sustain wetland hydrology in the early part of the growing season (which in this area begins in February). For purposes of the mitigation bank use plan, a zone within 25 feet upslope and downslope of the rail cut has been designated as an indirect impact area to account for the potential drainage effects of the cut and loss of catchment area and subsurface inputs. Since there is uncertainty about the extent of indirect hydrology impacts, monitoring of groundwater is proposed as a means of adjusting the compensatory mitigation requirements should the indirect impact area be larger than predicted (see Section 3.4).

Monitoring wells will be located at the edge of the indirect impact zones adjacent to Wetland D and spaced approximately 50 feet apart up to 200 feet from the cut. Any existing wetland areas outside of the indirect impact zones that fail to meet wetland hydrology criteria for two consecutive seasons during years of normal precipitation will be added to the calculations of indirect impacts. Additional compensatory mitigation, if necessary, will be provided for these areas.

The contribution of ditch flow is locally significant in the southern Wetland D forested mosaic area, which currently receives the majority of flow from Ditch D3 (as sheet flow). Ditches D3 and D4 receive outfall from the existing detention pond located just west of the project area. The pond treats runoff and condensate water from the refinery. Ditch D3 receives the majority of the water and flows nearly year-round due to the condensate water. This has resulted in artificially prolonged inundation in the mosaic depressions. Flow from both ditches will be redirected into a new ditch along the railroad tracks, and then through a pipe into the large stormwater pond. The

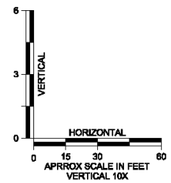


Section A



Section B

Notes:
1. Monitoring Wells (MW) are projected onto sections.
2. Geotechnical Borings from: URS (2013h)



J:\GIS\Projects\SHELL\Puget Sound Refinery\SubTasks\Crude Rail\Wetland\Mitigation\Report\Figure 4 (Sections).dwg
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URS

Figure 4
Sections A and B
Wetland Mitigation Bank Use Plan
Crude by Rail East Gate
Shell Puget Sound Refinery

loss of ditch flow downslope of the rail cut is expected to reduce the extent and duration of ponding in the Wetland D mosaic area. It is not expected to result in the loss of significant wetland area as topographic and soil conditions are likely to sustain wetland hydrology in the depressions. Surface and groundwater will be monitored in this area to assess long-term hydrologic changes.

4.3 Temporary Wetland Impacts

Both short-term (<1 year) and long-term temporary impacts are anticipated as a result of clearing or filling for construction access, temporary access roads, and pipeline and transmission line rerouting. A 25-foot temporary impact zone has been designated around almost all excavation and fill lines for purposes of impact assessment. The temporary impact zone was eliminated or reduced in areas with high-quality estuary habitat, in some forested wetlands, and near an eagle nest tree. Short-term temporary impacts totaling **6.74 acres** are anticipated in the pasture areas of **Wetlands D, E, I1, J,** and **V**. These areas will be restored in place by re-establishing pre-construction contours and reseeding with pasture species.

Long-term temporary impacts totaling **0.24 acre** are anticipated in the forested portions of **Wetlands D.** These areas will also be restored on site, but there will be a temporal loss (>1 year) of wetland functions until woody vegetation is re-established. Long-term temporary impacts will be compensated for by purchase of mitigation bank credits at one-half the ratio of permanent impacts.

4.4 Water Regimes

Wetland hydrology in the project impact area is highly seasonal. Wetlands receive direct precipitation, surface runoff from the surrounding grazed or developed catchments, and channelized flow from ditches that drain from the developed part of the refinery. Drainage is impeded by the low relief and fine or contrasting soil layers within approximately 1 to 3 feet of the ground surface. When the upper soil layer(s) are saturated, water may move laterally along the slope of the restrictive layer, contributing to downslope wetlands.

Based on field observations beginning in January 2013 and some initial well monitoring, the wetlands remain saturated throughout the winter and into early- to mid-spring, depending on their location. Wetlands north of 4th Street remain saturated longer into the growing season than those to the south. The water table in the pasture portion of Wetland D fell below 12 inches of the soil surface by the end of April or first week of May. Continuous surface inundation of more than 2 weeks was confined to the deeper depressions within the pasture wetlands (Appendix A, Photo #1). The forested mosaic portions of Wetland D have numerous small depressions that remain inundated for more than 2 weeks (Appendix A, Photo #2). Algal mats were present in the wetter depressions. Depressions in the southeastern forested mosaic of Wetland D remain wet for much longer. One reason is that the area receives water from Ditch D3 that comes from non-process areas of the refinery and from refinery condensate.

4.5 Soils / Geomorphology

Soil profiles were examined to at least 16 inches during the wetland delineation. Deeper profiles (to 25 inches) were examined during the installation of monitoring wells. The soils in the wetland impact areas typically have a very dark gray (10YR 3/1) loam or sandy loam surface 6 to 12 inches deep, with common, distinct redoximorphic features. Below this, the soil is typically grayish brown (2.5Y 5/2), with common, distinct, or prominent redoximorphic features. The texture of the subsoil is highly variable, ranging from sandy loam to clay, with 15 percent gravel. A clay-enriched layer typically begins within 19 inches of the soil surface.

Most of the soils in the wetland impact area are mapped as *Bow gravelly loam, 0 to 3 percent slopes*, which was confirmed by field observations (NRCS 2012a). *Bow* consists of deep, somewhat poorly drained hydric soils formed in gravelly glacial drift over glaciolacustrine material with a mantle of volcanic ash approximately 10 to 17 inches thick (NRCS 2012b).

The wetland impact area occurs on a gently sloping glaciomarine terrace at an elevation of 10 to 80 feet above mean sea level. Slope gradient is generally under 3 percent. Shallow ponded depressions and swales are intermixed with saturated sloping areas, giving the wetlands characteristics of both depressional and slope hydrogeomorphic (HGM) classes.

4.6 Vegetation

Palustrine and estuarine systems occur in the project area (Cowardin et al. 1979). No impacts will occur to estuarine habitats. The dominant wetland class in the impact area is palustrine, emergent, saturated (PEMB), which occurs over most of Wetlands D, E, I1, I2, J, U and V. Temporarily or seasonally flooded (PEMA or PEMC) depressions in these areas make up approximately 25 to 50 percent of the area. Emergent wetlands make up approximately 77 percent of the permanent impact area and 97 percent of the temporary impact area (**Table 3**). Most of these areas are actively grazed by cattle. They are dominated by non-native pasture grasses and forbs (**Table 4**). Reed canarygrass (*Phalaris arundinacea*) and Canada thistle (*Cirsium arvense*) are noxious weed species present in the wet pasture. Upland pasture areas in the project vicinity are dominated by many of the same non-native pasture species that occur in wetlands, with the addition of more weedy forbs.

Forested classes are present in Wetland D, Wetland T, and a small part of Wetland E and Wetland I1. These areas have seasonally flooded depressions in over 50 percent of their area (PFOC). Forested wetlands make up approximately 17 percent of the permanent impact area and 3 percent of the temporary impact area (**Table 3**). These areas are mixed coniferous and deciduous forests with shrub and herbaceous understory layers (**Table 4**). Trees range in age from approximately 30 to 60 years old. Himalayan blackberry (*Rubus armeniacus*) and evergreen blackberry (*Rubus laciniatus*) are noxious weed species present in the forested wetlands. They are rooted in the upland hummocks within the mosaic and on the wetland periphery. Forested uplands in the project vicinity have many of the same species that occur in wetlands, but with the addition of bigleaf maple (*Acer macrophyllum*), grand fir (*Abies grandis*), Indian plum (*Oemleria cerasiformis*), tall Oregon grape (*Berberis aquifolium*), red elderberry

(*Sambucus racemosa*), red huckleberry (*Vaccinium parvifolium*), and oceanspray (*Holodiscus discolor*).

A seasonally flooded scrub-shrub (PSSC) class is dominant in Wetland Q, along with smaller areas of forest (PFOC). Small areas of scrub-shrub wetlands are also present in Wetlands D and E. Scrub-shrub wetlands make up approximately 6 percent of the permanent impact area, and none of the temporary impact area (**Table 3**). Willows (*Salix* spp.) and other native shrubs and small trees are dominant (**Table 4**).

No rare plants or plant communities are known to occur in the project vicinity. Information regarding threatened or endangered species of plants and priority habitats for the project vicinity was obtained from the Washington Natural Heritage Program.

Table 3: Impact Areas by Cowardin Class

Cowardin Class	Total in Project Area[1]		Permanent Impacts[2]		Temporary Impacts[3]	
	acres[4]	percent	acres	percent[5]	acres	percent[5]
Forested	11.8	17.6	4.29	16.7	0.24	3.4
Scrub-Shrub	2.4	3.6	1.57	6.1	0	0
Emergent	51.1	76.4	19.84	77.2	6.74	96.6
Estuarine	1.6	2.4	0	0	0	0
Sum	66.9	100	25.70	100	6.98	100

[1]"Project area" includes the land that was surveyed for wetlands. Most wetlands extend beyond those survey boundaries.

[2]Includes direct permanent, indirect permanent, and conversion impacts.

[3]Includes short-term and long-term temporary impacts.

[4]Acreages of Cowardin classes are best approximations based on field inspections and interpretation of aerial photographs.

[5]Percent of project wetland impacts.

Table 4: Common Plants in the Affected Wetlands

COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS[1]
Emergent Class		
Bentgrass	*Agrostis* species	FAC
Velvetgrass	*Holcus lanatus*	FAC
Tall fescue	*Festuca arundinacea*	FAC
Crested dogtail	*Cynosurus cristatus*	FACU
Meadow foxtail	*Alopecurus pratensis*	FAC
Kentucky bluegrass	*Poa pratensis*	FAC
Soft rush	*Juncus effusus*	FACW
White clover	*Trifolium repens*	FAC
Forested Class		
Trees		
Red alder	*Alnus rubra*	FAC
Black cottonwood	*Populus balsamifera*	FAC
Western red cedar	*Thuja plicata*	FAC
Douglas-fir	*Pseudotsuga menziesii*	FACU
Quaking aspen	*Populus tremuloides*	FACU
Shrubs		
Salmonberry	*Rubus spectabilis*	FAC
Nootka rose	*Rosa nutkana*	FAC
Black twinberry	*Lonicera involucrata*	FAC
Pacific crabapple	*Malus fusca*	FACW
Common snowberry	*Symphoricarpos albus*	FACU
Trailing blackberry	*Rubus ursinus*	FACU
Herbs		
Lady fern	*Athyrium filix-femina*	FAC
Stinging nettle	*Urtica dioica*	FAC
Piggyback-plant	*Tolmiea menziesii*	FAC
Sword fern	*Polystichum munitum*	FACU
Slough sedge	*Carex obnupta*	OBL
Willowherb	*Epilobium ciliatum*	FACW

COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS[1]
Water parsley	*Oenanthe sarmentosa*	OBL
Creeping buttercup	*Ranunculus repens*	FAC
Fringecup	*Tellima grandiflora*	FACU
Scrub-Shrub Class		
Pacific willow	*Salix lasiandra*	FACW
Sitka willow	*Salix sitchensis*	FACW
Scouler's willow	*Salix scouleriana*	FAC
Douglas spiraea	*Spiraea douglasii*	FACW
Nootka rose	*Rosa nutkana*	FAC
Salmonberry	*Rubus spectabilis*	FAC
Common snowberry	*Symphoricarpos albus*	FACU

FAC – facultative
FACU – facultative upland
FACW – facultative wetland
OBL – obligate

4.7 Fauna

A biological assessment has been prepared for the project site (URS 2013d). Several federally listed threatened or endangered species are present in Padilla Bay. The project will not adversely affect any listed species or critical habitat.

Two active and one inactive bald eagle nests are located on the project site (shown on **Figure 3**). The inactive nest (#3) will be removed for construction of the large detention pond north of 4th Street. The pond has been narrowed to avoid impacting nest #2. Nest #1 is located adjacent to the existing BNSF rail and at the edge of the impact area. This nest will be removed for construction of the rail. Shell PSR will obtain the necessary permits from USFWS and will work with them to determine appropriate mitigation.

Juvenile fish (species unknown) have been observed in the tidally influenced reach of Stream S. Fish may have access to the upper reach of Stream S but are not expected to reside there due to limited hydrology and grazing and trampling impacts. A broken culvert at South Texas Road blocks any upstream fish passage.

Habitat for aquatic invertebrates and amphibians in the project area is poor due to the relatively limited extent, depth and duration of inundation, and disturbance from grazing. The heavily disturbed nature of most of the impacted wetlands and buffers, and the lack of connection to other habitats, restricts their use by other wetland-associated species. Animal movement on and through the project area is currently restricted by the refinery and other infrastructure including security fencing, the BNSF railroad and spur, 4th Street, South and East March Point Roads, and

North Texas Road. A comprehensive survey for fauna has not been conducted on the project area.

4.8 Wetland Ratings

Wetlands were rated using the Revised Wetlands Rating System for Western Washington (Ecology 2004). Rating sheets and scoring matrix are provided in Appendix D of the *Wetland Delineation Report and Critical Areas Assessment* (URS 2013a). The majority of wetlands in the project area (87 percent) rate as Category III (**Table 5**). These wetlands represent 97 percent of the permanent impacts and 93 percent of the temporary impacts. A breakdown of wetland impacts and impact type by combined wetland category and class is provided in **Table 6**.

Table 5: Impact Areas by Wetland Category

Wetland Category	Total in Project Area[1]		Permanent Impacts[2]		Temporary Impacts[3]	
	acres	percent	acres	percent[4]	acres	percent[4]
I	0	0	0	0	0	0
II	3.38	5.1	0.11	0.4	0.37	5.3
III	57.98	86.6	25.00	97.3	6.48	92.8
IV	5.57	8.3	0.59	2.3	0.13	1.9
Sum	66.93	100	25.70	100	6.98	100

[1]"Project area" includes the land that was surveyed for wetlands. Most wetlands extend beyond those survey boundaries.

[2]Includes permanent direct, indirect, and conversion impacts.

[3]Includes short-term and long-term temporary impacts.

[4]Percent of project wetland impacts.

Table 6: Impact Areas and Types by Wetland Category and Class

Wetland Category	Cowardin Class	Direct Permanent Impacts (acres)	Indirect Permanent Impacts (acres)	Conversion Impacts (acres)	Long-Term Temporary Impacts (acres)	Short-Term Temporary Impacts (acres)
I	N/A	0	0	0	0	0
II	Emergent	0.09	0	0	0	0.37
	Forested	0.02	0	0	0	0
III	Emergent	16.28	2.88	0	0	6.24
	Scrub-Shrub	1.16	0.35	0.06	0	0
	Forested	3.31	0.61	0.35	0.24	0
IV	Emergent	0.55	0.04	0	0	0.13
Total Acreage		**21.41**	**3.88**	**0.41**	**0.24**	**6.74**

4.9 Wetland Buffer Impacts

Buffer widths for each wetland are listed in **Table 1** and shown on **Figure 3**. **Figure 3** also shows buffer area that is being impacted by the proposed development. Wetland buffer widths are specified by Skagit County Code (14.24.230) and the joint guidance provided by the U.S. Army Corps of Engineers (USACE), Washington State Department of Ecology (Ecology), and the Environmental Protection Agency (Ecology et al. 2006). They are based on the type of wetland, wetland rating, habitat score, and intensity of adjacent land use. Thirteen wetlands will have either permanent or temporary impacts to their buffers (**Table 7**). Permanent and temporary buffer impacts total **14.70** and **4.47** acres, respectively.

Forested buffers represent approximately 55 percent of the permanent impacts and 35 percent of the temporary impacts. These are mixed forests dominated by red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), paper birch (*Betula papyrifera*), bigleaf maple, Douglas-fir (*Pseudotsuga menziesii*), and western redcedar (*Thuja plicata*). Forested buffer impacts are concentrated around Wetland T, which will be excavated in its entirety, and around the northern portion of Wetland D mosaic. The reduction in forested buffer adjacent to the remaining undisturbed portion of Wetland D mosaic may adversely affect wetland habitat functions (discussed in Section 5.3). Shrub buffers represent 3 percent of the permanent impacts. The remaining buffer impacts are in grazed pasture dominated by non-native grasses and forbs. These areas currently provide little benefit to wetland habitat or water quality functions.

Permanent buffer impacts will be compensated for through the purchase of the necessary wetland credits at a mitigation bank in Skagit County. Wetland bank credits generally satisfy the mitigation requirements for the associated buffer impacts. Temporary buffer impacts due to construction access or installation of buried pipelines will be restored in place. There is very limited opportunity for buffer enhancement on site due to the proposed configuration of the rail and associated structures; the rerouting and installation of pipelines and a transmission line adjacent to the rail; the location of existing and proposed security fencing; the location of roads and other rail and refinery infrastructure near the project site; and the continued use of some areas for cattle grazing.

Table 7: Wetland Buffer Impacts

Wetland Name	Dominant Buffer Vegetation	Permanent Impacts (acres)	Temporary Impacts (acres)
A	Forest	0.04	0.02
D	Pasture	2.77	0.54
	Forest	5.56	1.27
E	Pasture	1.81	1.52
E5/E6	Pasture	0	0.12
I1	Pasture	0.19	0.07
I2[1]	Pasture	0.71	0.37
J	Pasture	0.02	0.09
Q[1]	Shrubs	0.43	0
T[1]	Forest	2.43	0
U[1]	Pasture	0.65	0.18
V	Forest	0.09	0.18
W	Forest	0	0.11
Totals		**14.70**	**4.47**

[1]These wetlands will be entirely filled or excavated for the project.

4.10 Impacts to Other Waters

The upper reach of Stream S will be impacted by placing approximately **50 linear feet (LF)** of the channel into a 24-inch culvert for construction of an access road (**Figure 3).** Another approximately **175 LF** of the channel will be moved slightly to the north to facilitate construction of the rail. The rerouted Stream S channel will be approximately 4 feet wide and 1.5 feet deep (bankfull). Construction of the rail facilities will also require rerouting and piping of ditches that currently flow into Stream S. Ditch E2 will be rerouted to the south along the existing rail spur and into Ditch I. This will require a new 24-inch culvert under South Texas Road. The combined Ditch E2/I will be placed into a 36-inch culvert under the rail alignment. This culvert will continue to convey flow into Stream S. Ditch E3 will be placed into a 24-inch culvert under South Texas Road. The culvert will outfall at the upper end of Stream S. Approximately **0.5 cubic yard** of riprap will be placed at each of three culvert outfalls within Stream S.

The impacted portion of Stream S has intermittent flows and a highly disturbed and incised channel approximately 4 feet wide. It is fed primarily by the drainage ditches along South Texas Road and the Shell rail spur. It has poor water quality and habitat conditions due to grazing and trampling impacts upstream of tidal influence. In order to improve water quality and fish habitat downstream of the impact area, the lower two-thirds of the stream and the estuarine wetlands and their buffers will be fenced off from cattle grazing (**Figure 3**). Native woody plants will be installed in the fenced riparian area of Stream S and the fenced 200-foot buffer of the estuarine wetlands. The proposed area to be fenced and planted is approximately 8 acres.

Segments of seven additional drainage ditches will be rerouted and/or placed in pipes (**Figure 3**). The ditches are assumed to be jurisdictional since they have seasonal flow with discharge directly or indirectly into Padilla Bay. **Table 8** lists the affected ditches and the type and extent of modification. These ditches function primarily to convey water and have very little or no aquatic habitat functions due to limited flows and poor water quality and physical structure. They are either adjacent to roads and/or other development, or they have been highly disturbed from grazing and trampling impacts. The water conveyance capacity of the ditches will be maintained or replaced on site.

Table 8: Affected Jurisdictional Ditches

Ditch Name	Average Width	Linear Feet Affected	Area Affected (Sq Ft)	Type Of Modification
A1	3	490	1,470	Ditch filled for new retaining walls
B	1.5	100	150	Ditch filled for new road
D1	3	1,780	5,340	Water will be diverted into new stormwater system

Ditch Name	Average Width	Linear Feet Affected	Area Affected (Sq Ft)	Type Of Modification
D2	3	1,020	3,060	Water will be diverted into new stormwater system
D3	6	0	0	Ditch will remain in current configuration, but water that now sheet flows into Wetland D mosaic will be diverted into the new stormwater system
D4	3	680	2,040	Water from an existing detention pond that currently feeds Ditch D4 will be diverted into the new stormwater system
E2	3	270	810	Includes new culvert under South Texas Road
E3	3	90	270	Includes new 50-foot long culvert under South Texas Road
I	3	270	810	New 270-foot long culvert under rail track
Q	3	0	0	New 960-foot long culvert to be installed in Wetland Q fill
Totals		**4,700**	**13,950**	

5.0 IMPACTED WETLAND FUNCTIONS

Wetland functions were analyzed using methodology developed by Ecology and published in the *Revised Wetlands Rating System for Western Washington* (Ecology 2004). Rating sheets and scoring matrix are provided in Appendix D of the *Wetland Delineation Report and Critical Areas Assessment* (URS 2013a). Functions are assessed in three broad categories: water quality improvement (removal of sediments, nutrients, and toxicants from the water column), hydrologic function (storage and desynchronization of flood flows and reduction of bank erosion), and habitat quality (general habitat suitability for wetland-associated species). Both the potential and opportunity to provide each function is analyzed. The water quality and hydrologic functions are assessed differently according to the HGM class of the wetland.

5.1 Water Quality Functions

All of the wetlands have the *opportunity* to improve water quality due to active cattle grazing in or adjacent to at least part of the wetland. Some also receive runoff from non-process areas of the refinery. The *potential* to improve water quality is related to the ability of the wetland to slow or detain surface flows and physically and chemically bind pollutants. Three of the wetlands rate low for this function (**Table 9**) due to a high proportion of grazed vegetation and/or a small extent of seasonal ponding. Grazing reduces or eliminates the vegetative structure necessary for slowing flows and trapping pollutants. Without ponding, pollutants do not settle out of the water column. Wetlands D, I1, and Q rate moderate and Wetland T rates high for this function. These wetlands have a relatively low proportion of grazed vegetation and/or a large extent of seasonal ponding.

Water quality functions of the remaining undisturbed wetlands should not be altered significantly. Erosion and sedimentation controls instituted during construction should prevent excessive sediments from entering the wetlands. Runoff from new impervious surfaces will be detained in the new stormwater ponds. Oily wastewater will be separated and treated separately. Spill and pollution prevention controls will be instituted. See Section 8 for additional water quality measures.

5.2 Hydrologic Functions

None of the wetlands have the *opportunity* to reduce downstream flooding since they are located within a short distance of Padilla Bay. The *potential* to reduce flooding is related to the live storage capacity of the wetland and its relative size in relation to its catchment. All of the wetlands rated low for this function due to the lack of opportunity and the generally shallow depths of ponding/storage (**Table 9**). The flood storage functions of the remaining undisturbed wetlands should not change significantly. Storage currently provided by the impacted wetlands will be replaced by the new stormwater system, which is designed to detain, treat, and discharge storm flows in a manner that reproduces pre-construction hydrology. Outfall from the

stormwater ponds will be conveyed into downslope buffers and wetlands through the use of level spreaders.

Wetlands at the project impact site *do not* provide groundwater recharge into an underlying aquifer or freshwater seepage into Padilla Bay. Previous investigations in the project vicinity indicate that vertical hydraulic conductivity is very slow due to the presence of a thick, dense clay layer (Landau Associates 1988). The presence of the clay layer was confirmed in recent geotechnical borings conducted for this project, as well as more shallow excavations conducted for installation of shallow groundwater monitoring wells. The impacted wetlands have a seasonal shallow water table that is perched on the impermeable layer.

5.3 Habitat Functions

The opportunity to provide habitat for wetland-associated species is related to a wetland's position within the landscape, specifically the state of its buffers, the presence of vegetated corridors that connect to other habitats, the proximity of especially unique or high-value (priority) habitats or structures, and its connections to other wetlands. Overall the wetlands have low habitat *opportunity* due to the disturbed nature of most buffers and a lack of undisturbed corridors. Wetland D has the highest opportunity due to its proximity to several priority habitats (**Table 9**).

The *potential* to provide habitat is related to overall wetland diversity, including vegetation types, canopy layers, water regimes, plant species, and structures such as snags and logs. Four wetlands have low habitat potential, due either to their small size, disturbance from grazing or roads, or both. Wetland E has a moderate habitat potential, but a low overall function score due to limited opportunity. Wetlands D and I1 have relatively high habitat potential and an overall score of moderate. Wetland D is the largest wetland in the project vicinity and includes a large patch of relatively undisturbed forested wetlands that extend off of the project site. Wetland I1 is also relatively large, though most of it extends off of the project site. It contains Stream S, a riparian forest, and a tidal salt marsh adjacent to Padilla Bay.

Habitat functions of the remaining undisturbed portions of Wetland D mosaic will be adversely affected due to fragmentation, loss of adjacent forested wetlands and buffers, and an increase in noise and light pollution. The northern portion of Wetland D mosaic will be divided into two small wetlands and one medium-sized wetland, with disturbed areas on at least two sides of the wetlands. Access between the northern and southern portions of Wetland D mosaic will be cut off by the new rail. Impacts to Wetland I1 will be relatively minor or short term, and should not adversely affect habitat functions. Proposed on-site restoration adjacent to Stream S and the tidal salt marsh will improve habitat for fish and birds.

Table 9: Wetland Functions in the Impact Area

Wetland Name	Water Quality Functions			Hydrologic Functions			Habitat Functions			Total Score (out of 100)	Category
	Potential	Opportunity	Score (out of 32)	Potential	Opportunity	Score (out of 32)	Potential	Opportunity	Score (out of 36)		
D	7	2	14/ **mod**	10	1	10/ low	16	10	26/ **mod**	50	III
E	5	2	10/ low	10	1	10/ low	9	9	18/ low	38	III
I1[2]	7	2	14/ **mod**	8	1	8/ low	14	9	23/ **mod**	45	II[3]
I2[1]	1	2	2/ low	2	1	2/ low	2	7	9/ low	13	IV
J[2]	2	2	4/ low	10	1	10/ low	4	6	10/ low	24	IV
Q[1]	11	2	22/ **mod**	8	1	8/ low	6	5	11/ low	41	III
T[1]	12	2	24/ **high**	10	1	10/ low	5	7	12/ low	46	III
U[1]	4	2	8/ low	10	1	10/ low	4	6	10/ low	28	IV
V[2]	2	2	4/ low	7	1	7/ low	4	9	13/ low	24	IV

[1]These wetlands will be entirely filled or excavated for the project.
[2]These wetlands will have only minor or temporary impacts.
[3]Rates as Category II based on Special Characteristics: Estuarine Wetlands, which are present outside of the impact area.

6.0 WETLAND MITIGATION SITE SELECTION RATIONALE

6.1 Permittee-Responsible Mitigation Opportunities

Shell PSR began an extensive search for appropriate mitigation sites in winter 2012/2013, when it became clear from a preliminary assessment of wetland impacts that on-site mitigation was not possible. The Shell PSR property sits on a small peninsula on Padilla Bay, which it shares with the Tesoro Refinery. Area available for wetland mitigation is extremely limited by refinery development and the proximity of the bay.

A team of specialists including wetland scientists, real estate consultants, and public outreach consultants was assembled by Shell PSR to:

- Determine potential sources for mitigation property acquisition;
- Identify types of land from each source that should be considered;
- Physically inspect property to validate its type and suitability;
- Determine potential to satisfy wetland mitigation needs (functional lift); and
- Secure land for mitigation activities.

Mitigation site selection was guided by relevant federal, state, and local regulations and guidelines, including *Compensatory Mitigation for Losses of Aquatic Resources* (USACE and EPA 2008), *Selecting Wetland Mitigation Sites Using a Watershed Approach* (Hruby et al. 2009) and SCC 14.24.250 "Wetland alternative compensation projects."

Selection criteria included:

<u>Location</u>

- The mitigation site should be within one of the following drainage basins (in order of preference): Padilla Bay, Fidalgo Bay, Similk Bay, Skagit Bay (Fir Island and Skagit River delta), or Samish Bay. Opportunities that are nearest the site should be exhausted before moving farther away.

<u>Size</u>

- Minimum land requirement is approximately 50 acres (plus buffer).
- Maximum land requirement is approximately 200 acres (plus buffer).
- One or two large parcels are generally preferable to several smaller parcels, typically for both ecological and economic reasons.

<u>Zoning and Land Ownership</u>

- Both private and public lands may be used for mitigation.

- Areas zoned for agriculture would have to receive a special use permit from Skagit County to be used for mitigation. Actively farmed areas have a low likelihood of being permitted. Areas that have not been recently farmed have a better chance for permitting.
- Tribal ownership complicates and may prevent adequate, long-term legal protection of mitigation sites by a private company and access by local regulators.
- Adjacent zoning and land ownership should be compatible with the long-term sustainability of the site for wetland mitigation.

Site Characteristics

- There is a preference for areas that would receive the greatest potential functional lift and the greatest probability of success, including appropriately located uplands or former or current wetlands that have been altered by filling, draining, diking or other activities.
- The developed mitigation site should be sustainable within the given landscape/watershed context and be able to benefit from existing hydrologic connections and habitat corridors.
- The developed mitigation site should be able to provide ecosystem functions that are limited or valuable within the given watershed.

Several of these criteria were unlikely to be satisfied by in-kind mitigation alone. The actively grazed emergent, depressional, and slope wetlands that constitute the majority of the wetlands impacted by the project provide few habitat functions and are not limiting within the Padilla Bay watershed. Out-of-kind mitigation would likely provide much more functional lift and provide ecosystem functions that are more valuable or scarce within the watershed. **Table 10** lists several sites that were assessed for mitigation and their general constraints.

The combination of constraints and limited benefits made most of the sites reviewed unattractive. The Triton America poplar plantation on Padilla Bay was the most promising site due to its location and high potential for functional lift. Since the site had not been actively farmed for many years, it also avoided most zoning issues associated with wetland mitigation on agricultural land in Skagit County. A conceptual mitigation plan to restore estuarine habitat was developed for this site while negotiations with the land owner progressed. However, a mutual agreement between Shell PSR and the landowner for use of the site could not be reached.

Table 10: Sites Assessed for Wetland Mitigation Potential

Type	Description	Location	Notes
Re-establishment	Triton America poplar plantation north of SR-20	Padilla Bay	Owner not willing to sell or lease.
Re-establishment	Triton America properties south of SR-20	Swinomish Channel	Altering current use (farming) will not be permittable under County zoning regulations.

Type	Description	Location	Notes
Rehabilitation	Fir Island estuary restoration, Nature Conservancy project	Fir Island	Restoration credit is already allocated to farming groups under Chinook Recovery Agreement.
Rehabilitation	Samish Tribe working on saltmarsh restoration in Fidalgo Bay, south of trestle walkway	Fidalgo Bay	Site is too small; prefer to have site that drains to Padilla Bay (like the project site).
Re-establishment	Nelson parcels bordering Padilla Bay	Padilla Bay	Altering current use (farming) will not be permittable under County zoning regulations.
Re-establishment	Washington Department of Fish and Wildlife, Ecology parcels bordering Padilla Bay	Padilla Bay	Altering current use (farming) will not be permittable under County zoning regulations.
Creation	Moen Property (owned by Shell), north of old Techno facility across N. Texas Road	March Point	Too small; not enough credit available so would also need other mitigation locations.
Creation	Property south of SR-20, west of log cabins and boat store	Anacortes	Too small; not enough credit available so would also need other mitigation locations.
Enhancement	Wetland in Smiley's Bottom area behind high school	Anacortes	Too small; not enough credit available so would also need other mitigation locations.
Out-of-Kind	Beach enhancement to improve sand lance spawning (Department of Natural Resources (DNR)/Skagit River System Cooperative)	Fidalgo Bay	Too small; not enough credit available so would also need other mitigation locations.

Type	Description	Location	Notes
Out-of-Kind	Re-creating a flow connection between Fidalgo Bay and the center of Crandall Spit	Fidalgo Bay	Too small; not enough credit available so would also need other mitigation locations.
Out-of-Kind	Remove derelict creosote piles in Fidalgo and Padilla Bays (DNR/Ecology)	F. & P. Bays	Too small; not enough credit available so would also need other mitigation locations.
Preservation	Bell Parcel: development threat to habitat corridor, wetlands adjacent, and maybe on site	Anacortes	Too small; no functional lift.
Preservation	Diller Parcel: development threat to habitat corridor, wetlands adjacent, and maybe on site	Anacortes	Too small; no functional lift.
Rehabilitation	Similk Bay site mentioned by Ecology (need location details)	Similk Bay	Too small; not enough credit available so would also need other mitigation locations.
Rehabilitation	3 parcels on Bayview Edison Road (1 Ecology, 2 private ownership)	Fidalgo Bay	Ecology parcel does not need restoring. The other parcels are too small and may have unwilling sellers.
Bank	Skagit Environmental Bank	Mt Vernon	Outside service area.
Bank	Nookachamps Wetland Mitigation Bank - currently operational	Mt Vernon	Outside service area.

6.2 Wetland Mitigation Bank Selection

As a result of the failure to find an appropriate mitigation site in the vicinity of the impact area, Shell PSR proposes to purchase credits from the Nookachamps Wetland Mitigation Bank (Bank) to compensate for wetland impacts. The Bank is located adjacent to the Skagit River, approximately 2.5 river miles downstream of the confluence of the Skagit River and Nookachamps Creek, in Mount Vernon, Skagit County, Washington (**Figure 5**). Shell PSR has confirmed that sufficient mitigation credits will be available (pending credit release in early

2014) and has entered into an agreement with the bank to hold the credits until permitting of the project is complete, at which time the purchase and transfer of credits will be finalized.

6.2.1 Habitats and Ecological Benefits of the Bank

The Bank is located in the floodplain and terrace of the Skagit River, on previously farmed lands. According to the Mitigation Banking Instrument (MBI) (Nookachamps 2008), the Bank will create and enhance seasonally flooded palustrine and riverine wetlands, upland riparian forests, and off-channel habitat. The dominant wetland HGM class is riverine flow-through, with lesser amounts of depressional wetlands. The majority of the earthwork to construct the habitats on the Bank site was completed in 2010 with the first phase of native woody bare root plantings installed in 2011 (the next phase of bare root plantings is scheduled to occur in early 2014). The habitats created/restored/enhanced on the Bank site are shown in Table 11.

Table 11: Habitats at Nookachamps Wetland Mitigation Bank

Habitat Type/ Cowardin Classification	HGM Classification	Created, Enhanced, or Preserved	Acreage
Palustrine Emergent (Channels)/PEM	Depressional	Created	1.17 acres (3,870 LF)
Palustrine Emergent /PEM	Depressional	Preserved	4.49 acres
Palustrine Scrub Shrub/PSS	Slope	Created	64.57 acres
	Slope	Enhanced and converted degraded PEM and PSS	7.79 acres
Riparian Floodplain Forest/PFO	Riverine	Created	136.40 acres
	Riverine	Enhanced PFO and converted degraded PSS	1.97 acres
Palustrine Forested Seasonally Flooded/PFOC	Riverine	Enhanced	24.61 acres

Ecological and hydrological benefits of the Bank include 1) flooding, erosion, and sedimentation benefits that extend throughout the lower Skagit River (WRIA 3) floodplain; 2) migratory waterfowl over-wintering benefits in the lower Skagit River floodplain, including Padilla Bay; 3) anadromous fish benefits, including migratory bull trout and sea-run cutthroat that travel between the Skagit River and other WRIA 3 systems; and 4) wildlife habitat benefits along the Skagit River and WRIA 3 floodplain and tributary corridors.

6.2.2 Bank Service Area

A bank service area is defined as "the designated geographic area in which a bank can reasonably be expected to provide appropriate compensation for unavoidable impacts" (Ecology and USACE 2013). Service areas generally correspond with ecologically significant watershed boundaries, such as the WRIA boundaries identified by Ecology. The Bank service area includes almost all of WRIA 3 (Lower Skagit and Samish Rivers basin), but excludes Fidalgo Island and the March Point peninsula west of the Swinomish Channel (**Figure 5**).

The project site is located approximately 2.2 miles outside of the Bank service area and is within WRIA 3. There are currently no mitigation banks that service this area. As stated in the MBI,

Appendix E: "The Bank may be used to compensate for permitted impacts elsewhere in WRIA 03 and in adjoining WRIAs if specifically approved by the appropriate agencies requiring mitigation and the Interagency Review Team (IRT), provided that such mitigation would be practicable and environmentally preferable to other mitigation alternatives."

The project site is located adjacent to Padilla Bay. From a watershed perspective, there is little if any difference between the impact area on the west side of the bay and the area on the east side of the bay that is included in the bank service area. In fact, according to Ecology's description, "Padilla Bay is an estuary at the saltwater edge of the large delta of the Skagit River in the Salish Sea" (Ecology 2013). In addition, there is at least a partial hydrologic connection between the lower Skagit River and Padilla Bay through Swinomish Channel, which is the main source of freshwater input into the bay. The proximity of the project site to the service area and the lack of a complete barrier between the two may also indicate a habitat connection, particularly for birds. For these reasons, the use of the Bank should be considered ecologically appropriate. It is also environmentally preferable to any other mitigation option, which would most likely include the use of multiple, small parcels dispersed over a wide area (see many of the sites assessed in **Table 10**) since a single large parcel appropriate for mitigation is not available. The ecological benefits of large-scale mitigation projects are widely recognized and are one of the main reasons why mitigation banks are considered the preferred mitigation type by the regulatory agencies.

The IRT has previously accepted the use of Bank credits for wetland impacts outside of the service area. The Stanwood Siding Project is located approximately 3 miles south of the Bank service area, in Snohomish County. While the site was outside the service area, it was still within WRIA 3. The impacts occurring as a result of the Siding Project were mitigated by the purchase of 1.28 credits at the Bank.

In 2012, the Bank sponsor (Wildlands) and the National Oceanic and Atmospheric Administration (NOAA) cooperatively developed a proposed service area for impacts to salmonids for a planned conservation bank overlay. That service area, which is still in draft form but was reviewed and informally approved by NOAA, includes Padilla Bay in its entirety and the land forms west of Padilla Bay to, but not including, the San Juan Islands.

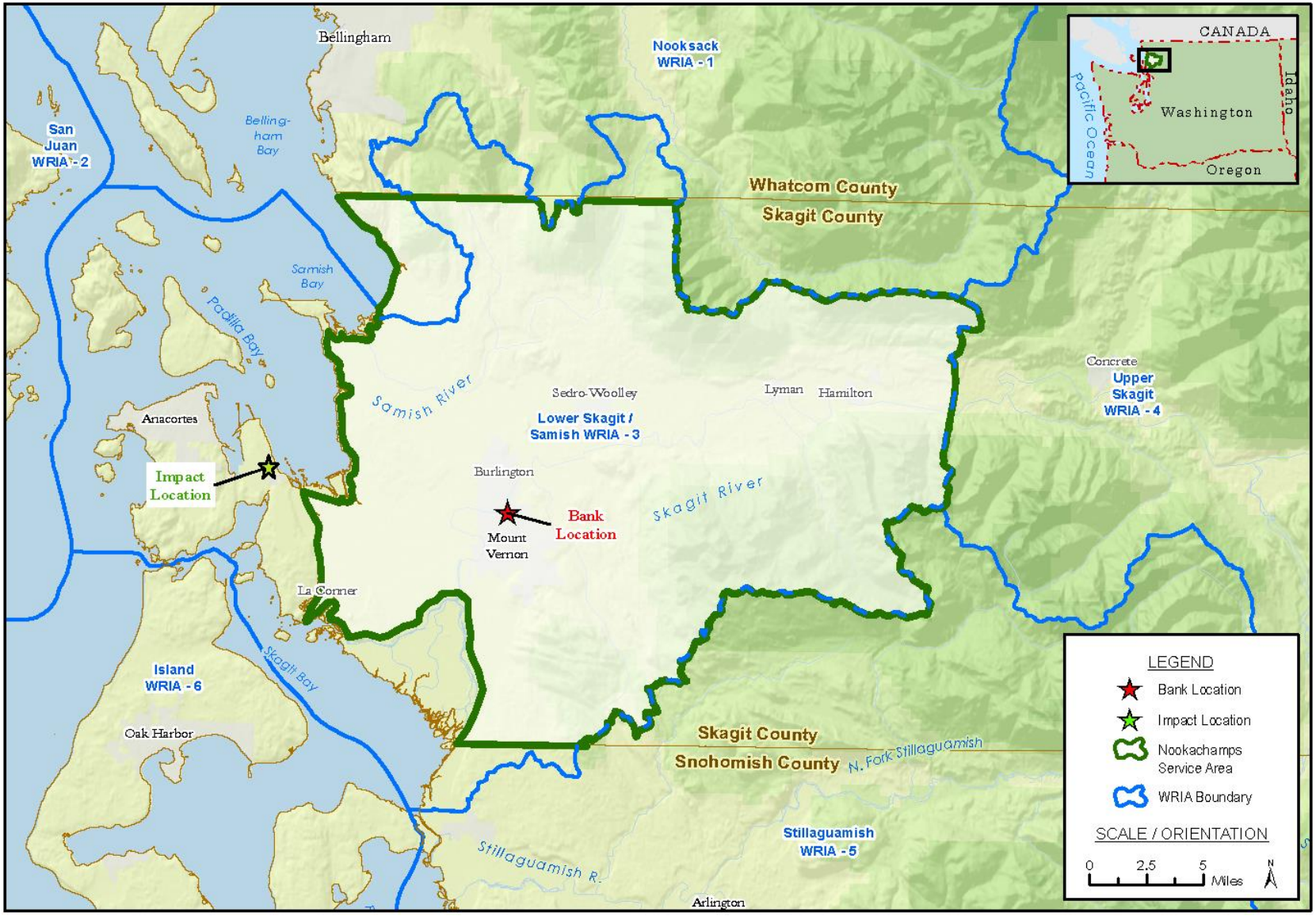

Figure 5: Nookachamps Bank and Service Area in Relation to Project Site and WRIA 3 (Source: Wildlands PNW)

7.0 WETLAND FUNCTIONS PROVIDED AT WETLAND MITIGATION BANK

The purchase of wetland mitigation bank credits from the Bank for unavoidable impacts occurring at the project site in conjunction with the avoidance and minimization measures proposed in Section 3 and Section 8 will ensure that the functions and services lost at the project site will be more than replaced within WRIA 3. While the project site is located just outside of the Bank's pre-approved service area, the Bank provides appropriate mitigation for the project impacts for the following reasons:

- Both the project impacts and the Bank are located within WRIA 3.
- Both the project site and the Bank are located within Skagit County.
- The project impacts are to freshwater wetlands and the Bank includes a mosaic of created, enhanced, and preserved freshwater wetlands.
- The impacted wetlands drain into Padilla Bay, which is part of the Skagit River Delta; the Bank is located immediately adjacent to the Skagit River and within the Skagit River floodplain.
- The project will result in impacts to forested, scrub-shrub, and emergent wetlands; the Bank includes forested, scrub-shrub, and emergent wetlands.
- The majority of the impacts are to low-functioning, pasture (i.e., grazed) wetlands while the wetlands created, enhanced, and preserved on the Bank site are high-functioning wetlands.

7.1 Water Quality Functions

Prior to construction, the 282-acre Bank site was actively farmed and mostly devoid of vegetation. Because the site was being actively farmed, periodic flooding of the site was a source of sediment as well as agricultural pollutants into the Skagit River. As part of Bank construction, the area was re-contoured to support channels, emergent marsh, scrub-shrub wetlands, and forested habitats. While the Bank site floods several times annually, it was further connected to the Skagit River through a created channel. Following the earthwork, the site was seeded and planted with native trees and shrubs. As a result, the vegetation provided stabilization to the site during high water events, reducing erosion and sedimentation of the Skagit River as well as acting as a filter for nutrients, sediment, and other pollutants. The site improves water quality and hydrologic function in WRIA 3, while also addressing limiting factors for salmon in the watershed. Avoidance and minimization measures implemented on the project site, including planting and removal of cattle grazing (described in detail in Sections 3 and 8), will benefit water quality in the immediate vicinity of the project site while the Bank will continue to benefit water quality within the context of the entire Skagit River watershed in perpetuity.

7.2 Hydrologic Functions

Hydrologic functions can include flood storage, velocity reduction, groundwater recharge, and de-synchronization of flood flows. Prior to construction, the Bank site and its existing wetlands were hydrologically disconnected from the Skagit River. As part of habitat construction, approximately 385,000 CY of material have been removed from the floodplain, which has increased flood storage in WRIA 3. After construction, the site's restored and enhanced habitats were directly connected to the Skagit River through floodplain channels containing large woody debris (LWD). The site floods on a regular basis, but because of the vegetation and topography of the constructed wetland habitats locally decreasing water velocity, water now moves more slowly over the site. The constructed habitats allow water to remain on site longer, which allows water to percolate into the ground to provide groundwater recharge. The floodplain channels provide a direct connection between the Skagit River and the existing, restored, and enhanced wetlands on the Bank site, as well as providing off-channel refugia and rearing habitat for anadromous and resident fish.

7.3 Habitat Functions

The 282-acre Bank contains restored and enhanced PEM wetlands, restored and enhanced PSS wetlands, enhanced PFO wetlands, restored floodplain riparian forest wetlands, and enhanced riparian forested channel. These habitats provide suitable, high-quality habitat for a variety of native wildlife occurring in the watershed, including invertebrates, amphibians, anadromous fish, resident fish, and a variety of birds and mammals. When the Skagit River water levels are high, the majority of the Bank site provides refugia from high waters and high velocity flows for all fish present including native salmonids. The Bank site also provides regional eco-diversity, plant community reestablishment, plant species richness, and primary production and organic export. Habitat features including LWD, and cottonwood boles were installed during construction of the habitat to provide habitat complexity by mimicking downed wood and snags typically found in a mature natural system. In addition, construction of the habitats was designed to avoid existing native trees and wetlands on the site to the maximum extent practicable while still achieving the stated goals of the Bank. There is one bald eagle nest documented on the Bank. This nest was documented as active in 2004 and has been documented as active for at least the past 6 years. The habitat functions and values provided by the Bank will provide benefits to WRIA 3 in perpetuity because they are protected by a perpetual conservation easement recorded on June 30, 2009.

7.4 Buffers at the Bank

The Bank includes approximately 45 acres of protective buffer (100-foot-wide vegetative buffer between the Bank and adjacent land uses). There is also a 50-foot-wide protective buffer on either side of the primitive trail located on the Bank. The protective buffer areas were not included in the crediting of the Bank. In addition, the Bank credits were based on a mosaic of both aquatic and upland habitats, some of which serve as buffers for the wetlands created, enhanced, and/or preserved on the Bank site.

8.0 WETLAND FUNCTIONS MITIGATED ON SITE

8.1 Stormwater Treatment

An erosion and sediment control plan will be prepared for the Crude by Rail East Gate project. Erosion is unlikely to occur as a result of clearing since the project site is nearly level or very gently sloping. Best Management Practices (BMPs) to reduce or control erosion would be implemented during the construction process in accordance with the NPDES Construction Stormwater Permit and the County's Drainage Ordinance (Skagit County Code [SCC] 14.32). BMPs may include:

- Limiting the maximum duration of open excavation to the shortest time possible;
- Stabilizing disturbed soils that are exposed to surface water runoff;
- Implementing in-place temporary construction erosion and sediment control measures prior to any site-grading activities, which may include erosion control fencing;
- Protecting cut slopes during construction, and any soil stockpiled on the site, by placing plastic sheeting on exposed cut slopes;
- Re-vegetating any exposed soils that are susceptible to erosion within 30 days; and
- Maintaining any erosion control measures left in place after construction is completed.

After project completion, there would be approximately 11 acres of additional impervious surfaces (approximately 22 percent of the permanently disturbed footprint). Sources of runoff include stormwater and a permitted NPDES outfall to on-site ditches. These ditches would be routed to new stormwater basins built for this project.

The project would not involve discharges of waste materials to surface or ground waters. The project would be designed to capture and/or control all potential wastes or spills and preclude such materials from reaching ground or surface waters. A liner would be installed underneath the entire unloading area as well as under the stormwater ponds. The unloading area would be sloped to the center from each end to aid in preventing tank cars from rolling backward to the mainline and to contain potential spills. The facilities would also contain a compressor to supply air to the tank cars in the unloading area to ensure the brake system is energized in the brake position. In addition, the new rail facility would also be located adjacent to existing facilities, which would allow for conveyance of oily wastewater to the refinery's on-site wastewater treatment facility. In the event of a major tank car spill, a suck truck would be used to drain the oil/water separator.

8.2 Habitat Functions

In addition to the purchase of mitigation bank credits, Shell PSR is proposing the following on-site restoration measures to improve critical riparian and estuarine habitat and water quality:

- Fence off Stream S and its riparian area east of the project site so as to eliminate cattle grazing and trampling impacts (Appendix A, Photo #5). Plant this area with native trees and shrubs. This will help to restore approximately **700 LF** of stream and **4 acres** of riparian area.

- Fence off the currently grazed area of Wetland I1 tidal salt marsh (Appendix A, Photo #6) and a 200-foot-wide zone upslope of the ordinary high water mark. Remove the existing fence within the salt marsh. Plant native trees and shrubs in the 200-foot-wide zone to restore approximately **4 acres** of buffer adjacent to the marsh. The grazed and trampled salt marsh area is expected to re-vegetate on its own with species present in the adjacent undisturbed portion of the marsh.

9.0 PROPOSED MITIGATION CREDITS

All unavoidable, permanent wetland and buffer impacts will be compensated for through the purchase of credits from the Nookachamps Wetland Mitigation Bank in Skagit County. Credit-debit ratios will follow guidance in the approved MBI (**Table 12**). These ratios are set at **1:1** (mitigation bank credits to project impact area) for direct and indirect permanent impacts to Category III wetlands, **1.25:1** for Category II wetlands; and **0.85:1** for Category IV wetlands. The ratio for wetland conversion impacts and long-term temporary impacts is generally **0.5:1**. All short-term temporary wetland and buffer impacts will be restored on site within 6 months of completion of the project and will not require compensatory mitigation.

Table 12: Mitigation Bank Credits Proposed for Use by Impact Project

Category of Impacted Wetlands	Impact Area (acres)	Credits per Impact Acre[3]	Credits Proposed for Use
II	0.11[1]	1.25	0.1375
III	24.59[1]	1.00	24.59
	0.65[2]	0.50	0.325
IV	0.59[1]	0.85	0.5015
Totals	**25.94**		**25.55**

[1]Direct and indirect permanent impacts.
[2]Permanent conversion impacts and long-term temporary impacts.
[3]From Appendix E, Mitigation Banking Instrument, Nookachamps Wetland Mitigation Bank, October 21, 2008.

10.0 CREDIT PURCHASE OR TRANSFER TIMING

Shell PSR has confirmed that sufficient mitigation credits will be available (pending credit release in early 2014) and has entered into an agreement with the bank to hold the credits until permitting of the project is complete, at which time the purchase and transfer of credits will be finalized

11.0 REFERENCES

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APPENDIX A

Photographs of the Proposed Wetland Impact and On-Site Restoration Areas

[Photographs of all wetlands, streams, and ditches in the Crude by Rail East Gate project area are provided in Appendices A & B of the Wetland Delineation Report and Critical Areas Assessment (URS 2013a)]

Proposed Wetland Impact Areas

1) ***South end of Wetland D grazed pasture impact area (January 21, 2013)***

2) Wetland D north forested mosaic impact area (January 24, 2013)

3) Wetland D central grazed pasture impact area (April 10, 2013)

4) Wetland E grazed pasture impact area (February 5, 2013)

Proposed On-Site Restoration Areas

5) ***Trampled section of Stream S to be fenced and planted for restoration (August 21, 2013)***

6) Grazed salt marsh (Wetland I1) to be fenced for restoration (February 28, 2013)