Appendix F

Wetland Reports

APPENDIX F-1
WETLAND REPORT

Wetland Report for Gateway Pacific Terminal

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prepared for:

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INTRODUCTION

Site Description

The portion of the Gateway Pacific Terminal (GPT) property that was investigated was the 60 (+/-) acre parcel south of Henry Johnson Road and a 50 foot wide proposed rail connection along Aldergrove Road arching southwardly to an area near the 60 acre parcel. The area lies within unincorporated Whatcom County, east of the City of Ferndale (within Sections 17, 18, and 19 of Township 39 North, Range 1 East of the Willamette Meridian) (Figure 1). This study also analyzes those areas within and adjacent to the areas of proposed impact (Figure 2). The site is bordered on the north and west by the Arco oil refinery, to the east by farms, other undeveloped industrial parcels and Intalco Aluminum Corporation, wooded acreage and State of Washington Department of Natural Resources Trust Lands, and to the south by the Strait of Georgia. This portion of the County, including the subject parcel, is zoned Heavy Industrial. Surrounding land uses include; the Arco and Tosco oil refineries, Intalco's aluminum plant, rural residential, agricultural, and wooded tracts. Several roads border or pass through the study area including; Aldergrove Road to the north, Gulf (Powder Plant Road) to the East, and Henry Road through portions of the south. Lonseth Road also passes east-west near the center of the study area. Several decaying sheds, old foundations from farm houses and outbuilding are located south of Henry Road and near the intersection of Aldergrove and Gulf Roads.

The study area is a mix of forest, abandoned shrub dominated fields, and agricultural fields still in use. The terrain ranges from flat to gently rolling, except a ravine on the southwest portion of the site with moderate slopes and moderate to steep bluffs along the shoreline. An unnamed seasonal stream is associated with the ravine.

The Soil Conservation Service indicates the dominant soil type on the property is a hydric Whitehorn silt loam. However, several other non-hydric soils also occur on the property including; Kickerville silt loam, Birchbay silt loam in bands along the western side, Neptune gravelly sandy loam along the shoreline bluffs and Whatcom silt loams in the ravine on the east side of the parcel (Figure 3).

The National Wetlands Inventory indicates the presence of wetlands on approximately 90 percent of the study area. Wetland classes include seasonally flooded and saturated palustrine emergent, scrub-shrub and forested wetlands. Uplands are identified near the corner of Aldergrove and Gulf Roads and immediately south of the end of Lonseth Road. This study confirms these wetland classes are present, but our field data indicates that there are significantly fewer wetlands (Figure 4).

Project Background

The parcel has been under various ownerships and was actively farmed up until the late 1960s. Farming included commodity crops, hay, dairy, chickens, and some woodlots for firewood and

frequent logging. The present condition of open fields and wood lots as been stable for at least 50 years as indicated by the 1950 aerial photograph (indicating the southerly parcel) and discussions with retired neighbors that have lived and worked in the Cherry Point area for most of their lives (Figure 5). The southerly 60 acre portion of the subject parcel is expected to be the area most heavily impacted by this project. The other areas in Figure 2 will be impacted by the rail line. The southern area was farmed for oats to supply a chicken farm with feed up until the early 1970s. No cattle have been reported nor indications sighted on the property south of Henry Road. This area was used yearly for agricultural crops, therefore reducing surficial compaction of the soil and adding tilth.

When the Cherry Point area was rezoned in the early 1970s to Heavy Industrial, various entities began to collect the farmlands into larger blocks of land. Many of the farms were not actively producing commodity crops since that time, but cattle, hay and limited commodity crops were grown on most fields. The subject parcel has been compiled from two separate owners and is held under a purchase agreement.

Purpose

Aqua-Terr Systems, Inc. (ATSI) reviewed plant communities, site soils and hydrology within the designated study area to determine the presence of wetlands. The purpose of the review was to provide an assessment of the presence, location, and extent of wetlands and other waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (Corps) and Whatcom County. The wetlands are defined as: "*....those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.*" (Environmental Laboratory 1987). Through Section 404 of the Clean Water Act, the Corps has the authority to regulate the placement of fill materials in wetlands and requires permits for such activities. Whatcom County regulates all activities in and around wetlands and streams under the "The Critical Areas Ordinance Referendum 92-3" (1993).

Methods and Procedures

A two step procedure was used to determine the presence and extent of wetlands upon the parcel. These procedures included a preliminary data review and on-site investigations.

Preliminary data included the review of public resource documents to provide initial site information on soils, vegetation, and hydrology (Appendix A includes a complete list of references). Resources included:

- National Wetlands Inventory maps (NWI).
- United States Department of Agriculture, Soil Conservation Service soil survey.
- Soil Conservation Service, hydric soils list.
- Current and historical aerial photographs.

On-site investigations were conducted between August 1994 and August 1995, with most of the data being collected between May and August 1995. Wetlands were identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as described in the Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory 1987) to fulfill requirements for both Whatcom County and the Army Corps of Engineers. Under normal circumstances, all three parameters must be present for an area to be considered a jurisdictional wetland. Figure 2 depicts sample plot locations, wetlands, and proposed developed areas. Appendix B contains Data Sheets.

An area was determined to have hydrophytic vegetation if greater than 50% of the total composition of plant species from all strata had an indicator status of facultative, facultative wetland or obligate wetland as defined in the *National List of Plant Species that occur in Wetlands: Washington* (Reed 1988, 1993). Dominant plant species were determined for each stratum (canopy, shrub, and herbaceous) within a thirty foot radius of each plot by establishing the percent areal cover for each plant species. If the dominant vegetation was composed of greater than 50 percent facultative, facultative wet, or obligate plant species, the definition for hydric vegetation was met.

Soil samples were examined just below the A-horizon or at 10" from a 20" soil pit. Soils were examined for hydric characteristics and indicators such as mottling, texture, and color. Color was determined using a Munsell soil color chart (Kollmorgen 1975). The presence of hydric soil was determined by the presence and strength of the following field indicators; high organic-matter, sulfitic odor, aquic moisture regime, reducing conditions, gleyed or low chroma colors, concretions, organic layers or streaking in sandy soils, and or listing on the local or national hydric soils lists (Environmental Laboratory 1987.)

Wetland hydrology was considered present where seasonal or permanent indicators of local water inundation were observed. These indicators include; inundation, saturation in the upper 12 inches, water marks, drift lines, sediment deposits, drainage patterns, oxidized root channels, and water-stained leaves (Environmental Laboratory 1987.)

The wetland rating system used in this report is based on these Washington State Department of Ecology's and Whatcom County's Wetland Rating Systems. These rating systems attempt to differentiate between wetlands based on their sensitivity to disturbance, rarity, irreplaceability, and the functions and values they provide. There are four wetland Categories. Category I wetlands are essentially pristine and usually have: 1) value for a particular rare species; 2) represent a high quality example of a rare wetland type; 3) rare within a given region; or 4) provide irreplaceable functions and values. Category II wetlands are those that: 1) provide habitat for very sensitive or important wildlife or plants; 2) are either difficult to replace; or 3) provide very high functions and values, particularly for wildlife habitat. Category III wetlands provide important functions and values. They are generally smaller, less diverse and/or more isolated than wetlands in Categories I and II. Category IV wetlands are smaller, isolated and have less diverse vegetation than any of the preceding Categories. Categories III and IV are

therefore considered the lowest value wetland Categories. Appendix C contains the Wetlands Rating Field Data Forms.

In order to provide some documentation of the existing wetland functions and their associated values a modified version of the Washington State Department of Ecology's Wetlands Characterization format was used. This provides information that aids in categorization of the wetlands and baseline information if future mitigation may be required. Below is a partial list of functions addressed:

- Flood and storm drainage protection.
- Transition zone between dry land and water courses.
- Preservation of drinking water.
- Special vegetation and vegetation communities.
- Surface and ground water recharge.
- Retardation of soil erosion.
- Breeding, spawning, rearing, feeding, nesting, and wintering habitat for fish and/or wildlife.
- Wildlife corridors.
- Outdoor training and educational resources.
- Aesthetic value.
- Water quality (silt, nutrient, and other pollution filtration).
- Size.
- Wetland classification diversity.
- Buffer size and character.
- Fragmentation of wetland classes.
- Age classes of wetland communities.
- Unusual habitat features, such as snags or downed logs.
- Presence of sensitive, threatened, or endangered plants or animals.

VEGETATION:

This parcel includes upland forest, upland fields, upland shrub, palustrine emergent wetlands, palustrine forested wetlands, and palustrine scrub-shrub wetland communities. Historically, the large parcels making up the study area were cleared and converted to agricultural fields and pasture. Today, fields south of Henry Road and along Aldergrove Road continue to be farmed in forage crops, but others have been abandoned and support forested and shrub vegetation. Some fields have been used intermittently as pasture for cattle, but the fields south of Henry Road have never been used for livestock grazing.

Seasonally saturated palustrine emergent wetlands are located in depressions and along drainages in fields and are dominated by non-native herbaceous plant species. Our data also indicated both upland and wetland (PEM) fields had similar grasses and forbes present generally displaying a facultative neutral status and varied with the seasons as to dominance. Seasonally saturated

palustrine forested and scrub-shrub wetlands are located within upland forests and shrub habitats and are dominated by native plant species. Below is a description of the on-site vegetation communities:

o**Upland Forest** - Upland forest occupies the northwestern one-third of the property, as well as patches within fields and along the seasonal drainage on the east side of the parcel. Most of the upland forest is a deciduous forest dominated by red alders (*Alnus rubra*) intermixed with paper birch (*Betula papyrifera*), western red cedar (*Thuja plicata*), and Douglas fir (*Pseudotsuga menziesii*). Understory species include; vine maple (*Acer circinatum*), snowberry (*Symphoricarpos albus*), Indian plum (*Oemleria cerasiformis*), red elderberry (*Sambucus racemosa*), salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), and trailing blackberry (*Rubus ursinus*). The herbaceous layer is shaded out and sparse in most areas.

o**Upland Shrub** - Upland shrub dominates logged areas and abandoned agricultural fields. This habitat type is most prominent at the southeast corner of Aldergrove and Gulf Roads, in the logged areas north of Lonseth Road and in isolated patches on the north and south sides of Henry Road. This habitat is typified by a regenerating canopy 15 to 20 feet high of red alder and paper birch. A dense shrub layer with Himalayan and evergreen blackberries (*Rubus discolor* and *R. laciniatus*), salmonberry, red elderberry, snowberry, thimbleberry (*Rubus parviflorus*), trailing blackberry and bracken (*Pteridium aquilinum*) stands 6 to 10 feet high. Except for exceptionally tall species (i.e. bracken), the herbaceous layer has been shaded out.

o**Upland Fields** - Upland fields dominate along Aldergrove Road, the southwest ridge from Aldergrove Road towards Lonseth Road, and fields south of Henry Road. The fields are dominated by a facultative community of non-native pasture grasses. Representative species include; red fescue (*Festuca rubra*), vernal sweetgrass (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), velvet grass (*Holcus lanatus*), redtop (*Agrostis alba*), hop clover (*Trifolium dubium*), Canadian thistle (*Cirsium arvense*), oxeye daisy (*Chrysanthemum leucanthemum),* reed canarygrass (*Phalaris arundinacea*), English and common plantains (*Plantago lanceolata* and *P. major*), and white clover (*Trifolium repens*).

o**Palustrine Emergent Wetlands (PEM)** - PEM wetlands are located within shallow depressions and shallow swales within the upland fields and along the northern portion of the seasonal drainage. The wetlands are composed of a single vegetation class (herbaceous) with little complexity. They support non-native and invasive plant species including; reed canary grass, meadow foxtail, red fescue, soft rush (*Juncus effusus*), velvet grass, sawbeak sedge (*Carex stipata*), hare's-foot sedge (*Carex leporina*), slough sedge (*Carex obnupta*), bird's-foot trefoil (*Lotus corniculatus*), white clover (*Trifolium repens*), redtop (*Agrostis alba*), and Pacific silverweed (*Potentilla anserina*).

o**Palustrine Forested/Scrub-Shrub Wetland (PSS)** - Very few true forested wetlands are located within the study area, most are dominated by shrub species within the wetland, but have an upland canopy that extends over the wetland. Pure scrub-shrub wetlands include portions of

Wetland L and Wetland K. PFO/PSS wetlands typically have a 50 to 70 foot canopy of red alder and paper birch that is rooted in the uplands, but provides a canopy over the shrub wetland. The actual wetland plants include; salmonberry, black twinberry (*Lonicera involucrata*), hardhack (*Spiraea douglasii*), Nootka rose (*Rosa nootkana*), Hooker's willow (*Salix hookeriana*), Pacific willow (*S. lasiandra*), and slough sedge.

In other areas, a dense shrub layer averaging 6 to 10 feet tall is interspersed with patches of PEM wetlands (Wetlands M, S, and portions of Wetlands T and K, Figure 2). Dominants within the shrub layer include; hardhack, Nootka rose, Hooker's willow, Himalayan blackberry and black twinberry. The herbaceous layer is composed of the grass and sedge species mentioned in the above PEM description.

SOILS

The Soil Conservation Service (SCS) indicates the presence of five soil series within the study. The dominant soil series is Whitehorn silt loam, which occupies approximately 90 percent of the site. Whitehorn silt loam is listed as hydric on the local Hydric Soils List (SCS 1991). A ridge of non-hydric Birchbay silt loam extends from the corner of Aldergrove and Gulf Roads southwest to the end of Lonseth Road. A ribbon of non-hydric Kickerville silt loam parallels the southwestern Birchbay soil (on the west portion of the site), but most of this has been extensively disturbed by barrow pit activities. Non-hydric Whatcom silt loams are found on the western portion of the property between Aldergrove and Henry Roads as well as within the ravine on the eastern side of the parcel. Non-hydric Neptune very gravelly sandy loam occurs along the marine shoreline.

Indicators of wetland hydrology and vegetation were often difficult to distinguish within the agricultural fields. In those cases the soil criteria was used as the primary indicator for wetland determination in combination with any wetland hydrology or vegetation indicators available. Most on-site agricultural fields are underlain by Whitehorn silt loam. Although this soil series is indicated as hydric, hydric indicators were not located at all sample plots. Plots which displayed a topsoil with a color of 10 YR 3/2 or 3/3 with no evidence of mottling were designated as uplands; whereas soils within plots with colors of 10YR 2/1, 2/2 or 3/2 with mottles were considered hydric. The depth of the topsoil in these areas exceeded 12 inches. The subsoil was similar throughout the Whitehorn series, with a matrix color of 10YR 5/1-5/3 with distinct to prominent mottles. In some cases the subsoil matrix had a chroma of 3; not typically considered a hydric soil indicator, in others the matrix chroma was 2 without mottles. Below is a description of the on-site soil series.

°**Birchbay Silt Loam** (#'s12 & 13)- This soil was observed along a pronounced ridge that extended from immediately west of the Aldergrove-Gulf Road intersection southwest to immediately north of the western terminus of Henry Road. This soil is listed as a non-hydric mesic Typic Haplorthod by the SCS. It is classified as moderately well drained and typically has a seasonal high water table at 2 to 4 feet from the surface December through April.

Data collected from soil pits on the site show this soil typically had an 'A' horizon 10 to 15 inches deep with a dark brown color (10YR 4/3) and a loam texture. The 'B' horizon was a lighter brown (10YR 4/4) and was a silt loam. A duff layer (O Horizon) of 2 to 3 inches was observed at sample plots in forested areas. No indicators of hydric soils were observed at any sample plot identified as a Birchbay silt loam.

o**Kickerville Silt Loam** (#80) - Kickerville soils were observed south of Lonseth Road and North of Henry Roads. This soil series was located in areas that had been disturbed by past barrow pit actives. The soil is listed by the SCS as a non-hydric mesic Typic Haplorthod. It is well drained and is not typically subject to a seasonally high water table.

On-site soil samples within this soil series did not have a well developed A Horizon. Presumably this is the result of past barrow pit activities. The B Horizon had a grey-brown color (10YR 5/2) and in most cases was not mottled, but some soil samples displayed distinct mottling. The mottling was present in areas in which the surface layer had been extensively scraped.

o**Whatcom Silt Loams** (#181) - Although listed, no Whatcom silt loams were identified within the study area. This soil is indicated to occur west of the Kickerville series and within the ravine. Because there are no proposed impacts within the ravine we did not sample in that area. The area west of the Kickerville series was extensively disturbed from past barrow pit activities and identification of the soil series was not possible. Whatcom silt loams are listed as non-hydric on the local Hydric Soils List.

o**Whitehorn Silt Loams** (#184) - Based on the SCS Soils Survey, Whitehorn silt loams are the dominant soil type within the study area. Whitehorn silt loams are listed as hydric on the local Hydric Soils List. They are classified as a poorly drained mesic Typic Umbraqualf. Typically, this soil series is subject to a seasonally high water table which is at a depth of 0 to 1 foot from November through May.

Typical soil samples from the site displayed a dark brown (10YR 3/2-3/3) to very dark brown (10YR 3/1) silt loam A Horizon ranging from 4 inches to 18 inches deep. The B Horizon ranged from an olive brown to grayish brown sandy to silty clay loam with mottles. In most all samples the subsoil was heavily mottled with distinct to prominent mottles. In some cases the topsoil was mottled with small faint to distinct mottles, but in many cases there was no evidence of mottling in the top 12 inches of soil with a chroma of 2 or more.

o**Neptune Very Gravelly Sandy Loam** (111) - This soil series was not encountered within our study area.

HYDROLOGY

The topography within the study area can be generally defined as flat to gently rolling terrain with shallow swales and small ridges. Moderate to steep bluffs are located along the marine shoreline and within the ravine located in the southeast corner of the study site. Site surface and subsurface drainage is directed towards the south. The majority of the sites surface drainage either directly or indirectly drained into the unnamed stream, which flows into the Strait of Georgia approximately one-quarter mile west of Gulf Road. Such as, ditches along Henry Road which are effective in intercepting lateral surficial flow. However, numerous ditches and roads intercept the natural hydrology of some wetlands. Wetland L lies at the headwaters and remains associated in the middle reaches of the site stream. Wetland K was hydrologically isolated from the stream, but has been artificially connected via ditches. Wetlands A-J and M-S remain hydrologically isolated.

The primary factors influencing the hydrology on this property are direct precipitation, stratigraphy, topography and soil texture. Precipitation and a seasonally high perched water table appear to be the driving forces behind this site's wetland hydrology. The average annual precipitation is 30 to 40 inches, with most falling in the months of November, December, January, February, and March. The average growing season is about 180 days and begins mid-March and ends the first part of November. The majority of the site wetlands are underlain by Whitehorn silt loam, which has a seasonal perched high water table at a depth of 0 to 1 foot from the surface November through May. The stratigraphy of Whitehorn silt loams is a series of slowly permeable soil horizons that are composed of layers of silt loams, loams, and sandy loams. Typically, subsoils underlying the wetlands had a silty clay subsoil, but some were very sand. Dense silty clay prevents surface water collected from direct precipitation from percolating downward, resulting in saturated or inundated conditions; whereas sandy subsoil lenses may be further influenced by a perched high water table saturating the soils.

Hydrology within the agricultural fields is not well defined. No primary field indicators of wetland hydrology were observed, but secondary indicators included oxidized root channels in the upper 2 to 3 inches of the soil and local soil survey data indicating the presence of a seasonally high perched water table early in the growing season. Interviews with local farmers suggest that this area can be farmed (plowed) by late April in most years, indicating that wetland hydrology is present only very early in the growing season.

The NWI indicates both seasonally saturated and seasonally flooded hydrologic conditions within the site wetlands. However, on-site data and field observations indicate that the majority of the site wetlands are seasonally saturated (not flooded) during the growing season. Within these soil types, seasonally saturated wetlands generally display low matrix chromas and mottling to the surface demonstrating fluctuating water levels near and at the soil surface. However, data collected from some sample plots had matrix chromas between 2 and 3 with no mottles. Chromas were not low enough to indicate prolonged saturation near the surface and the lack of mottles implies a stable water table below the major root zone during the growing season.

WETLAND FUNCTIONS AND VALUES

In order to assess the functional values of the on-site wetlands we have used the Wetland Characterization sheets developed by the Washington Department of Ecology. Wetland functions are divided into primary categories of wetland condition, buffers, wildlife habitat, fisheries habitat, hydrology, cultural values, shoreline stabilization, and heritage value. Within these primary categories individual functions are assessed point values of 1-3. Functions having values of 1 are considered low value; functions with values of 2 have moderate value; and functions with 3 points have high values. Appendix C contains the Wetland Characterization sheets for the wetlands on this parcel.

Table 1 indicates the functions addressed for the palustrine emergent wetlands (Wetlands A through J south of Henry Road and Wetlands O, R and portions of N, P, Q and L on the west and north portions of the study site, Figure 2) and their associated values. Only water quality functions received values "moderate" or greater. The remaining functions received "low" values.

Table 1. Palustrine Emergent Wetlands Functions and Values. South of Henry Road

FUNCTION	VALUE
o Human impacts to wetlands	1.5
o Buffer structure and function	1.5
o Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife	1
o Water quality	2
o Flood and storm drainage protection	1
o Support of baseflow	1
o Shoreline stabilization	N/A
o Sea level rise	N/A
o Groundwater exchange	1
o Cultural values	0
o Heritage value	0

The overall wetland condition has a "high-low" value. The site has been extensively impacted by past agricultural practices on the majority of the site and some industrial filling and earth moving on the western portion. The acreage south of Henry Road has been actively farmed for over 50 years. All PEM wetlands and surrounding uplands are fields dominated by non-native pasture grasses that are presently mowed for hay. Each PEM wetland within this area is under one-half acre in size and is hydrologically isolated, except wetland L. Hydrological alterations

include ditches within the fields and along Henry Road. The ditches along Henry Road may have the greatest impact by separating wetlands in the southern fields from upgradient surface and subsurface drainage from wetlands on the north side of Henry Road.

The buffer surrounding these wetlands is closely mowed upland fields dominated by non-native grasses and small areas of forested/shrub habitat. The wetlands are greater than 100 feet from any other habitat type, but marine, forest, and shrub habitats are located within one-quarter mile. The vegetation cover between the wetlands and other habitats is mowed grass, providing low cover values.

Habitat value within these wetlands is low. The low value is associated with the small size of the wetlands, their isolated nature, and lack of structural diversity. As mentioned previously, the PEM wetlands are all under one-half acre in size and most are hydrologically isolated. The buffer area is predominately open grassland. Vegetation within the wetlands is dominated by non-native plant species consisting of a single vegetation class. The wetlands have a simple shape and no interspersion of wetland classes, reducing the edge habitat. No significant habitat structures, such as downed logs, snags, or perches, were observed within these wetlands or their associated buffers. The only connection to other habitat types is via mowed open fields. There is no connection to fish habitat.

These wetlands serve "low" to "moderate" hydrological functions. The wetlands are located in shallow depressions underlain with silt and clay. The average slope around the wetlands is low (<3%). There is no apparent inlet or outlet to the wetlands, except Wetland L. The wetlands are isolated and water is removed primarily through evapotranspiration. The ditches have altered the natural hydrology of the wetlands, separating them from upgradient drainage. The wetlands are moderately vegetated with emergent vegetation, which may aid water quality during the growing season, but not in the winter.

Cultural and Heritage values of these wetlands are "low". This is based on the small size, disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

Based on the Whatcom County's and the DOE Wetland Rating System, the palustrine emergent wetlands (Wetlands A-J, I R P and Q) are unregulated (Whatcom County) Category IV wetlands; and the remaining PEM wetlands (Wetlands N and portions of L) are regulated Category IV wetlands due to size and connection to the seasonal stream. The DOE's four tiered rating system designates these wetlands as Category IV wetlands. These ratings are based on small size (less than one-half acre in size), isolation, hydrological alteration, and the presence of a single wetland class dominated by vegetation that is primarily non-native, invasive wetland species. Appendix D includes the Wetlands Rating Form.

Table 2 indicates the functions addressed for the palustrine scrub-shrub wetlands (Portions of Wetlands L and K) and their associated values. Functions that have the highest values are; human

impact, buffer structure and function, wildlife habitat, water quality, flood and stormwater protection, and support of baseflow. The remaining functions received "low" values.

The human impact to these wetlands has been moderate. The wetlands have experienced alterations resulting from past logging, agriculture, and livestock grazing. Based on aerial photographs and interviews with local farmers, most of these fields were cleared and used for agricultural crops and livestock grazing. The fields are now abandoned and support dense shrub communities. Other disturbances include logging within wetlands and ditches that have interrupted the natural hydrology to the wetlands. The wetlands are dominated by non-native vegetation, but also include native plants. Probable pollutants could include sedimentation and nutrient inputs from past agricultural and logging activities.

The wetlands are buffered by a mix of forested/shrub, mowed agricultural fields and roads. The buffer is greater than 100 feet where forest, shrub and fields occur.

Table 2. Palustrine Scrub-Shrub Wetland Functions and Values.

FUNCTION	VALUE
o Human impacts to wetlands	2
o Buffer structure and function	2.5
o Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife.	2
o Water quality	3
o Flood and storm drainage protection	2
o Support of baseflow	2
o Shoreline stabilization	N/A
o Sea level rise	N/A
o Groundwater exchange	1
o Cultural values	0
o Heritage value	0

These wetlands have moderate wildlife habitat values. The wetlands include both palustrine emergent and palustrine scrub-shrub wetland classes with moderate interspersion and shape. No open water is present and the wetlands are dry during the summer. Clumps of willows and small trees serve as perches for raptors in these fields. No other habitat features were identified. The wetlands are connected to other habitats via the on-site seasonal stream, but much of the riparian vegetation is limited to reed canarygrass. Fish do not inhabit these wetlands.

Water quality functions have "high" values. The wetlands combined large size, moderate level of disturbance, slow rate of water movement, and dense vegetation combine to provide these

wetlands with the ability to serve significant water quality functions. These same features combined with the wetlands direct and indirect association with the on-site stream allow them to provide moderate values in flood and stormwater abatement and support of the base flow of the stream. There is little data associated with the wetlands interaction with groundwater, but some site wetlands have a sandy subsoil indicating some possible interaction.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

Based on the Whatcom County's Wetland Rating System, these palustrine scrub-shrub wetlands (portions of Wetlands L and K) are Category III wetlands. The DOE's four tiered rating system designates these wetlands as Category III wetlands. These ratings are based on combined size of greater than 5 acres, hydrological connection to a seasonal stream, and the presence of two wetland classes dominated by both non-native and native vegetation. Appendix D includes the Wetlands Rating Form.

Table 3 indicates the functions addressed for the palustrine forested wetlands (Wetlands M, S, and portions of Wetlands L, T and K) and their associated values. Functions that have the highest values are; the overall wetland condition, buffer structure and function, water quality and flood and stormwater abatement. The remaining functions received "low" values.

Table 3. Palustrine Forested Wetland Functions and Values.

FUNCTION	VALUE
° Human impacts to wetlands	3
° Buffer structure and function	2.5
° Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife.	1.5
° Water quality	3
° Flood and storm drainage protection	2
° Support of baseflow	1
° Shoreline stabilization	N/A
° Sea level rise	N/A
° Groundwater exchange	1
° Cultural values	0
° Heritage value	0

The human impacts to these wetlands have been moderate, although logging has occurred in the near past. In some areas logging has reduced the total canopy and allowed non-native blackberries to invade and in others the wetlands have recovered from logging that occurred more

than 10 years ago. Peripheral ditches along the roads may have altered the original hydrology, but sufficient hydrology remains to support these communities. Past logging may have temporarily increased sediment loads, but no pollutants are currently apparent.

Buffers around the wetlands are composed of forest and shrub vegetation greater than 100 feet wide.

These wetlands have low to moderate wildlife habitat functions. No open water component is present. Palustrine forested and scrub-shrub wetland classes are present. Emergent vegetation is present, but makes up less than 10 percent of the community. Simple interspersion occurs between the wetland classes with moderate to complex wetland shapes. Habitat features include fallen logs, small snags and perches. There are narrow corridors with forested to herbaceous vegetation cover to other habitats. There is no documentation nor field observations indicating that these wetlands are connected to a fishery habitat.

Water quality functions have "high" values. The wetlands are moderately (30 to 75% areal cover) vegetated with persistent and non-persistent vegetation. Because the wetlands are located in isolated depressions water movement is slow to non-existent. The surrounding area around the wetlands has low (3% to 8%) slopes. These features provide the wetlands with high nutrient trapping features.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

Based on the Whatcom County's Wetland Rating System, these palustrine forested wetlands (Wetlands L, M, S, and portions of Wetlands T and K) are Category III wetlands. The DOE's four tiered rating system designates these wetlands as Category III wetlands. These ratings are based on a total size greater than 5 acres, hydrological isolation, moderate complexity, forested class and vegetation dominated by a mix of native and non-native plant species. Appendix D includes the Wetlands Rating Form.

DETERMINATION

The study area includes palustrine emergent, scrub-shrub, and forested wetlands. The wetlands met all three wetland parameters, but by differing degrees. In general all site wetlands displayed a predominance of hydric vegetation, hydric soils displaying low chromas and mottling, and soils which displayed wetland hydrology field indicators such as oxidized root channels.

The wetlands were categorized using both Whatcom County's and the Washington Department of Ecology's Wetland Rating Systems. Using Whatcom County's Category system the PEM wetlands south of Henry Road are unregulated by the County, and are categorized as Category IV wetlands by the DOE and regulated. The remaining PEM wetlands are regulated Category

IV wetlands using either system. Both the PSS and PFO wetlands are regulated Category III wetlands using either system.

Identified important wetland functions using the DOE's wetland characterization sheets include; water quality in the palustrine emergent wetlands (Wetlands A-J, O, R and portions of N, P, Q and L). Human impacts to wetlands, buffer structure and function, breeding, rearing, feeding, and wintering habitat for wildlife, water quality, flood and storm drainage protection, and support of baseflow are important functions in the palustrine scrub-shrub wetland (Portions of Wetlands L and K). Valuable functions in the palustrine forested wetlands (Wetlands M, S, and portions of Wetlands T and K) are human impacts to wetlands, buffer structure and function, water quality, and flood and storm drainage protection functions. No fisheries are located on this site nor within the adjacent stream.

CONCLUSION

The U.S. Army Corps of Engineers (Corps) allows up to one (1) acre of isolated and above the headwater wetlands to be significantly disturbed (filled, excavated, or change of class) using the Nationwide 26 permit as delineated using the 1987 Corps manual. All disturbances greater than one acre require agency notification and possible compensatory mitigation. The Washington State Department of Ecology (DOE) requires a 401 water quality certification for disturbance of areas greater than one (1) acre of isolated or above the headwater wetlands. Any disturbance of a wetland area greater than two (2) acres requires an individual permit, a compensatory mitigation plan by the Corps, and a practicable alternatives analysis. The Corps retains discretionary action over all waters of the U.S. regardless of size, if of high value (such as Category I). The DOE also requires certification that no listed nor known endangered or threatened animal species, or National Historic Places are present on this parcel.

Whatcom County regulates all activities in and around Category III wetlands over 10,000 square feet (CAO, 1992). A minimum of a 50 foot, naturally vegetated buffer is required around all regulated Category III wetlands in areas of high intensity land use and 25 feet in areas of low intensity land use. The County regulates all Category IV wetlands over 1 acre in size and requires a minimum of a 25 foot, naturally vegetated buffer with all land use activities. All impacts to regulated wetlands and their associated buffers require compensatory mitigation.

We have used the most current, established methods to make determinations as to the location, size, and types of wetlands on this parcel. All of the above statements are based on our best professional judgment and although we follow the federal criteria, we cannot guarantee the Federal, State, or the local jurisdiction determination (delineation or isolated status) will correspond to ours.

Figures

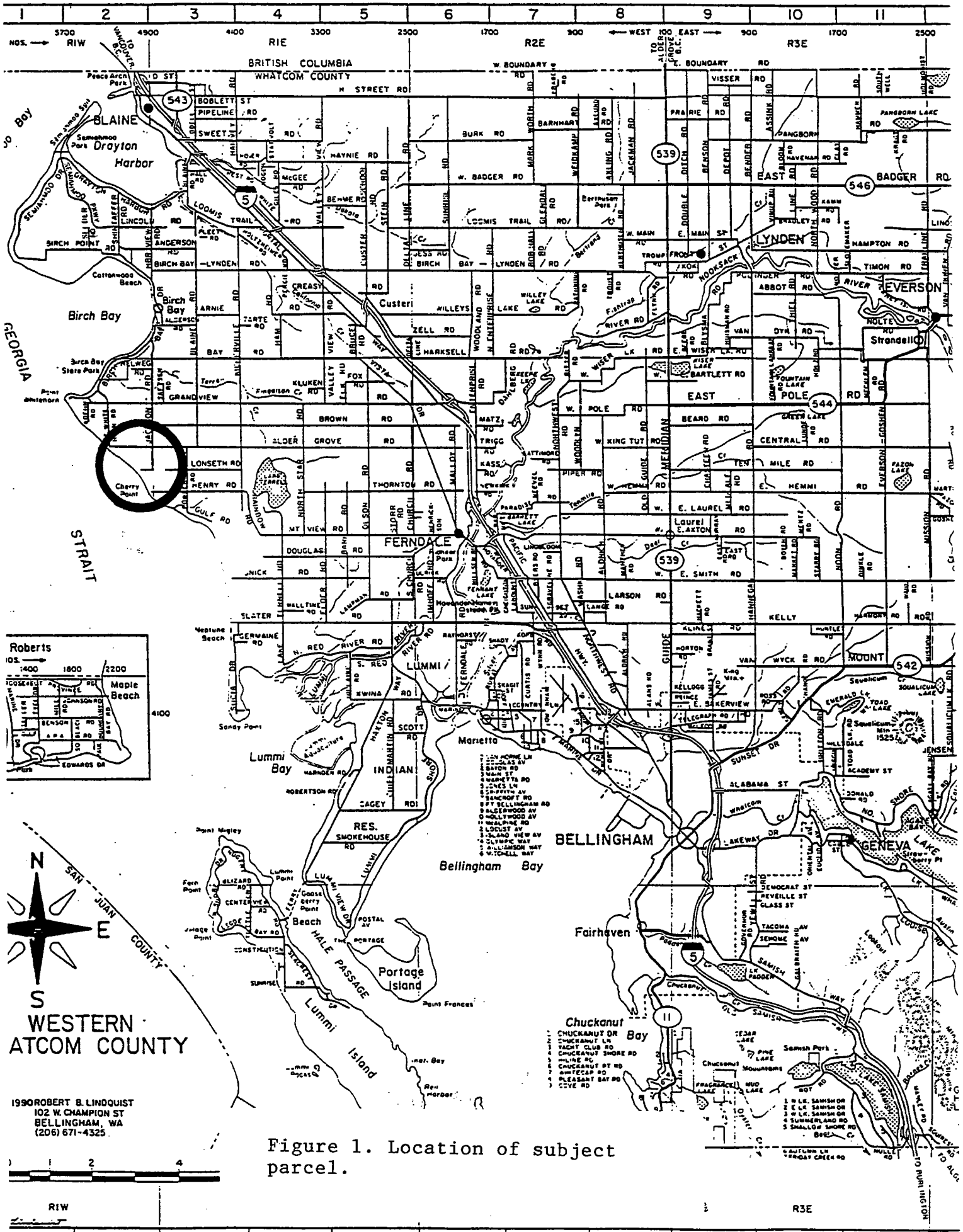

Figure 1. Location of subject parcel.

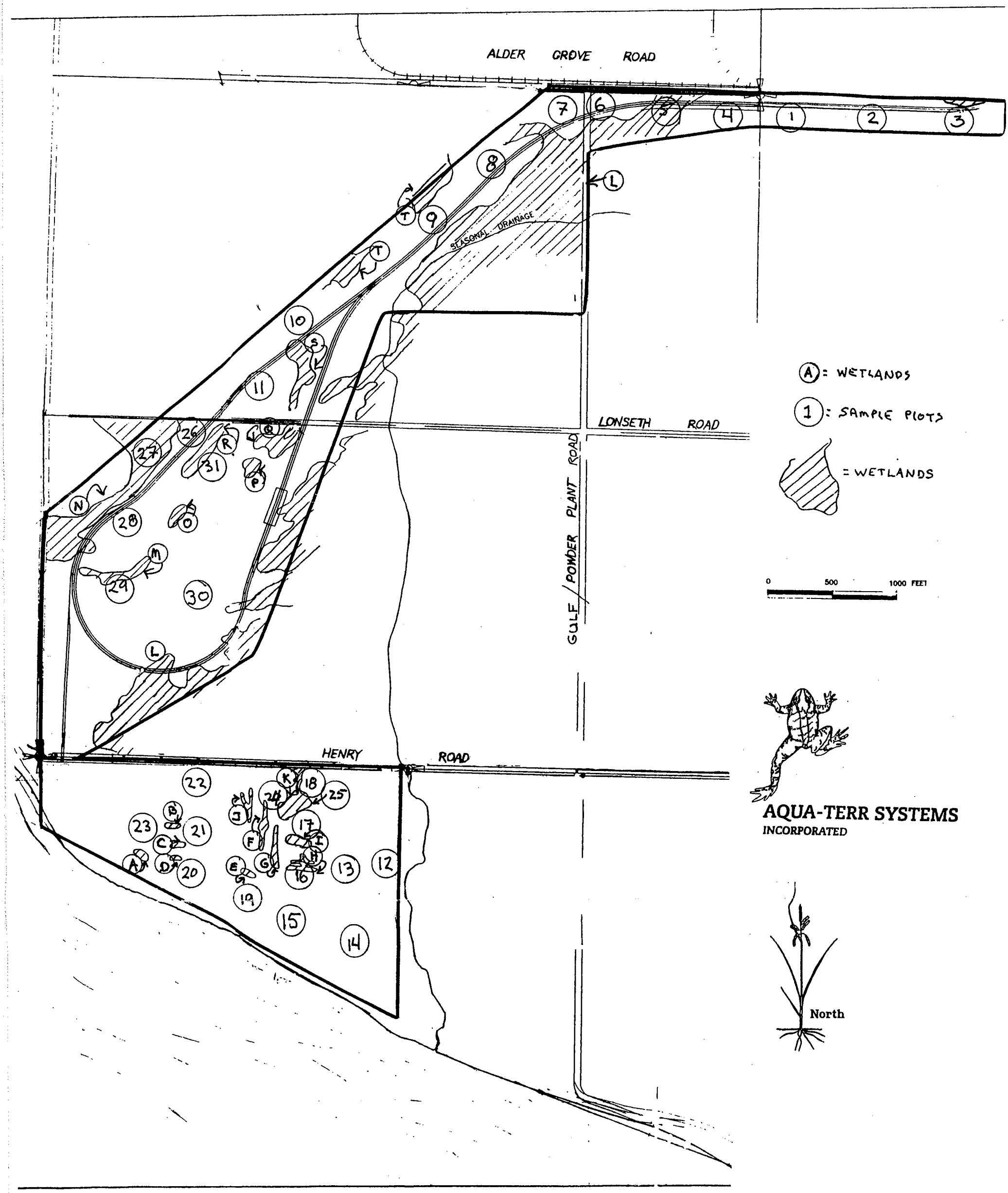

Figure 2. Approximate locations of wetlands and sample plots.

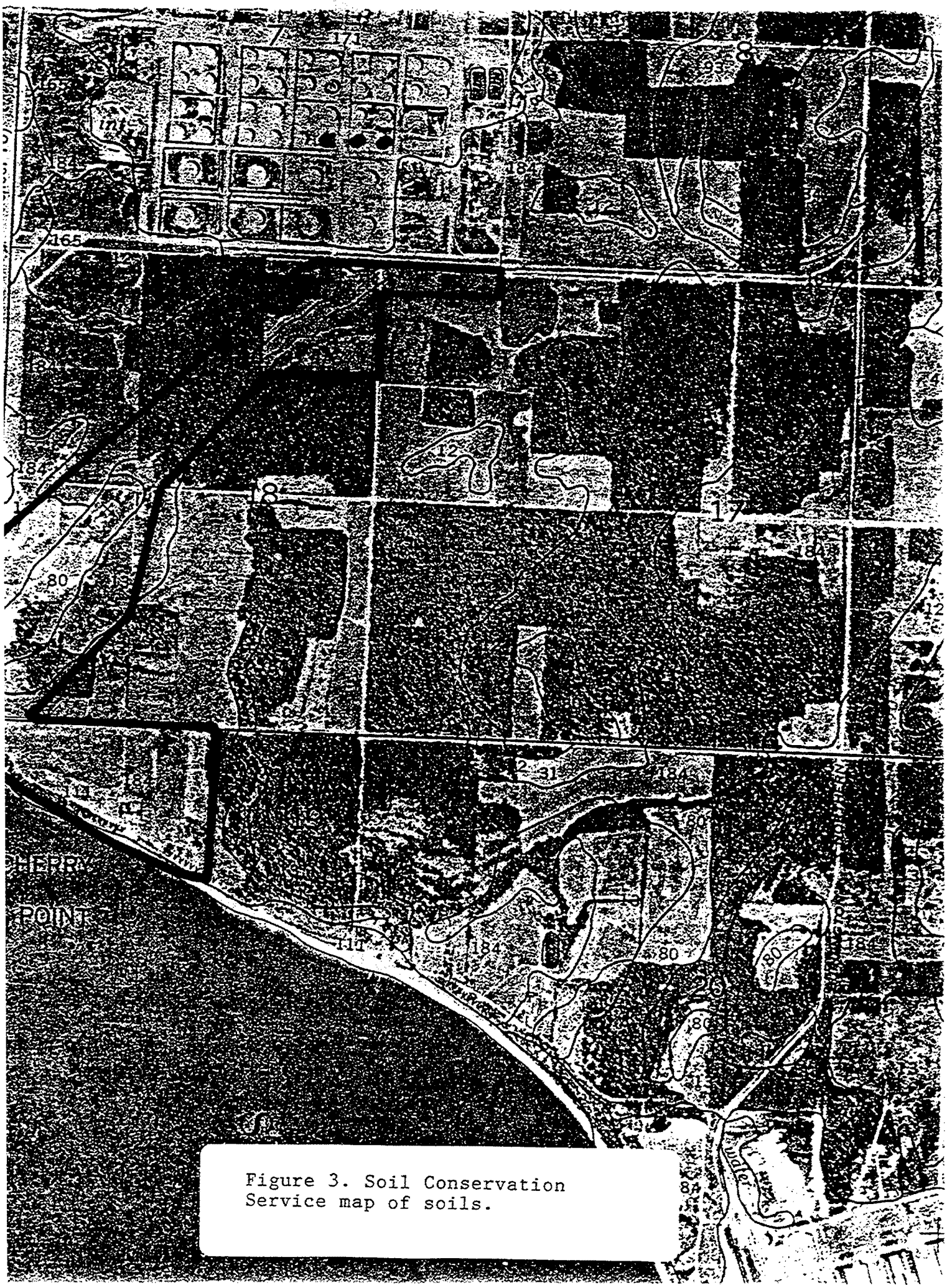

Figure 3. Soil Conservation Service map of soils.

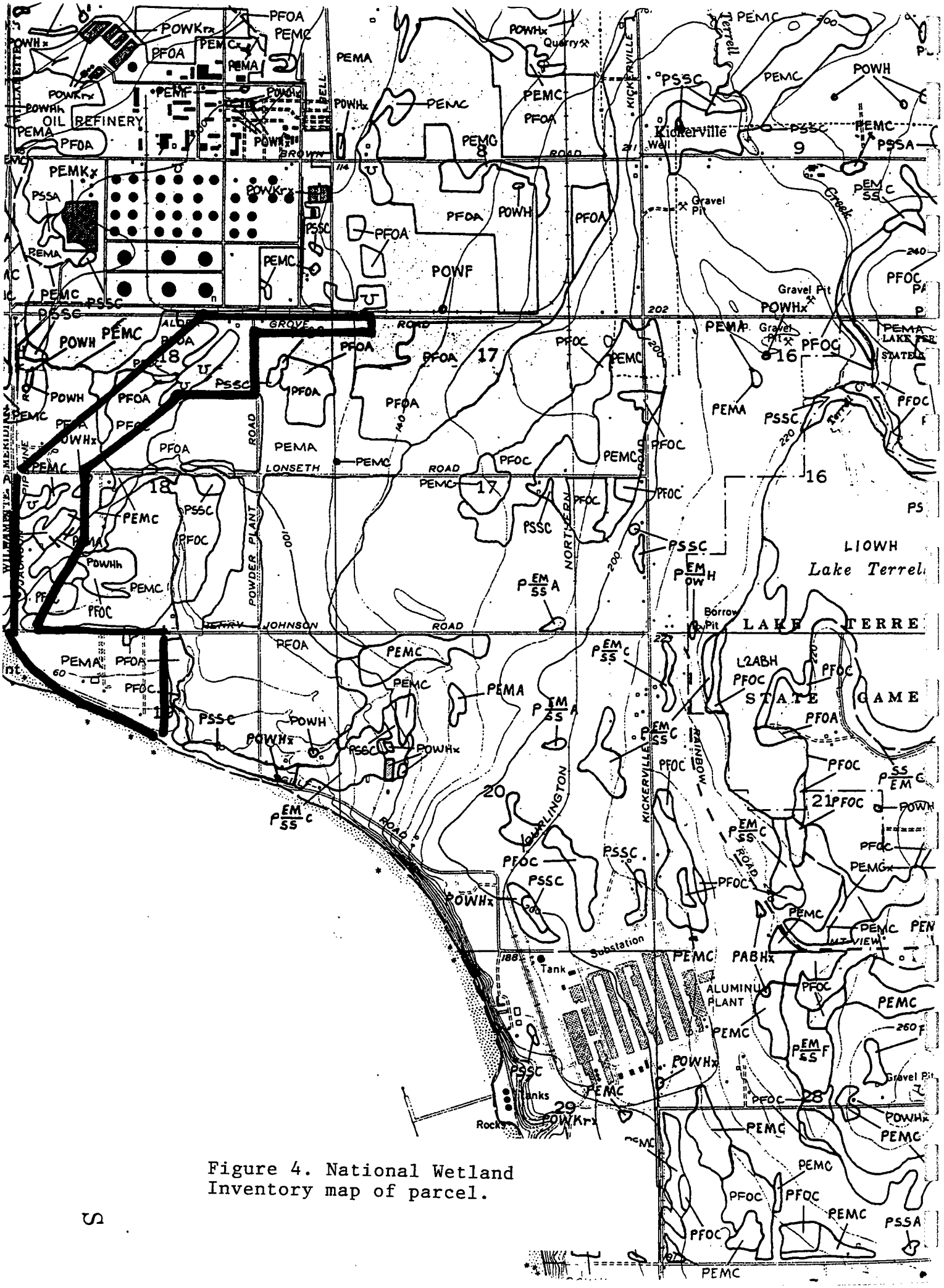

Figure 4. National Wetland Inventory map of parcel.

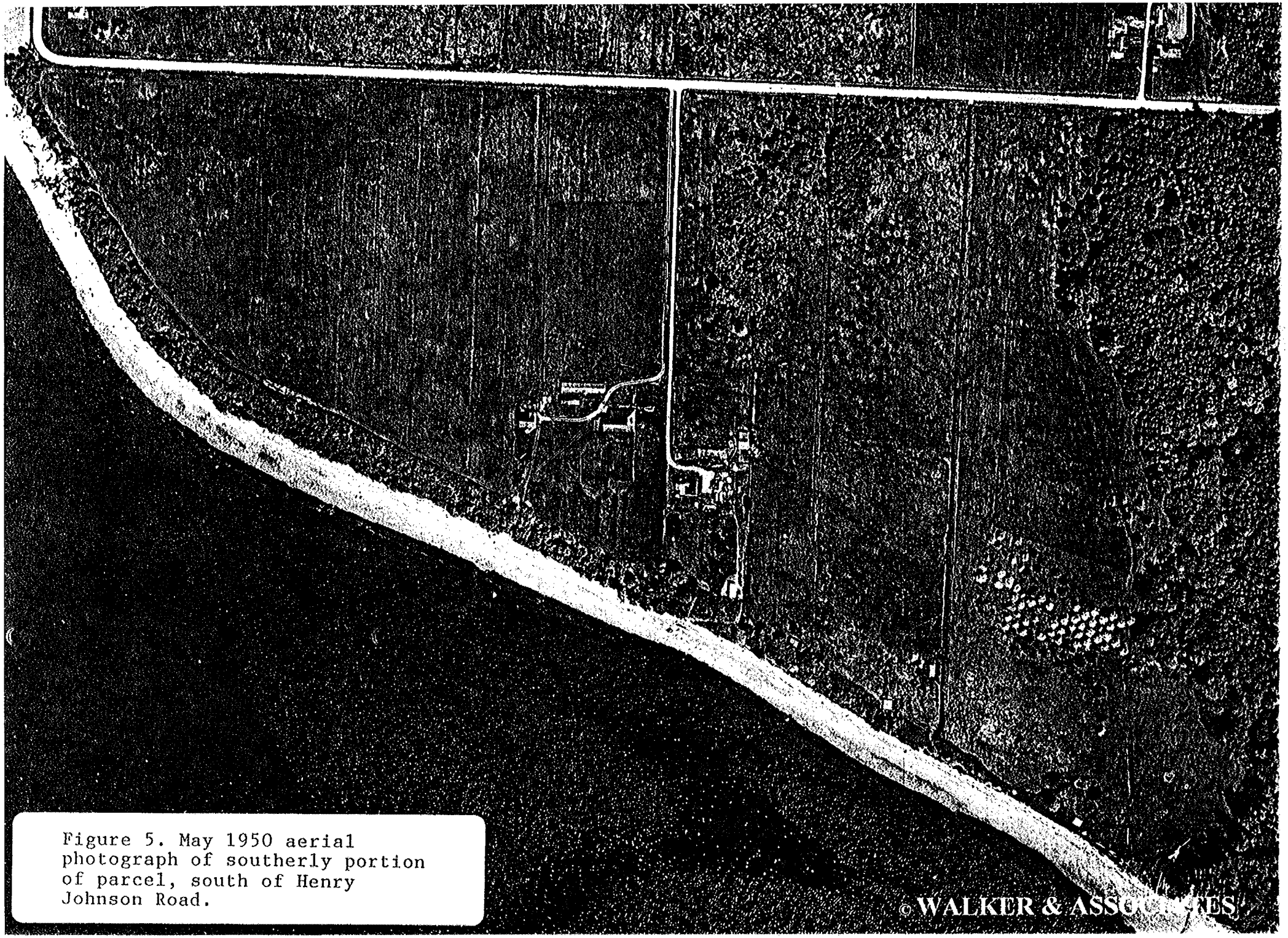

Figure 5. May 1950 aerial photograph of southerly portion of parcel, south of Henry Johnson Road.

Appendix A: References

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Appendix B: Data Sheets

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.) *

Community ID: Up
Transect ID:
Plot ID: 1

limited disturbance from installation of powerlines

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
40	1. Festuca rubra	Herb	3+		9.		
30	2. Ranunculus acris	"	2-		10.		
25	3. Holcus lanatus	"	3		11.		
20	4. Trifolium repens	"	3		12.		
15	5. Alopecurus pratensis	"	2		13.		
	6.				14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750%

Remarks: Old pasture - some recent disturbance from powerline installation.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

SOILS

Map Unit Name
(Series and Phase): Whitehorn Silt Loam

Drainage Class: PD

Taxonomy (Subgroup): mesic Typic Umbraqualf

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 13"	A	10yr 3/3	—	—	Loam
↓13"	B	10yr 5/3	10yr 4/6	common/distinct	sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soil listed on Local hydric list + mottles present, although matrix chroma was greater than 2. Therefore this does not appear to be hydric

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: Criteria for Vegetation met, but Hydrology + Soils criteria not met

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.) *	Community ID: UP Transect ID: Plot ID: 2

See #1

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
60	1. Alopecurus pratensis	Herb	3	9.		
80	2. Trifolium repens	"	3	10.		
20	3. Holcus lanatus	"	3	11.		
20	4. Plantago major	"	3+	12.		
15	5. Festuca rubra	"	3+	13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750%

Remarks: Vegetation predominantly fac., but meets hydric criteria

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ✓ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands
Field Observations: Depth of Surface Water: 0" (in.) Depth to Free Water in Pit: 720" (in.) Depth to Saturated Soil: 720" (in.)	Secondary Indicators (2 or more required): ✓ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: Scattered poorly developed oxidized root channels in top 2".
Soils compacted from adjacent powerline work.
No clear indicators of hydrology here.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: PD

Field Observations
Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup): See #1

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 2"	A	10yr 4/2	10yr 4/4	few/faint	Silt Loam-compacted — ox. root channels
2-16"	A	10yr 3/2	10yr 4/4	few/faint	Silt Loam
16"	B	10yr 5/3	10yr 4/6	common/distinct	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Although listed on hydric soil list + mottles ~~com~~ present, mottles are faint & matrix ~~color~~ chroma is above 2 ∴ therefore soil not hydric.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	Yes (No)	(Circle)

Remarks: Vegetation criteria met, but hydrology + soils criteria ~~not~~ not met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: PEM
Transect ID:
Plot ID: 3

Soils rutted + compacted - adjacent vegetation + ~~not~~ plot vegetation disturbed.

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
50	1. Alopecurus geniculatus	Herb	1	9.		
50	2. Juncus effusus	"	2	10.		
10	3. Carex stipata	"	2+	11.		
5	4. Phalaris arundinacea	"	2	12.		
	5. ~~Plant~~			13.		
2	6. Alisma plantago-aquatica	"	1	14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Vegetation dominated by facw + obl. species.
Approx. 20-30% of ground is bare.
Hydric criteria met.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)
Depth to Free Water in Pit: 720" (in.)
Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
✓ Water Marks
___ Drift Lines
✓ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Disturbed by equipment. Topsoil very thin + compacted
Sediment deposits + water marks present.
Wetland is distinct depression

SOILS

Map Unit Name
(Series and Phase): Whitehorn Silt Loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 4"	A	10yr 4/2	10yr 4/6	Common/Distinct	Silty clay,
↓4"	B	10yr 5/2	10yr 3/6	Common/Distinct	Silty clay.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soil listed on local hydric soils list & combined w/ low chroma matrix + distinct mottles = hydric

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No (Circle)
Wetland Hydrology Present?	(Yes)	No
Hydric Soils Present?	(Yes)	No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks: all 3 wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: UP
Transect ID:
Plot ID: 4

This area was used for livestock, but is currently ungrazed.

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
80	1. Festuca rubra	Herb	3+	9.		
20	2. Alopecurus pratensis	"	2	10.		
15	3. Holcus lanatus	"	3	11.		
5	4. Ranunculus repens	"	2+	12.		
5	5. Lotus corniculatus	"	3	13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Vegetation dominated by FAC+ FACW species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)
Depth to Free Water in Pit: 720" (in.)
Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 15"	A	10yr 3/2	None		Silt Loam
15"	B	10yr 5/3	10yr 4/6	common/distinct	sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Chroma above 3.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks: Vegetation criteria met, but Hydrology + soils not met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.) *See note #4

Community ID: PEM
Transect ID:
Plot ID: 5

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
60	1. Agrostis alba	Herb	3	9.		
70	2. Lotus corniculatus	"	3	10.		
25	3. Holcus lanatus	"	3	11.		
30	4. Juncus effusus	"	2	12.		
30	5. Cirsium arvense	"	4+	13.		
1	6. Carex obnupta	"	1	14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750%

Remarks: Vegetation dominated by fac + facw species..

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
✓ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Hydrology indicators unclear. This area set in depression Hummocky + oxidized root channels.

SOILS

Map Unit Name (Series and Phase): Whitehorn Silt Loam – Edgewater Birch Bay.

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 10"	10yr 3/2	A	10yr 4/6-8	common/distinct	V.fine sandy silt
↓10"	10yr 5/2	B	10yr 4/6	n "	silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ mottles.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	(Yes) No ?	
Hydric Soils Present?	(Yes) No	
Is this Sampling Point Within a Wetland?	(Yes) No	(Circle)

Remarks: Clear indicators on Veg + ~~Hydrology~~ Soils present.

Hydrology indicators weak.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Teeminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: UP Transect ID: Plot ID: 6

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
40	1. Fescua rubra		3+		9.		
20	2. Dactylis glomerata		4		10.		
25	3. Cirsium arvense		4+		11.		
20	4. Holcus lanatus		3		12.		
15	5. Alnus rubra <20'	Shrub	3		13.		
10	6. Rubus discolor	"	4		14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Only fac-N test this plot Not hydric.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
To 10"	A	10yr 4/2	None	—	Silt Loam
↓10"	B	10yr 5/3	10yr 4/6	Common/distinct	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: matrix of B Horizon to High.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No (Circle)
Wetland Hydrology Present?	Yes	No
Hydric Soils Present?	Yes	No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: None of the wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: UP Transect ID: Plot ID: 7

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
30	1. Phalaris arundinacea	Herb	2	9.		
30	2. Festuca rubra	"	3+	10.		
30	3. Anthoxanthum odoratum	"	4	11.		
15	4. Circium arvense	"	4	12.		
10	5. Holcus lanatus	"	3	13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Many FAC-N Test Plus plot Non-hydric veg..

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitesilt Loam / Birch Bay Silt Loam interface
Drainage Class: PD/MWD
Taxonomy (Subgroup): See #1 / mesic Typic Haplorthod.
Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 16"	A	10yr 3/3	None	—	Silt Loam
↓ 16	B	10yr 4/3-5/3	10yr 4/4-4/6	few/faint	Variegated Sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List - one soil
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Mottles faint - chromas high.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: None of the 3 criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: UP Transect ID: Plot ID: 8

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
40	1. Festuca rubra	Herb	3+	9.		
40	2. Anthoxanthum odoratum	"	4	10.		
40	3. Plantago lanceolata	"	3	11.		
30	4. Vicia sativa	"	5	12.		
15	5. Taraxacum officinale	"	5	13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Vegetation dominated by fac, facu & upl. species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed. Located on prominent ridge.

SOILS

Map Unit Name
(Series and Phase): BirchBaysilt Loam

Drainage Class: MWD

Taxonomy (Subgroup): Mesic Typic Haplorthod

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 15"	A	10yr 4/3	—	—	Loam
↓ 15"	B	10yr 4/4	—	—	Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the 3 wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 9

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
60	1. Alnus rubra	Canopy	3	9.		
30	2. Betula papyrifera	"	3	10.		
20	3. Acer circinatum	Shrub	4+	11.		
20	4. Sambucus racemosa	"	4	12.		
40	5. Symphoricarpus albus	"	NI	13.		
10	6. Rosa gymnocarpa	"	4	14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: No herbaceous layer present. Vegetation dominated by fac + facu species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed on Ridge.

SOILS

Map Unit Name (Series and Phase): Birchbay silt Loam

Drainage Class: MWD

Taxonomy (Subgroup): See #8

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 15"	A	10yr 4/3	—	—	Silt Loam
↓ 15"	B	10yr 4/4	—	—	Silt Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Is this Sampling Point Within a Wetland? Yes (No) (Circle)

Remarks: None of the wetlands criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? **Yes** No
Is the site significantly disturbed (Atypical Situation)? Yes **No**
Is the area a potential Problem Area? Yes **No**
(If needed, explain on reverse.) *

Community ID: Up
Transect ID:
Plot ID: 10

* logged 3-5 yrs ago.

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
20	1. Betula papyrifera	Canopy	3	9.		
20	2. Alnus rubra	"	3	10.		
15	3. Sambucus racemosa	Shrub	4	11.		
40	4. Rubus spectabilis	"	3	12.		
30	5. Symphoricarpos albus	"	NI	13.		
10	6. Pteridium aquilinum	Herb	4	14.		
30	7. Ribes lacustre	Shrub	4	15.		
40	8. Ribes ursinum	Herb	4	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Dominated by fac + facu species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)
Depth to Free Water in Pit: 720" (in.)
Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Birchbay silt loam

Drainage Class: MWD

Taxonomy (Subgroup): See #8

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 10"	A	10yr 4/3	—	—	Loam
↓10"	B	10yr 4/4	—	—	Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: UP Transect ID: Plot ID: 11

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Canopy	3	9.		
2. Sambucus racemosa	Shrub	4	10.		
3. Rubus spectabilis	"	3	11.		
4. Oemleria cerasiformis	"	4	12.		
5. Rubus ursinus	Herb	4	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Vegetation dominated by fac + facu species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: >20" (in.)

Depth to Saturated Soil: >20" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name (Series and Phase): Birch Bay Silt Loam

Drainage Class: MWD

Taxonomy (Subgroup): See #8

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 2"	O	Duff			leaves, twigs
2-14"	A	10yr 4/3	—	—	Loam
14" ↓	B	10yr 4/4	—	—	Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Is this Sampling Point Within a Wetland? Yes (No) (Circle)

Remarks: None of the wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.) * Possibly disturbed Pocket upclear.

Community ID: ~~PEM?~~ UP
Transect ID:
Plot ID: 12

OLD ROAD BED

VEGETATION

	Dominant Plant Species	Stratum	Indicator
40	1. Festuca rubra	Herb	3+
30	2. Holcus lanatus		3
80	3. Poa compressa		4
1	4. Carex leporina		2
1	5. Juncus effusus		2
3	6. Alnus rubra seedlings	Shrub	3
	7.		
	8.		
	9.		
	10.		
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Dominated by fac species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No clear indicators of hydrology. Shallow depression.

SOILS

Map Unit Name (Series and Phase): Whitehorn silt Loam

Drainage Class: ~~[illegible]~~

Taxonomy (Subgroup): See #1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 10"	A	10yr 3/2	10yr 3/4	few/Distinct	Charcoal pieces
↓10"	B	Variegated Sand	10yr 3/4	common/Distinct	gravelly sand → Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ mottles; Charcoal may indicate disturbance

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	
Is this Sampling Point Within a Wetland?	(Yes) No	(Circle)

Remarks: Vegetation criteria met, but hydrology + soils unclear. If FAC-N test used site is wet.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 5/31/95
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.) x-farmed field

Community ID: UP
Transect ID:
Plot ID: 13

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
40	1. Festuca rubra	Herb	3+		9.		
30	2. Holcus lanatus	"	3		10.		
40	3. Poa compressa	"	4		11.		
1	4. Carex leporina	"	2		12.		
5	5. Trifolium repens	"	3		13.		
	6.				14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Vegetation dominated by fac. species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn Silt Loam

Drainage Class: mmm PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 8"	A	10yr 3/2	None	—	Silt Loam
↓ 8"	B	2.5y 5/2	10yr 3/6	Common/distinct	V. fine sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ distinct mottles

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: Hydrology criteria not met, vegetation criteria weak.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 14

Old orchard

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pyrus communis		NI	9.		
2. Pyrus malus		NI	10.		
3. Rubus discolor		4	11.		
4. Festuca rubra		3+	12.		
5. Agrostis alba		3	13.		
6. Vicia villosa		NI	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). = 50%

Remarks: Based on those species indicated, ~~the~~ this community is dom by fac species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: ~~mwd~~ PD

Taxonomy (Subgroup): See Plot #1

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 16"	A	10yr 3/2			Loam
↓16"	B	10yr 4/1			Silt Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma present in subsoil, but ~~depth~~ depth was greater than averge root depth (12").

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the 3 wetland criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 15

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
90	1. Agrostis alba		3		9.		
40	2. Festuca sp.		3		10.		
20	3. Holcus lanatus		3		11.		
30	4. Trifolium dubium		3		12.		
5	5. Cirsium arvense		4		13.		
	6.				14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Vegetation dominated by fox species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 726" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ✓ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Plot located in depression with cracked mud.

SOILS

Map Unit Name (Series and Phase): Whitehorn silt Loam

Drainage Class: ~~[illegible]~~ PD

Taxonomy (Subgroup): See # 1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top ↓	A	10yr 3/2	None	—	Rocky silt Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Although listed as a hydric soil, No hydric field indicators were observed at this plot.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: The hydric soil criteria not met

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: PEM Transect ID: Plot ID: 16

maybe add drainage swale?

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
95	1. Agrostis alba	Herb	3	9.		
20	2. Carex lenticularis	"	3	10.		
25	3. Holcus lanatus	"	3	11.		
20	4. Festuca rubra	"	3+	12.		
10	5. Agropyron repens	"	3-	13.		
15	6. Juncus effusus	"	2	14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Dominated by hydrophytic species.

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ✓ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ✓ Drift Lines ✓ Sediment Deposits ✓ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ✓ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: 0" (in.) Depth to Free Water in Pit: 720" (in.) Depth to Saturated Soil: 720" (in.)	

Remarks: Plot located in depression (swale) some silt deposits.
O2 Root Channels in Top 3".

SOILS

Map Unit Name (Series and Phase): Whitehorn-Silt Loam

Drainage Class: ~~Moderately~~ PD

Taxonomy (Subgroup): See plot #1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 8"	A	10yr 3/2	10yr 3/4	Common/Faint	Silt Loam
↓ 8"	B	2.5y 5/2	10yr 3/4	Frequent/Distinct	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low matrix chroma w/ distinct mottles in Rooting Zone.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	
Is this Sampling Point Within a Wetland?	(Yes) No	(Circle)

Remarks: All 3 WL criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes (circled) No Is the site significantly disturbed (Atypical Situation)? Yes No (circled) Is the area a potential Problem Area? Yes No (circled) (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 17

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Shrub	3	9.		
2. Chrysanthemum leucanthemum	"	5	10.		
3. Festuca rubra	"	3+	11.		
4. Holcus lanatus	"	3	12.		
5. Anthoxanthum odoratum	"	4	13.		
6. Pteridium aquilinum	"	4	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Veg. dominated by non-hydric species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators

SOILS

Map Unit Name
(Series and Phase): Whitehorn Silt Loam

Drainage Class: Poorly

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 15"	A	10yr 3/3	10yr 3/4	few/faint @ 12"	Loam
↓ 15"	B	2.5y 5/2	7.5yr 3/3	frequent/distinct	Silt Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: mottles present, but chroma below 12".

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the 3 WL criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 18

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Canopy	3	9.		
2. Oemleria cerasiformis	Shrub	4	10.		
3. Sambucus racemosa		4	11.		
4. Symphoricarpos albus		N/I	12.		
5. Rubus spectabilis		3	13.		
6. Maianthemum dilatatum	Herb	3	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75% fac

Remarks: Veg. dominated by fac + facup species. If fac-N + not used it is an ~~upla~~ non-hydric community.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric soil indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn Silt Loam

Drainage Class: ~~[illegible]~~ PO

Field Observations
Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup): See #1

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 1"	O	Duff layer			
1" to 12"	A	10yr 3/2	—	—	Loam
12" to 16"	A/B	10yr 4/2	—	—	Silt
16" ↓	B	2.5y 5/3	10yr 4/4	few/distinct	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Mottles present but below major root zone & matrix chroma > 2

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks: Wetland criteria Not met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Teeminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: UP Transect ID: Plot ID: 19

OLD HOUSESITE

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
100 1. Phalaris arundinacea	Herb	2	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Dominated by hydric veg.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: PD

Taxonomy (Subgroup): Sec #1

Field Observations
Confirm Mapped Type? Yes No — some dup different

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Topsoil	A	10yr 3/2	—	—	Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: may have been old garden – ~~[illegible]~~
Low matrix chroma, but No mottles.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: Hydrology + Soil criteria NOT met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.) Near old house/barn site	Community ID: Up Transect ID: Plot ID: 26

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca rubra	Herb	3+	9.		
2. Holcus lanatus	"	3	10.		
3. Trifolium repens	"	3	11.		
4. Trifolium dubium	"	NI	12.		
5. Agrostis alba	"	3	13.		
6. Alopecurus pratensis	"	2	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750%

Remarks: Veg. dominated by fac. species

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric field indicators present.

SOILS

Map Unit Name (Series and Phase): Whitehorn Silt Loam

Drainage Class: PD

Taxonomy (Subgroup): Sec# 1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 15"	A	10yr 3/2	10yr 3/4 Top 3" only	frequent/faint	Silt Loam
↓ 15	B	2.5y 5/3	10yr 4/4	few/distinct	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soils compacted – these mottles may have formed recently from compaction. mottles faint. No clear hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle) (but not clear)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	Yes (No) (Circle)	

Remarks: Hydric field indicators for vegetation & soils not clear. Based on ~~the~~ lack of hydrology indicators & past disturbance this plot appears to be upland

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: ~~3~~ 11p Transect ID: Plot ID: 21

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
70	1. Alopecurus pratensis	Herb	3		9.		
20	2. Holcus lanatus	"	3		10.		
5	3. Trifolium ~~pratense~~ repens	"	3		11.		
5	4. Festuca rubra	"	3+		12.		
5	5. Agrostis alba	"	3		13.		
	6.				14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750% fac.

Remarks: Vegetation dominated by fac. species.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Plot located in slight depression. Oxidized root channels in top 12 inches

SOILS

Map Unit Name (Series and Phase): Whitehorn Silt Loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 16"	A	10yr 3/2	—	—	silt Loam
↓16"	B	10yr 3/4	10yr 4/4	few/faint	" "

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: mottles present, but matrix chroma >2.
No other field indicators observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No ?
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: ~~Man~~
Vegetation facultative, hydrology unclear
Determination based on soil.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 22

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca rubra	Herb	3+	9.		
2. Anoxanthum odoratum		4	10.		
3. Holcus lanatus		3	11.		
4. Plantago major		4+	12.		
5. Trifolium repens		3	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Using a FAC-N test community is Not hydric.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: PD

Taxonomy (Subgroup): Sec #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 6"	A	7.5yr 3/2	None		Silt Loam
↓ 16"	B	10yr 3/4	None		Sandy Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric field indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No) (Circle)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	(Circle) Yes (No)	

Remarks: None of the WL criteria met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: PEM Transect ID: Plot ID: 23

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
70	1. Alopecurus pratensis	Herb	3		9.		
30	2. Holcus lanatus	"	3		10.		
10	3. Trifolium repens	"	3+		11.		
20	4. Festuca rubra	"	3+		12.		
15	5. Agrostis alba	"	3		13.		
	6.				14.		
	7.				15.		
	8.				16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Vegetation dominated by a facultative community.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Shallow depression - bare patches
No clear indicators of hydrology.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 8"	A	7.5yr 3/2	None		Silt Loam
↓ 8"	B	10yr 5/2	10yr 4/6	frequent/Distinct	V. fine sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma & distinct mottles in upper 12" of soil.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	Yes No	— unclear
Hydric Soils Present?	(Yes) No	

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Vegetation is a facultative community, Hydrology unclear. Soils are hydric.
Determination based on soils

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: PSS Transect ID: Plot ID: 24

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Canopy 20' Tall	3	9.		
2. Rubus fusca	Shrub	3+	10.		
3. Rubus communis	"	NI	11.		
4. Lonicera involucrata	"	3+	12.		
5. Carex obnupta	Herb	1	13.		
6. Juncus effusus		2	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750%

Remarks: Vegetation is dominated by hydric vegetation.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicator?

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt loam

Drainage Class: PD

Taxonomy (Subgroup): Sec# 1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 16"	A	10yr 3/2	10yr 4/6	few/Distinct	Silt Loam
				mottles 1 per 10 sq"	≈ 2mm m size

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ distinct mottles, but mottles infrequent approx 1 mottle per 10 sq. inches -- very small

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)	
Wetland Hydrology Present?	Yes No-assumed	
Hydric Soils Present?	(Yes) No	
Is this Sampling Point Within a Wetland?	(Circle) (Yes) No	

Remarks: Edge of wetland.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 5/31/95 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: PFO/PSS Transect ID: Plot ID: 25

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Canopy	3	9.		
2. Pyrus fusca	Shrub	3+	10.		
3. Carex obnupta	Herb	1	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Understory very sparse
Canopy 20 to 30 ft. tall. Dominated by fac + obl. species

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ✓ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ✓ Sediment Deposits ___ Drainage Patterns in Wetlands
Field Observations: Depth of Surface Water: 0" (in.) Depth to Free Water in Pit: 720" (in.) Depth to Saturated Soil: 720" (in.)	Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: Depression - sediment deposits.

SOILS

Map Unit Name
(Series and Phase): Whitehorn silt Loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 12"	A	10yr 3/1	—	—	Silt Loam
↓ 12"	B	10yr 4/2	10yr 4/6	distinct/frequent	Sandy silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ mottles in upper 12".

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks: all 3 wl parameters met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 10/10/94 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 26

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pseudotsuga menziesii	Canopy	4	9.		
2. Rubus discolor	Shrub	4	10.		
3. Urtica dioica	Herb	3+	11.		
4. Cirsium arvense	"	4+	12.		
5. Brassica nigra	"	5	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Vegetation dominated by non-hydric species.
D. fir planted - approx. 3-5 yrs. old.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

SOILS

Map Unit Name (Series and Phase): Birch Bay silt Loam

Drainage Class: MWD

Taxonomy (Subgroup): See #30

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 10"	A	10yr 3/4	—	—	Sandy Loam
↓ 10"	B	10yr 5/4	—	—	Sandy gravelly Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)

Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the 3 wl parameters met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Teeminal Investigator: V. Jackson & J. Wiggins	Date: 10/10/94 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: PEM Transect ID: Plot ID: 29

may have been altered by borrow activities

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Agrostis alba	Herb	3	9.		
2. Holcus lanatus	"	3	10.		
3. Juncus effusus	"	2	11.		
4. Cirsium vulgare	"	4	12.		
5. Alopecurus geniculatus	"	1	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: Vegetation dominated by hydrophytic species

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ✓ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Based on topography (swale), raised hummocks w/ watermarks + local soil data, this site has WL Hydrology.

SOILS

Map Unit Name (Series and Phase): Whitehorn silt loam

Drainage Class: PD

Taxonomy (Subgroup): See #1

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 to 6"	A	10yr 4/2	—	—	Silt Loam
↓6"	B	10yr 5/2	10yr 4/6	Frequent/Distinct	Very sandy silt ↑ hard pan

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Low chroma w/ distinct mottles.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	(Circle)
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	
Is this Sampling Point Within a Wetland?	(Yes) No	(Circle)

Remarks: All 3 WL parameters met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 10/10/94 County: Whatcom State: WA
Do Normal Circumstances exist on the site? Yes **No** Is the site significantly disturbed (Atypical Situation)? **Yes** No Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 28

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Pseudotsuga menziesii	Canopy	4	9.		
2. Pinus contorta	"	3	10.		
3. Festuca rubra	Herb	~~N~~ 3+	11.		
4. Trifolium pratense	"	~~N~~ 4	12.		
5. Daucus carota	"	~~N~~ 5	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). <50%

Remarks: Community dominated by non-hydric veg. D. fir + lodgepole pine - planted.

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ✓ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands
Field Observations: Depth of Surface Water: 0" (in.) Depth to Free Water in Pit: 720" (in.) Depth to Saturated Soil: 720" (in.)	Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: No hydric indicators observed.

SOILS

Map Unit Name
(Series and Phase): Disturbed Birch Bay Silt Loam

Drainage Class: MWD

Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): See # 30

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top ↓	B	10yr 5/2	—	—	gravelly silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Topsoil removed in barrow activities
No hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: None of the 3 WL parameters met.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point
Applicant/Owner: Gateway Pacific Terminal
Investigator: V. Jackson & J. Wiggins

Date: 10/10/94
County: Whatcom
State: WA

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: PEM
Transect ID:
Plot ID: 29

Depression left in Barrow pit.

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Carex obnupta	Herb	1	9.		
2. Phalaris arundinacea	"	2	10.		
3. Lemna minor	"	1	11.		
4. Alnus rubra (on edge)	Canopy	3	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75%

Remarks: 15-20 yr. old alder along edge - not in WL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: >20" (in.)

Depth to Saturated Soil: 20" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
✓ Water Marks
___ Drift Lines
✓ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Soils moist throughout. Water marks + sediment on plants + sides. Distinct depression.
Appears to be inundated w/ up to 1' of H_2O at times.

SOILS

Map Unit Name (Series and Phase): Drained Birch Bay Silt Loam

Drainage Class: Mwd

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): See #30

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 1"	O	10yr 2/1	—	—	muck
1"	A	10yr 5/1	10yr 4/6	Frequent/distinct	Sandy Gravelly silt

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: ~~Soil~~ Top soil removed on Barrow activities.
Low chroma, high organic

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No (Circle)
Wetland Hydrology Present?	Yes	No
Hydric Soils Present?	Yes	No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks: although disturbed, it met all 3 WL parameters.

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Cherry Point Applicant/Owner: Gateway Pacific Terminal Investigator: V. Jackson & J. Wiggins	Date: 10/10/94 County: Whatcom State: WA
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Up Transect ID: Plot ID: 30

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Alnus rubra	Canopy	3	9.		
2. Acer circinatum	Shrub	3-	10.		
3. Oemleria cerasiformis	"	4	11.		
4. Ribes lacustre	"	3+	12.		
5. Maianthemum dilatatum	Herb	3	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 750% but w/ fac-N test Not.

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0" (in.)

Depth to Free Water in Pit: 720" (in.)

Depth to Saturated Soil: 720" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators.

SOILS

Map Unit Name (Series and Phase): Birch Bay Silt Loam

Drainage Class: MWD

Taxonomy (Subgroup): Mesic Typic Haporthod

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
Top 4"	A	10yr 2/2	—	—	Loam
↓ 4"	B	7.5yr 4/4			Silt Loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No hydric indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

(Circle)

Is this Sampling Point Within a Wetland? Yes (No)

Remarks: None of the 3 wetland parameters met.

Approved by HQUSACE 2/92

Appendix C:
Wetland Function Summary Sheet

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PFO Wetlands ID #: _____ Date: 5/31/95

V. Jackson - ATSI

Section III: HUMAN IMPACTS TO WETLAND

8. Indicate the land-uses that occur within 200 feet of the wetland boundary.

- forest-commercial/harvested
- shrub
- agricultural-grazed
- residential
- marine
- other _____
- forest-uncut
- agricultural-cultivated
- commercial/industrial approx. .25 mile North.
- road
- protected conservation or natural area

9. What is the average density of commercial or residential structures within 200 feet of the wetland?

- high density (>1 building per 2 acres)
- medium density (1:2 to 1:10)
- low density (<1:10)

10. Indicate the causes of visible alterations or impacts to the wetland relating to hydrology.

HYDROLOGY

- dredging _____
- damming _____
- diking _____
- other _____
- drainage ditches/diversions ditches near roads + ag. areas.
- blocked outlets/inlets _____
- roads _____

11. From the listing above, summarize the overall extent of impact due to hydrologic alterations.

- extensive
- moderate
- minimal
- unknown

12. Indicate the causes of visible alterations or impacts to the wetland due to other human uses.

OTHER HUMAN IMPACTS

- logging _____
- litter _____
- peat extraction _____
- structures _____
- sedimentation _____
- other _____
- grazing _____
- filling _____
- crop production _____
- recreational overuse _____
- road run-off _____

13. From the listing above, summarize the overall extent of impacts from human use other than hydrology.

- extensive
- moderate
- minimal to moderate
- unknown

Washington State Department of Ecology

WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

14. What invasive or exotic species are present within the wetland?
(See instructions for an expanded species list.)

- *No invasive or exotic species*
- *Purple loosestrife*
- *Orchard grass*
- *Ranunculus repens*
- *Reed canary grass*
- *Himalayan blackberry*
- *Russian olive*
- *Other* _____
- *Juncus effusus*
- *Spartina*
- *Other Pasture Grasses*
- *Other* _____

15. Total percent cover by all exotics:

- *> 50%*
- *10-50%*
- *< 10% or dominated by native plant community*

Somewhat dominated by 7/10% Hom. BB.

16. Is there evidence of any pollution or sediment inputs to the wetland which would affect the water quality of the wetland (i.e. agricultural practices, road run-off, logging, etc.)?

- *No* _____
- *Probable inputs* past logging may have increased sedimentation
- *No known inputs*
- *Visible inputs* _____
- *Undetermined*

SUMMARY - HUMAN IMPACTS TO WETLAND

	Extent of Impact					
	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
Hydrologic Alterations (Question # 11)	extensive		moderate		minimal	3
Other Impacts (# 13)	extensive		moderate	2.5	minimal	
Presence of exotics (# 15)	> 50 %		10 - 50 %	2.5	< 10 %	
Evidence of pollution (#16)	>3 possible or any visible		2-3 prob/ no visible	2.5	<1 prob or no visible	
Subtotals				7.5		3
TOTAL				<< 10.5 >>		

LOW = < 6 MEDIUM = 6 - 8 HIGH = > 8

Enter High, Medium, or Low in "Summary of all Functions" at the end of this report, Page 20.

Wetlands Name: PPO Wetlands ID #: _____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent human impacts to this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section IV: BUFFER AROUND THE WETLAND

17. Indicate the categories that best describe the wetlands buffer. If more than one category applies, average them and insert the averaged "value" in the block below. Additionally, an adjustment should be made to the assigned "value" if the on the ground conditions do not match the descriptions given below.

Forest, scrub, native grasslands or open water buffers that are at least 100 feet around 95 % of the circumference. HIGH

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/2 of the wetland circumference, or
forest, scrub, grasslands or open water buffer wider than 50 feet around 95 % of the circumference. HIGH-MEDIUM

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/4 of the wetland circumference, or
forest, scrub, grasslands or open water buffer wider than 50 feet for more than 1/2 of the wetland circumference. MEDIUM-LOW

No roads, buildings or paved areas within 100 feet of the wetlands for more than 95 % of the wetlands circumference. HIGH-LOW

No roads, buildings or paved areas within 25 feet of the wetlands for more than 95 % of the wetlands circumference or
no roads, buildings or paved areas within 50 feet of the wetlands for more than 1/2 of the wetlands circumference. LOW

Paved areas, industrial areas or residential construction (with less than 50 feet between houses) are less than 25 feet from the wetland for more than 95 % of the circumference of the wetland. MINIMAL TO NO BUFFER

SUMMARY - BUFFER AROUND WETLAND

LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH

Enter the "value" here and in the "Summary of all Functions" at the end of this report, Page 20.

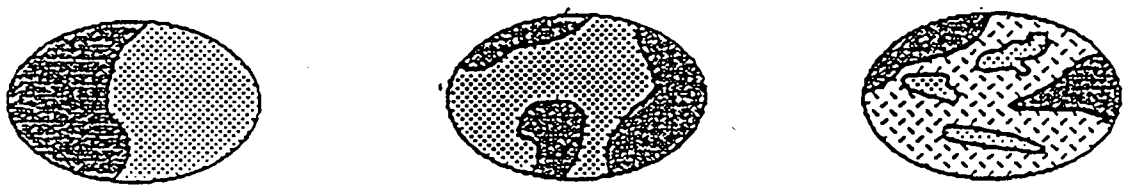
Wetlands Name:_____ Wetlands ID #:_____ Date: _____

Section V: HABITAT VALUE

18. Indicate which of the following best describes the presence of open water in the wetland. (Note: only indicate if open water is >1/2 acre or >10% of the wetland.)

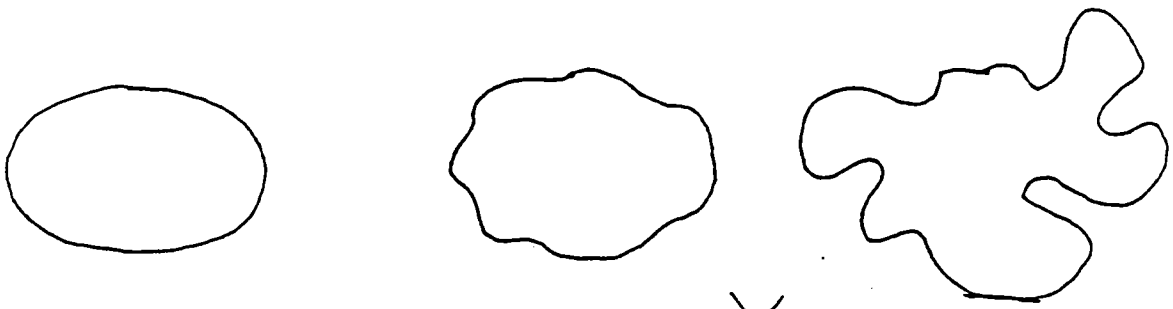
- *no open water*
- *seasonal open water*
- *permanent open water < 1/2 acre or < 10% of wetland*
- *permanent open water > 1/2 acre or > 10% of wetland*

19. Which of the following best represents the interspersion (number and distribution) of wetland classes (including open water) within the wetland? (Note: only indicate wetland classes that are >1/2 acre or >10% of the wetland.)



SIMPLE *MODERATE* *COMPLEX*

20. Which of the following best represents the shape of the wetland edge?



SIMPLE *MODERATE* X *COMPLEX*

21. How many of the following habitat features does the wetland have? (Circle all that apply)

- *snags*
- *fallen logs*
- *perches/mature trees*
- *islands*
- *heron rookery within 300 feet*
- *raptor nest within 300 feet*
- *beaver lodges or current evidence of use by beavers*
- *other* _____
- *eel grass and/or kelp beds*

TOTAL NUMBER of types 3

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PF6 Wetlands ID #: _____ Date: _____

22. Indicate the river/stream connection relative to fish.

- *Wetland provides fish habitat at any time of year and has a perennial surface water connection to a fish bearing stream.*
- *Wetland provides fish habitat seasonally and has a seasonal connection to a fish bearing stream.*
- *No connection for fish.*

23. Indicate the type of connection this wetland has to other habitat areas.
Insert the value associated with the connection in the Summary provided below?

- *Connects to a riparian corridor at least 100 feet wide which connects two or more wetlands, or there is an upland connection present > 100 feet wide with good forest or shrub cover (> 25 %) connecting it with a Significant Habitat Area.* HIGH

- *Connects to another habitat area with either a forested/shrub corridor . ~~100 feet wide or~~ a corridor that is > 100 feet wide but has low vegetation cover less than 6 feet in height.* MEDIUM Med./High Riparian corridor near, but fields between forests and stream.

- *Connects to, or is part of a riparian corridor between 50 - 100 feet wide with scrub/shrub cover or forest cover connecting to other wetlands.* MEDIUM

- *Connects to any other habitat area with a narrow corridor (<100 feet wide) of low or sparse vegetation (< 6 feet high).* LOW

- *Wetland is isolated by development.* LOW

24. Using USFWS Cowardin classification system, indicate the wetland types found in the wetland. (Note: indicate only those wetland classes that are >1/2 acre or >10% of the wetland.)

1. PFO
2. PSS
3. _____
4. _____
5. _____
6. _____

25. Does the wetland include documented habitat for:
- *endangered or threatened plant, fish, or animal species*
- *priority or sensitive species listed with WDW,*
- *listed fish species*
- *regionally significant waterfowl or shorebird concentration*

List species, if known: See PEM Notes.

SUMMARY - HABITAT VALUES

CHARACTERISTIC	LOW	1 pt	MEDIUM	2 pt	HIGH	3 pt
Size (# 1)	0 - 5 acres	1	6 - 20 acres		> 20 acres	
Total from "Summary-Human Impacts" (p. 5)	Low		Medium		High	3
Total from "Summary-Buffers" (p. 6)	Low		Medium	2.5	High	
Total from "Summary-Baseflow Support" (p. __)	Low		Medium		High	
Presence of open water (# 18)	Seasonal open water	0	Permanent water < 1/2 acre or <10% of wetland		Permanent water > 1/2 acre or >10% of wetland	
Interspersion of vegetative classes (# 19)	Simple		Moderate	2	Complex	
Shape of wetland (# 20)	Simple		Moderate	2.5	Complex	
Number of habitat features (# 21)	2 features		3 features	2	4 or more features	
Connection to stream w/ fish (# 22)		0	Seasonal connection		Permanent connection	
Type of corridor (# 23)	Low		Medium	2.5	High	
Number of habitat types (# 24)	2 types	1	3 types		4 or more types	
Documented habitat for... (# 25)		1	Priority or sensitive species; or suspected area for categories in "High"		Endangered/ threatened species; or concentration area for shorebirds or waterfowl	
SUBTOTALS FOR COLUMNS		3		11.5		3
TOTAL				<< 17.5 >>		

LOW (< 18) LOW/MED MEDIUM (18 - 30) HIGH (> 30)

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: RO Wetlands ID #: _____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent habitat value of this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VI: HYDROLOGIC FEATURES

26. Which of the following best describes the location of the wetland within the watershed. (See instructions).

- *low*
- *middle*
- *high*

27. Indicate the general storage capacity and depth of the wetland basin.

- *wetland is generally flat with no depression*
- *wetland is in a slight depression*
- *wetland is a moderate to deep depression*
- *wetland is a deep depression*

28. Indicate which of the following best represents the hydrologic connectivity of the wetland.

- *wetland is adjacent or connected (connection could swale) to permanent stream High*
- *wetland in floodplain of a river or stream High*
- *wetland is adjacent or connected to a seasonal stream Medium*
- *wetland is adjacent or connected to an open freshwater system (such as a lake) Medium*
- *wetland is adjacent or connected to a marine or estuarine system Low*
- *wetland is isolated (there is no surface water connection via channel or flooding) None*

29. Which of the following best describes the water movement through the wetland (excluding flooding)?

- *no visible movement or slow movement*
- *flows fast in center of channel, slow in rest of wetland*
- *fast movement*
- *moderate movement*
- *undetermined*

30. For the predominant vegetation type (emergent or woody vegetation), check the appropriate category for the density of wetland vegetation. Insert the percent of the vegetative cover in the spaces below.

Vegetation type	*Little or sparse cover*	*Moderate Cover*	*Dense Cover*
Emergent	_____	_____	_____
Woody	_____	X	_____

31. Which of the following best describes the aerial cover of vegetation in the wetland?

- *< 30 %*
- *30 - 75 %*
- *> 75 %*

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

32. What is the average slope of the area within 200 feet of the wetland?

- *steep (> 8%)*
- *moderate (3-8%)*
- *low (<3%)*

33. Indicate the type of visible inlet or surface water source.

- *no apparent inlet or surface water source*
- *river or stream*
- *ditch*
- *other (describe)* Precipitation
- *seep or spring*
- *culvert or drainage pipe*
- *undetermined*

34. Indicate the type of outlet.

- *no apparent outlet*
- *culvert or drainage pipe*
- *river or stream*
- *undetermined*
- *ditch*

35. Using geologic maps, soils information, field soil samples, and topographic information, does there appear to be a confining layer such as hardpan, bedrock, etc. below the wetland?

*No*____ *Yes* ✓

Describe source(s) of information: See PEM sheets

36. Is the wetland critical to base flow for any sensitive habitat areas such as: fish bearing stream; estuarine; lake or other wetland?

No ✓ *Yes*____

If yes, identify habitat type: _____

37. Indicate the value of the base flow support provided by the wetland to the habitat identified above.

HIGH	MEDIUM	NONE
• *surface connectivity to sensitive area*	• *subsurface* (see instructions)	• *unknown*
• *within the floodplain with sensitive area*	• *upstream of sensitive area*	maybe some subsurface towards stream, but separated
• *adjacent to sensitive habitat*		

38. Does the wetland which supports the habitat area (identified above) have water flow during the late summer months? (Do not include streams or rivers that are fed by glacial melt.)

No ✓ *Yes*____

39. If the wetland is adjacent to another water body, which of the following best describes the amount of fetch in the adjacent water body? (See instructions to define fetch)

N/A

- *little or no fetch*
- *moderate fetch*
- *long fetch*

SUMMARY - HYDROLOGIC VALUE Continued

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
SUPPORT OF BASE FLOW						
Hydrologic connectivity (Ø 28)	Low	0	Medium		High	
Upstream from what sensitive area (Ø 36)	intermittent stream	0	lake, other wetland		stream w/ fish or estuarine	
Value of base flow support (Ø 37)	Low	1	Medium		High	
SUBTOTALS for columns		1				
TOTAL for Support of Base Flow				<< 1 >>		
SHORELINE STABILIZATION						
Adjacency to open water (Ø 39 & Ø 40) N/A	adjacent to open water w/ little or no fetch; or adjacent to stream w/ scarce or no vegetation		adjacent to open water w/ moderate fetch, scarce woody or dense herb veg; or adjacent to stream w/ scarce veg.		adjacent to open water w/ long fetch and dense woody veg; or adjacent to stream with dense woody veg.	
SEA LEVEL RISE						
If tidally influenced, what is slope of adjacent upland? (Ø 41, N/A	Steep (> 8%)		Moderate (3-8 %)		Low slope (< 3 %)	

SUMMARY - HYDROLOGIC VALUE

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
WATER QUALITY: NUTRIENT AND SEDIMENT TRAPPING						
Size (Ø1)	< 6 acres	1	6 - 20 acres		> 20 acres	
Pollution Impacts (from "Summary of Wetland Impacts, p. 5)	High		Moderate		Low	3
Rate of water movement (Ø 29)	fast		moderate, fast in channel, slow elsewhere		slow or no movement	3
% Vegetation cover (Ø 31)	< 30 %		30 - 75 %	2	> 75 %	
Average slope (Ø 32)	Low (< 3 %)	1	Moderate (3 - 8 %)		Steep (> 8%)	
SUBTOTALS FOR COLUMNS		2		2		6
TOTAL FOR Water Quality: Nutrient and sediment trapping					<< 10 >>	
FLOOD AND STORMWATER ABATEMENT						
Location in watershed and size (Ø 1 & Ø 26)	low in watershed		high & < 20 acres or middle & < 6 acres	2	high & > 20 acres or middle & > 6 acres	
Storage capacity (Ø 1 & Ø 27)	slight depression & <20 acres or flat	1	Mod-deep & <6 acres; or slight depression & 20-40 acres		mod-deep and >6 acres; or slight depression & > 40 acres	
Hydrologic connectivity (Ø 28)	Low	0	Medium		High	
Vegetation density (Ø 30)	mod-sparse emergent or sparse woody		mod-sparse woody or mod-dense emergent	2	dense woody	
SUBTOTALS FOR COLUMNS		1		4		
TOTAL FOR Flood and Stormwater Abatement					<< 5 >>	

SUMMARY OF ALL HYDROLOGIC FUNCTIONS

Mark the appropriate boxes below.

SUMMARIES OF THE HYDROLOGIC FUNCTIONS	LOW	MEDIUM	HIGH
WATER QUALITY	< 7	7 - 9	> 9
FLOOD & STORMWATER ABATEMENT	< 5	5 - 10	> 10
SUPPORT OF BASE FLOW	< 5	5	> 5
SHORELINE STABILIZATION N/A	1	2	3
SEA LEVEL RISE N/A	1	2	3
GROUNDWATER EXCHANGE	• Potential discharge	• Potential recharge	• No exchange • Unknown

Subjective Evaluation:

In your professional opinion, does the apparent hydrologic values of this wetland match the value listed above? If not, describe on a separate sheet. This is the final summary for hydrologic functions.

P40

Wetlands Name: PFO Wetlands ID #: _____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent cultural value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VIII: HERITAGE VALUE OF THE WETLAND

49. Does the wetland include any of the following wetland communities which are relatively undisturbed and have < 25% invasive/exotic species?

NO

- *sphagnum bog or fen*
- *estuarine wetland > 1 acre*
- *mature forested wetland (dominant trees are >80 years old or dominant trees are 50-80 years old and with high structural diversity of trees, shrubs, and herbaceous vegetation).*

50. Is the wetland documented by Natural Heritage as a high quality native wetland site, or does it qualify as a Natural Heritage wetland?

No ✓ Yes ____

51. Is the wetland listed on the National or State Register of Archeological and Historic Sites, or, if not listed, does it have any known archeological features?

No ✓ Yes ____

52. Does the wetland meet recreation needs that are identified in the local jurisdiction's "Parks and Recreation Plan"?

No ✓ Yes ____

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

SUMMARY: HERITAGE VALUE OF THE WETLAND

	LOW	MEDIUM	HIGH	3 pt
Special Wetland Community (#49)	0		(Any of the answers)	
Natural Heritage Wetland (# 50)	0		Yes	
Archeological/historic site (# 51)	0		Yes	
"Park and Rec Plan" (# 52)	0		Yes	
TOTAL FOR HERITAGE VALUE				

Low = 0 Medium = 3 - 6 High = > 6

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

Subjective Evaluation:

In your professional opinion, does the apparent Heritage value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PFO Wetlands ID #: _____ Date: _____

SUMMARY - ALL CATEGORIES

FUNCTION	LOW	MEDIUM	HIGH
Human Impacts to Wetland (p. 5)			X
Buffer around Wetland (p. 6) use sliding scale		X	
Habitat Value (p. 8)	X		
Hydrologic Values (p.15)			
Water Quality			X
Flood & Stormwater Abatement		X	
Support of Base Flow	X		
Shoreline Stabilization N/A			
Sea Level Rise N/A			
Groundwater exchange • Potential recharge • Potential discharge • No exchange • Unknown			
Cultural Value (p. 17) 0			
Heritage Value (p. 19) 0			

NOTES:

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PSS Wetlands ID #: _____ Date: 5/31/95

V. Jackson - ATST

Section III: HUMAN IMPACTS TO WETLAND

8. Indicate the land-uses that occur within 200 feet of the wetland boundary.

- *forest-commercial/harvested*
- *shrub*
- *agricultural-grazed*
- *residential*
- *marine*
- *other* _____
- *forest-uncut*
- *agricultural-cultivated*
- *commercial/industrial*
- *road*
- *protected conservation or natural area*

9. What is the average density of commercial or residential structures within 200 feet of the wetland?

- *high density (>1 building per 2 acres)*
- *medium density (1:2 to 1:10)*
- *low density (<1:10)*

10. Indicate the causes of visible alterations or impacts to the wetland relating to hydrology.

HYDROLOGY

- *dredging* _____
- *damming* _____
- *diking* _____
- *other* _____
- *drainage ditches/diversions* Some ditches, but ineffective
- *blocked outlets/inlets* _____
- *roads* along perimeter

11. From the listing above, summarize the overall extent of impact due to hydrologic alterations.

- *extensive*
- *moderate*
- *minimal*
- *unknown*

12. Indicate the causes of visible alterations or impacts to the wetland due to other human uses.

OTHER HUMAN IMPACTS

- *logging* _____
- *filter* _____
- *peat extraction* _____
- *structures* _____
- *sedimentation* from adjacent Ag.
- *other* _____
- *grazing* Grazing in past, but not presently
- *filling* _____
- *crop production* Hay
- *recreational overuse* _____
- *road run-off* _____

13. From the listing above, summarize the overall extent of impacts from human use other than hydrology.

- *extensive*
- *moderate*
- *minimal*
- *unknown*

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

14. What invasive or exotic species are present within the wetland?
(See instructions for an expanded species list.)

- *No invasive or exotic species*
- *Purple loosestrife*
- *Orchard grass*
- *Ranunculus repens*
- *Reed canary grass*
- *Himalayan blackberry*
- *Russian olive*
- *Other* _____
- *Juncus effusus*
- *Spartina*
- *Other Pasture Grasses*
- *Other* _____

15. Total percent cover by all exotics:

- *> 50%*
- *10-50%*
- *< 10% or dominated by native plant community*

16. Is there evidence of any pollution or sediment inputs to the wetland which would affect the water quality of the wetland (i.e. agricultural practices, road run-off, logging, etc.)?

- *No*
- *Probable inputs* pot inputs include sedimentation + nutrients from cattle
- *No known inputs*
- *Visible inputs* _____
- *Undetermined*

SUMMARY - HUMAN IMPACTS TO WETLAND

	Extent of Impact					
	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
Hydrologic Alterations (Question # 11)	extensive		moderate	2	minimal	
Other Impacts (# 13)	extensive		moderate	2	minimal	
Presence of exotics (# 15)	> 50 %	1	10 - 50 %		< 10 %	
Evidence of pollution (#16)	>3 possible or any visible		2-3 prob/ no visible	2	<1 prob or no visible	
Subtotals		1		6		
TOTAL				<< 7 >>		

LOW = < 6 MEDIUM = 6 - 8 HIGH = > 8

Enter High, Medium, or Low in "Summary of all Functions" at the end of this report, Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PSS Wetlands ID #:_____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent human impacts to this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section IV: BUFFER AROUND THE WETLAND

17. Indicate the categories that best describe the wetlands buffer. If more than one category applies, average them and insert the averaged "value" in the block below. Additionally, an adjustment should be made to the assigned "value" if the on the ground conditions do not match the descriptions given below.

Forest, scrub, native grasslands or open water buffers that are at least 100 feet around 95 % of the circumference. HIGH

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/2 of the wetland circumference, or
forest, scrub, grasslands or open water buffer wider than 50 feet around 95 % of the circumference.
HIGH-MEDIUM Buffered by shrub in most areas, but also agri fields & roads

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/4 of the wetland circumference, or
forest, scrub, ~~grasslands or~~ open water buffer wider than 50 feet for more than 1/2 of the wetland circumference. MEDIUM-LOW

No roads, buildings or paved areas within 100 feet of the wetlands for more than 95 % of the wetlands circumference. HIGH-LOW

No roads, buildings or paved areas within 25 feet of the wetlands for more than 95 % of the wetlands circumference or
no roads, buildings or paved areas within 50 feet of the wetlands for more than 1/2 of the wetlands circumference. LOW

Paved areas, industrial areas or residential construction (with less than 50 feet between houses) are less than 25 feet from the wetland for more than 95 % of the circumference of the wetland.
MINIMAL TO NO BUFFER

SUMMARY - BUFFER AROUND WETLAND

LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH

Enter the "value" here and in the "Summary of all Functions" at the end of this report, Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

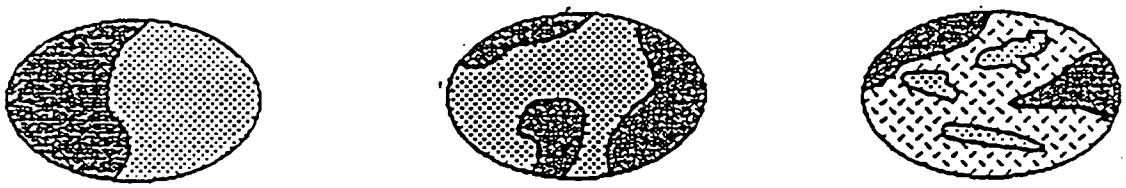
Wetlands Name:_____ Wetlands ID #:_____ Date: _____

Section V: HABITAT VALUE

18. Indicate which of the following best describes the presence of open water in the wetland. (Note: only indicate if open water is >1/2 acre or >10% of the wetland.)

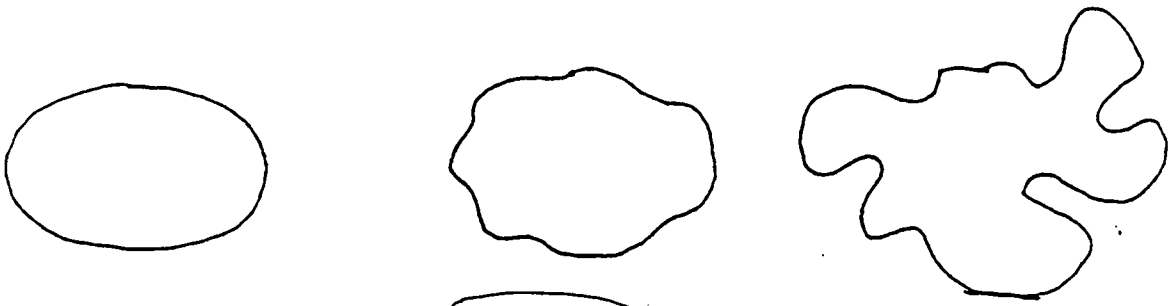
- *no open water*
- *seasonal open water*
- *permanent open water < 1/2 acre or < 10% of wetland*
- *permanent open water > 1/2 acre or > 10% of wetland*

19. Which of the following best represents the interspersion (number and distribution) of wetland classes (including open water) within the wetland? (Note: only indicate wetland classes that are >1/2 acre or >10% of the wetland.)



SIMPLE *MODERATE* *COMPLEX*

20. Which of the following best represents the shape of the wetland edge?



SIMPLE *MODERATE* *COMPLEX*

21. How many of the following habitat features does the wetland have? (Circle all that apply)

- *snags*
- *islands*
- *beaver lodges or current evidence of use by beavers*
- *eel grass and/or kelp beds*
- *fallen logs*
- *Heron rookery within 300 feet*
- *perches/mature trees* shrub & small trees in fields used by raptors
- *raptor nest within 300 feet*
- *other* _____

TOTAL NUMBER of types 1

Washington State Department of Ecology

WETLANDS CHARACTERIZATION

Wetlands Name: PBS Wetlands ID #: _____ Date: _____

22. Indicate the river/stream connection relative to fish.

- *Wetland provides fish habitat at any time of year and has a perennial surface water connection to a fish bearing stream.*
- *Wetland provides fish habitat seasonally and has a seasonal connection to a fish bearing stream.*
- *No connection for fish.*

23. Indicate the type of connection this wetland has to other habitat areas. Insert the value associated with the connection in the Summary provided below?

- *Connects to a riparian corridor at least 100 feet wide which connects two or more wetlands, or there is an upland connection present > 100 feet wide with good forest or shrub cover (> 25 %) connecting it with a Significant Habitat Area.* HIGH

- *Connects to another habitat area with either a forested/shrub corridor . ~~100 feet wide~~ or a corridor that is > 100 feet wide but has low vegetation cover less than 6 feet in height.* MEDIUM
  Connected or located near stream, but cover is primarily grasses or distance between WL + corridor is long grass
- *Connects to, or is part of a riparian corridor between 50 - 100 feet wide with scrub/shrub cover or forest cover connecting to other wetlands.* MEDIUM

- *Connects to any other habitat area with a narrow corridor (<100 feet wide) of low or sparse vegetation (< 6 feet high).* LOW

- *Wetland is isolated by development.* LOW

24. Using USFWS Cowardin classification system, indicate the wetland types found in the wetland. (Note: indicate only those wetland classes that are >1/2 acre or >10% of the wetland.)

1. PEM
2. PSS
3. _____
4. _____
5. _____
6. _____

25. Does the wetland include documented habitat for:
- *endangered or threatened plant, fish, or animal species*
- *priority or sensitive species listed with WDW,*
- *listed fish species*
- *regionally significant waterfowl or shorebird concentration*

List species, if known: See Note for PEM wetlands

SUMMARY - HABITAT VALUES

CHARACTERISTIC	LOW	1 pt	MEDIUM	2 pt	HIGH	3 pt
Size (# 1)	0 - 5 acres		6 - 20 acres	2	> 20 acres	
Total from "Summary-Human Impacts" (p. 5)	Low		Medium	2	High	
Total from "Summary-Buffers" (p. 6)	Low		Medium	2.5	High	
Total from "Summary-Baseflow Support" (p. __)	Low		Medium		High	
Presence of open water (# 18)	Seasonal open water	0	Permanent water < 1/2 acre or <10% of wetland		Permanent water > 1/2 acre or >10% of wetland	
Interspersion of vegetative classes (# 19)	Simple		Moderate	2	Complex	
Shape of wetland (# 20)	Simple		Moderate	2	Complex	
Number of habitat features (# 21)	2 features 1 feature	0	3 features		4 or more features	
Connection to stream w/ fish (# 22)		0	Seasonal connection		Permanent connection	
Type of corridor (# 23)	Low		Medium	2	High	
Number of habitat types (# 24)	2 types	2	3 types		4 or more types	
Documented habitat for... (# 25)			Priority or sensitive species; or suspected area for categories in "High"	2	Endangered/ threatened species; or concentration area for shorebirds or waterfowl	
SUBTOTALS FOR COLUMNS		2		14.5		
TOTAL				<< 16.5 >>		

LOW (< 18) MEDIUM (18 - 30) HIGH (> 30)

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PBS Wetlands ID #: _____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent habitat value of this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VI: HYDROLOGIC FEATURES

26. Which of the following best describes the location of the wetland within the watershed. (See instructions).

- low
- middle
- high

Locations range from high to middle of WS.

27. Indicate the general storage capacity and depth of the wetland basin.

- wetland is generally flat with no depression
- wetland is a moderate to deep depression
- wetland is in a slight depression
- wetland is a deep depression

28. Indicate which of the following best represents the hydrologic connectivity of the wetland.

- wetland is adjacent or connected (connection could swale) to permanent stream High
- wetland in floodplain of a river or stream High
- wetland is adjacent or connected to a seasonal stream Medium
- wetland is adjacent or connected to an open freshwater system (such as a lake) Medium
- wetland is adjacent or connected to a marine or estuarine system Low
- wetland is isolated (there is no surface water connection via channel or flooding) None

some indirectly

29. Which of the following best describes the water movement through the wetland (excluding flooding)?

- no visible movement or slow movement
- fast movement
- undetermined
- flows fast in center of channel, slow in rest of wetland
- moderate movement

30. For the predominant vegetation type (emergent or woody vegetation), check the appropriate category for the density of wetland vegetation. Insert the percent of the vegetative cover in the spaces below.

Vegetation type	Little or sparse cover	Moderate Cover	Dense Cover
Emergent	_____	_____	✓ _____
Woody	_____	✓ _____	_____

31. Which of the following best describes the aerial cover of vegetation in the wetland?

- < 30 %
- 30 - 75 %
- > 75 %

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

32. What is the average slope of the area within 200 feet of the wetland?

- *steep (> 8%)*
- *moderate (3-8%)*
- *low (<3%)*

33. Indicate the type of visible inlet or surface water source.

- *no apparent inlet or surface water source*
- *river or stream*
- *ditch*
- *other (describe)* direct precipitation / High H_2O table
- *seep or spring*
- *culvert or drainage pipe*
- *undetermined*

34. Indicate the type of outlet.

- *no apparent outlet*
- *culvert or drainage pipe*
- *river or stream*
- *undetermined*
- *ditch*

Some wl imm. adjacent to Stream, others connected via Roadside ditches.

35. Using geologic maps, soils information, field soil samples, and topographic information, does there appear to be a confining layer such as hardpan, bedrock, etc. below the wetland?

*No*____ *Yes* ✓ Some wetlands ~~are~~ have silt/clay layer below others have sand.
Describe source(s) of information: _____

36. Is the wetland critical to base flow for any sensitive habitat areas such as: fish bearing stream; estuarine; lake or other wetland?

No ✓ *Yes*____
If yes, identify habitat type: _____

37. Indicate the value of the base flow support provided by the wetland to the habitat identified above.

HIGH

- *surface connectivity to sensitive area*
- *within the floodplain with sensitive area*
- *adjacent to sensitive habitat*

MEDIUM

- *subsurface* (see instructions)
- *upstream of sensitive area*

NONE

- *unknown*

38. Does the wetland which supports the habitat area (identified above) have water flow during the late summer months? (Do not include streams or rivers that are fed by glacial melt.)

No ✓ *Yes*____

39. If the wetland is adjacent to another water body, which of the following best describes the amount of fetch in the adjacent water body? (See instructions to define fetch)

N/A

- *little or no fetch*
- *moderate fetch*
- *long fetch*

SUMMARY - HYDROLOGIC VALUE

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
WATER QUALITY: NUTRIENT AND SEDIMENT TRAPPING						
Size (Ø1)	< 6 acres		6 - 20 acres	2	> 20 acres	
Pollution Impacts (from "Summary of Wetland Impacts, p. 5)	High		Moderate	2	Low	
Rate of water movement (Ø 29)	fast		moderate, fast in channel, slow elsewhere		slow or no movement	3
% Vegetation cover (Ø 31)	< 30 %		30 - 75 %		> 75 %	3
Average slope (Ø 32)	Low (< 3 %)	1	Moderate (3 - 8 %)		Steep (> 8%)	
SUBTOTALS FOR COLUMNS		1		4		6
TOTAL FOR Water Quality: Nutrient and sediment trapping					<< 11 >>	
FLOOD AND STORMWATER ABATEMENT						
Location in watershed and size (Ø 1 & Ø 26)	low in watershed		high & < 20 acres or middle & < 6 acres	2	high & > 20 acres or middle & > 6 acres	
Storage capacity (Ø 1 & Ø 27)	slight depression & <20 acres or flat	1	Mod-deep & <6 acres; or slight depression & 20-40 acres		mod-deep and >6 acres; or slight depression & > 40 acres	
Hydrologic connectivity (Ø 28)	Low		Medium	2	High	
Vegetation density (Ø 30)	mod-sparse emergent or sparse woody		mod-sparse woody or mod-dense emergent	2	dense woody	
SUBTOTALS FOR COLUMNS		1		6		
TOTAL FOR Flood and Stormwater Abatement					<< 7 >>	

SUMMARY - HYDROLOGIC VALUE Continued

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
SUPPORT OF BASE FLOW						
Hydrologic connectivity (Ø 28)	Low		Medium	2	High	
Upstream from what sensitive area (Ø 36)	intermittent stream	1	lake, other wetland		stream w/ fish or estuarine	
Value of base flow support (Ø 37)	Low		Medium	2	High	
SUBTOTALS for columns		1		4		
TOTAL for Support of Base Flow				<< 5 >>		
SHORELINE STABILIZATION						
Adjacency to open water (Ø 39 & Ø 40) N/A	adjacent to open water w/ little or no fetch; or adjacent to stream w/ scarce or no vegetation		adjacent to open water w/ moderate fetch, scarce woody or dense herb veg; or adjacent to stream w/ scarce veg.		adjacent to open water w/ long fetch and dense woody veg; or adjacent to stream with dense woody veg.	
SEA LEVEL RISE						
If tidally influenced, what is slope of adjacent upland? (Ø 41,	Steep (> 8%) N/A		Moderate (3-8 %)		Low slope (< 3 %)	

SUMMARY OF ALL HYDROLOGIC FUNCTIONS

Mark the appropriate boxes below.

SUMMARIES OF THE HYDROLOGIC FUNCTIONS	LOW	MEDIUM	HIGH
WATER QUALITY	< 7	7 - 9	> 9
FLOOD & STORMWATER ABATEMENT	< 5	5 - 10	> 10
SUPPORT OF BASE FLOW	< 5	5	> 5
SHORELINE STABILIZATION N/A	1	2	3
SEA LEVEL RISE N/A	1	2	3
GROUNDWATER EXCHANGE	• Potential discharge	• Potential recharge	• No exchange • Unknown

unknown, but some wetlands have sandy subsoil + may have potential recharge values.

Subjective Evaluation:

In your professional opinion, does the apparent hydrologic values of this wetland match the value listed above? If not, describe on a separate sheet. This is the final summary for hydrologic functions.

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent cultural value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VIII: HERITAGE VALUE OF THE WETLAND

49. Does the wetland include any of the following wetland communities which are relatively undisturbed and have < 25% invasive/exotic species?

NO

- *sphagnum bog or fen*
- *estuarine wetland > 1 acre*
- *mature forested wetland (dominant trees are >80 years old or dominant trees are 50-80 years old and with high structural diversity of trees, shrubs, and herbaceous vegetation).*

50. Is the wetland documented by Natural Heritage as a high quality native wetland site, or does it qualify as a Natural Heritage wetland?

*No*____ *Yes*____

51. Is the wetland listed on the National or State Register of Archeological and Historic Sites, or, if not listed, does it have any known archeological features?

*No*____ *Yes*____

52. Does the wetland meet recreation needs that are identified in the local jurisdiction's "Parks and Recreation Plan"?

*No*____ *Yes*____

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PSO Wetlands ID #: _____ Date: _____

SUMMARY: HERITAGE VALUE OF THE WETLAND

	LOW	MEDIUM	HIGH	3 pt
Special Wetland Community (#49)	0		(Any of the answers)	
Natural Heritage Wetland (# 50)	0		Yes	
Archeological/historic site (# 51)	0		Yes	
"Park and Rec Plan" (# 52)	0		Yes	
TOTAL FOR HERITAGE VALUE				

Low = 0 Medium = 3 - 6 High = > 6

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

Subjective Evaluation:

In your professional opinion, does the apparent Heritage value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Washington State Department of Ecology

WETLANDS CHARACTERIZATION

Wetlands Name: PGS Wetlands ID #: _____ Date: _____

SUMMARY - ALL CATEGORIES

FUNCTION	LOW	MEDIUM	HIGH
Human Impacts to Wetland (p. 5)		X	
Buffer around Wetland (p. 6) use sliding scale			X
Habitat Value (p. 8)		X	
Hydrologic Values (p.15)			
Water Quality			X
Flood & Stormwater Abatement		X	
Support of Base Flow		X	
Shoreline Stabilization N/A			
Sea Level Rise N/A			
Groundwater exchange • Potential recharge • Potential discharge • No exchange • Unknown			
Cultural Value (p. 17)	X		
Heritage Value (p. 19)	X		

NOTES:

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PEM Wetlands ID #: _____ Date: 5/31/95

V. Jackson ATSI

Section III: HUMAN IMPACTS TO WETLAND

8. Indicate the land-uses that occur within 200 feet of the wetland boundary.

- *forest-commercial/harvested*
- *shrub*
- *agricultural-grazed*
- *residential*
- *marine*
- *other* _____
- *forest-uncut*
- (•) *agricultural-cultivated* Hay
- *commercial/industrial*
- *road*
- *protected conservation or natural area*

9. What is the average density of commercial or residential structures within 200 feet of the wetland?

- *high density (>1 building per 2 acres)*
- *medium density (1:2 to 1:10)*
- (•) *low density (<1:10)*

10. Indicate the causes of visible alterations or impacts to the wetland relating to hydrology.

HYDROLOGY

- *dredging* _____
- *damming* _____
- *diking* _____
- *other* _____
- (•) *drainage ditches/diversions* Ditch along Henry Rd intercepts surface + subsurface drainage
- *blocked outlets/inlets* _____
- *roads* _____

11. From the listing above, summarize the overall extent of impact due to hydrologic alterations.

- *extensive*
- (•) *moderate*
- *minimal*
- *unknown*

12. Indicate the causes of visible alterations or impacts to the wetland due to other human uses.

OTHER HUMAN IMPACTS

- *logging* _____
- *litter* _____
- *peat extraction* _____
- *structures* _____
- *sedimentation* _____
- *other* _____
- *grazing* _____
- *filling* _____
- (•) *crop production* Hay
- *recreational overuse* _____
- *road run-off* _____

13. From the listing above, summarize the overall extent of impacts from human use other than hydrology.

- *extensive*
- (•) *moderate*
- *minimal*
- *unknown*

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

14. What invasive or exotic species are present within the wetland?
(See instructions for an expanded species list.)

- *No invasive or exotic species*
- *Purple loosestrife*
- *Orchard grass*
- *Ranunculus repens*
- *Reed canary grass*
- *Himalayan blackberry*
- *Russian olive*
- *Other* _____
- *Juncus effusus*
- *Spartina*
- *Other Pasture Grasses*
- *Other* _____

Dominated by non-native or invasive species.

15. Total percent cover by all exotics:

- *> 50%*
- *10-50%*
- *< 10% or dominated by native plant community*

16. Is there evidence of any pollution or sediment inputs to the wetland which would affect the water quality of the wetland (i.e. agricultural practices, road run-off, logging, etc.)?

- *No*
- *No known inputs*
- *Undetermined*
- *Probable inputs* Sediment from Agricultural practices.
- *Visible inputs* _____

SUMMARY - HUMAN IMPACTS TO WETLAND

	Extent of Impact					
	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
Hydrologic Alterations (Question # 11)	extensive		moderate	X	minimal	
Other Impacts (# 13)	extensive		moderate	X	minimal	
Presence of exotics (# 15)	> 50 %	X	10 - 50 %		< 10 %	
Evidence of pollution (#16)	>3 possible or any visible		2-3 prob/ no visible	X	<1 prob or no visible	
Subtotals						
TOTAL				<< 7 >>		

LOW = < 6 MEDIUM = 6 - 8 HIGH = > 8

Enter High, Medium, or Low in "Summary of all Functions" at the end of this report, Page 20.

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name: PEM Wetlands ID #: _____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent human impacts to this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Human impact appears to be higher than indicated - no native veg. present, Hydrology altered.

Section IV: BUFFER AROUND THE WETLAND

17. Indicate the categories that best describe the wetlands buffer. If more than one category applies, average them and insert the averaged "value" in the block below. Additionally, an adjustment should be made to the assigned "value" if the on the ground conditions do not match the descriptions given below.

Forest, scrub, native grasslands or open water buffers that are at least 100 feet around 95 % of the circumference. HIGH

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/2 of the wetland circumference, or
forest, scrub, grasslands or open water buffer wider than 50 feet around 95 % of the circumference. HIGH-MEDIUM

Forest, scrub, native grassland or open water buffers wider than 100 feet for more than 1/4 of the wetland circumference, or
forest, scrub, ~~grasslands or~~ open water buffer wider than 50 feet for more than 1/2 of the wetland circumference. MEDIUM-LOW

No roads, buildings or ~~paved areas~~ within 100 feet of the wetlands for more than 95 % of the wetlands circumference. HIGH-LOW

No roads, buildings or paved areas within 25 feet of the wetlands for more than 95 % of the wetlands circumference or
no roads, buildings or paved areas within 50 feet of the wetlands for more than 1/2 of the wetlands circumference. LOW

Paved areas, industrial areas or residential construction (with less than 50 feet between houses) are less than 25 feet from the wetland for more than 95 % of the circumference of the wetland. MINIMAL TO NO BUFFER

SUMMARY - BUFFER AROUND WETLAND

High Low

LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
X				

Enter the "value" here and in the "Summary of all Functions" at the end of this report, Page 20.

Buffered by mowed agricultural land. >100 ft. wide.

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

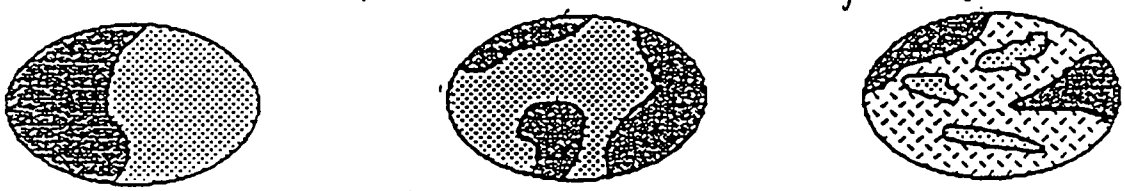
Section V: HABITAT VALUE

18. Indicate which of the following best describes the presence of open water in the wetland. (Note: only indicate if open water is >1/2 acre or >10% of the wetland.)

- *no open water*
- *seasonal open water*
- *permanent open water < 1/2 acre or < 10% of wetland*
- *permanent open water > 1/2 acre or > 10% of wetland*

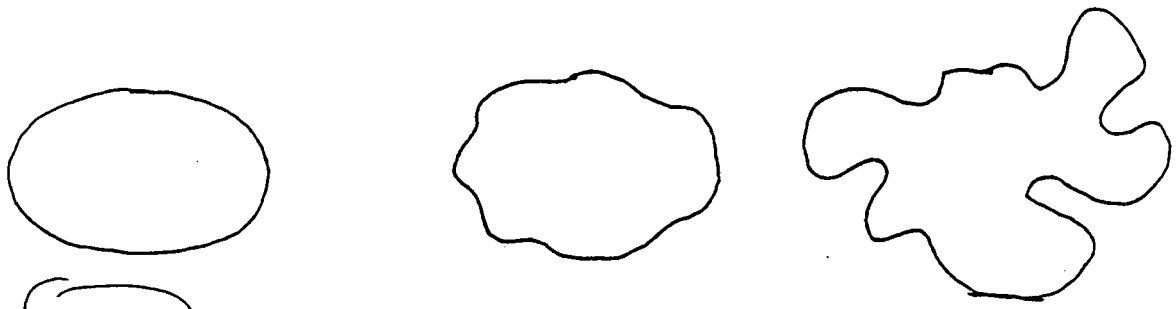
19. Which of the following best represents the interspersion (number and distribution) of wetland classes (including open water) within the wetland? (Note: only indicate wetland classes that are >1/2 acre or >10% of the wetland.)

There is No interspersion because there is a only a single wetland Class present.



SIMPLE *MODERATE* *COMPLEX*

20. Which of the following best represents the shape of the wetland edge?



SIMPLE *MODERATE* *COMPLEX*

21. How many of the following habitat features does the wetland have? (Circle all that apply)

- *snags*
- *islands*
- *beaver lodges or current evidence of use by beavers*
- *eel grass and/or kelp beds*
- *fallen logs*
- *heron rookery within 300 feet*
- *perches/mature trees*
- *raptor nest within 300 feet*
- *other* _____

TOTAL NUMBER of types None

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

22. Indicate the river/stream connection relative to fish.

- *Wetland provides fish habitat at any time of year and has a perennial surface water connection to a fish bearing stream.*
- *Wetland provides fish habitat seasonally and has a seasonal connection to a fish bearing stream.*
- *No connection for fish.*

23. Indicate the type of connection this wetland has to other habitat areas.
Insert the value associated with the connection in the Summary provided below?

- *Connects to a riparian corridor at least 100 feet wide which connects two or more wetlands, or there is an upland connection present > 100 feet wide with good forest or shrub cover (> 25 %) connecting it with a Significant Habitat Area.* HIGH

- *Connects to another habitat area with either a forested/shrub corridor . ~~100 feet wide~~ or a corridor that is > 100 feet wide but has low vegetation cover less than 6 feet in height.* MEDIUM

- *Connects to, or is part of a riparian corridor between 50 - 100 feet wide with scrub/shrub cover or forest cover connecting to other wetlands.* MEDIUM

- *Connects to any other habitat area with a narrow corridor (<100 feet wide) of low or sparse vegetation (< 6 feet high).* LOW

- *Wetland is isolated by development.* LOW

24. Using USFWS Cowardin classification system, indicate the wetland types found in the wetland. (Note: indicate only those wetland classes that are >1/2 acre or >10% of the wetland.)

1. PEM
2. _____
3. _____
4. _____
5. _____
6. _____

25. Does the wetland include documented habitat for:
- *endangered or threatened plant, fish, or animal species*
- *priority or sensitive species listed with WDW,*
- *listed fish species*
- *regionally significant waterfowl or shorebird concentration*

List species, if known: The parcel is located within documented Breeding Territories of Bald eagles + winter habitat for peregrin falcons. However, these wetlands do not provide habitat types that would be directly used by either species, but may be used by waterfowl

SUMMARY - HABITAT VALUES

CHARACTERISTIC	LOW	1 pt	MEDIUM	2 pt	HIGH	3 pt
Size (# 1)	0 - 5 acres	X1	6 - 20 acres		> 20 acres	
Total from "Summary-Human Impacts" (p. 5)	Low	1.5	Medium		High	
Total from "Summary-Buffers" (p. 6)	Low	1.5	Medium		High	
Total from "Summary-Baseflow Support" (p. __)	Low	0	Medium		High	
Presence of open water (# 18)	Seasonal open water	0	Permanent water < 1/2 acre or <10% of wetland		Permanent water > 1/2 acre or >10% of wetland	
Interspersion of vegetative classes (# 19)	Simple	0	Moderate		Complex	
Shape of wetland (# 20)	Simple	1	Moderate		Complex	
Number of habitat features (# 21)	2 features	0	3 features		4 or more features	
Connection to stream w/ fish (# 22)		0	Seasonal connection		Permanent connection	
Type of corridor (# 23)	Low		Medium	2	High	
Number of habitat types (# 24)	2 types 1 type	0	3 types		4 or more types	
Documented habitat for... (# 25)			Priority or sensitive species; or suspected area for categories in "High"	2	Endangered/ threatened species; or concentration area for shorebirds or waterfowl	
SUBTOTALS FOR COLUMNS		5		4		
TOTAL				<< 9 >>		

LOW (< 18) MEDIUM (18 - 30) HIGH (> 30)

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

RM

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent habitat value of this wetland match the value listed above? If not, describe on a separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VI: HYDROLOGIC FEATURES

26. Which of the following best describes the location of the wetland within the watershed. (See instructions).

- *low*
- *middle* but isolated
- *high*

27. Indicate the general storage capacity and depth of the wetland basin.

- *wetland is generally flat with no depression*
- *wetland is a moderate to deep depression*
- *wetland is in a slight depression*
- *~~wetland is a deep depression~~*

28. Indicate which of the following best represents the hydrologic connectivity of the wetland.

- *wetland is adjacent or connected (connection could swale) to permanent stream* High
- *wetland in floodplain of a river or stream* High
- *wetland is adjacent or connected to a seasonal stream* Medium
- *wetland is adjacent or connected to an open freshwater system (such as a lake)* Medium
- *wetland is adjacent or connected to a marine or estuarine system* Low
- *wetland is isolated (there is no surface water connection via channel or flooding)* None

29. Which of the following best describes the water movement through the wetland (excluding flooding)?

- *no visible movement or slow movement*
- *flows fast in center of channel, slow in rest of wetland*
- *fast movement*
- *moderate movement*
- *undetermined*

30. For the predominant vegetation type (emergent or woody vegetation), check the appropriate category for the density of wetland vegetation. Insert the percent of the vegetative cover in the spaces below.

Vegetation type	*Little or sparse cover*	*Moderate Cover*	*Dense Cover*
Emergent	_____	X	_____
Woody	_____	_____	_____

31. Which of the following best describes the aerial cover of vegetation in the wetland?

- *< 30 %*
- *30 - 75 %*
- *> 75 %*

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

32. What is the average slope of the area within 200 feet of the wetland?

- *steep (> 8%)*
- *moderate (3-8%)*
- *low (<3%)*

33. Indicate the type of visible inlet or surface water source.

- *no apparent inlet or surface water source*
- *river or stream*
- *ditch*
- *seep or spring*
- *culvert or drainage pipe*
- *undetermined*
- *other (describe)* precipitation + perched High H_2O table.

34. Indicate the type of outlet.

- *no apparent outlet*
- *culvert or drainage pipe*
- *river or stream*
- *undetermined*
- *ditch*

35. Using geologic maps, soils information, field soil samples, and topographic information, does there appear to be a confining layer such as hardpan, bedrock, etc. below the wetland?
dense silt layer + Clay

*No*____ *Yes* ✓
Describe source(s) of information: SCS data, field data.

36. Is the wetland critical to base flow for any sensitive habitat areas such as: fish bearing stream; estuarine; lake or other wetland?

No ✓ *Yes*____
If yes, identify habitat type: _____

37. Indicate the value of the base flow support provided by the wetland to the habitat identified above.

HIGH

- *surface connectivity to sensitive area*
- *within the floodplain with sensitive area*
- *adjacent to sensitive habitat*

MEDIUM

- *subsurface* (see instructions)
- *upstream of sensitive area*

NONE

- *unknown*

38. Does the wetland which supports the habitat area (identified above) have water flow during the late summer months? (Do not include streams or rivers that are fed by glacial melt.)

No ✓ *Yes*____

39. If the wetland is adjacent to another water body, which of the following best describes the amount of fetch in the adjacent water body? (See instructions to define fetch)

N/A

- *little or no fetch*
- *moderate fetch*
- *long fetch*

SUMMARY - HYDROLOGIC VALUE

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
WATER QUALITY: NUTRIENT AND SEDIMENT TRAPPING						
Size (Ø1)	< 6 acres	1	6 - 20 acres		> 20 acres	
Pollution Impacts (from "Summary of Wetland Impacts, p. 5)	High		Moderate	2	Low	
Rate of water movement (Ø 29)	fast		moderate, fast in channel, slow elsewhere		slow or no movement	3
% Vegetation cover (Ø 31)	< 30 %		30 - 75 %	2	> 75 %	
Average slope (Ø 32)	Low (< 3 %)	1	Moderate (3 - 8 %)		Steep (> 8%)	
SUBTOTALS FOR COLUMNS		2		4		3
TOTAL FOR Water Quality: Nutrient and sediment trapping				<< 9 >>		
FLOOD AND STORMWATER ABATEMENT						
Location in watershed and size (Ø 1 & Ø 26)	low in watershed		high & < 20 acres or middle & < 6 acres	2	high & > 20 acres or middle & > 6 acres	
Storage capacity (Ø 1 & Ø 27)	slight depression & <20 acres or flat	1	Mod-deep & <6 acres; or slight depression & 20-40 acres		mod-deep and >6 acres; or slight depression & > 40 acres	
Hydrologic connectivity (Ø 28)	Low	0	Medium		High	
Vegetation density (Ø 30)	mod-sparse emergent or sparse woody	1	mod-sparse woody or mod-dense emergent		dense woody	
SUBTOTALS FOR COLUMNS		2		2		
TOTAL FOR Flood and Stormwater Abatement				<< 4 >>		

SUMMARY - HYDROLOGIC VALUE Continued

	LOW	1 pt	MEDIUM	2 pts	HIGH	3 pts
SUPPORT OF BASE FLOW						
Hydrologic connectivity (Ø 28)	Low	0	Medium		High	
Upstream from what sensitive area (Ø 36)	Intermittent stream	0	lake, other wetland		stream w/ fish or estuarine	
Value of base flow support (Ø 37)	Low	0	Medium		High	
SUBTOTALS for columns		0				
TOTAL for Support of Base Flow				<< ___ ___ >>		
SHORELINE STABILIZATION						
Adjacency to open water (Ø 39 & Ø 40) N/A	adjacent to open water w/ little or no fetch; or adjacent to stream w/ scarce or no vegetation		adjacent to open water w/ moderate fetch, scarce woody or dense herb veg; or adjacent to stream w/ scarce veg.		adjacent to open water w/ long fetch and dense woody veg; or adjacent to stream with dense woody veg.	
SEA LEVEL RISE						
If tidally influenced, what is slope of adjacent upland? (Ø 41,	Steep (> 8%) N/A		Moderate (3-8 %)		Low slope (< 3 %)	

SUMMARY OF ALL HYDROLOGIC FUNCTIONS

Mark the appropriate boxes below.

SUMMARIES OF THE HYDROLOGIC FUNCTIONS	LOW	MEDIUM	HIGH
WATER QUALITY	< 7	7 - 9	> 9
FLOOD & STORMWATER ABATEMENT	< 5	5 - 10	> 10
SUPPORT OF BASE FLOW	< 5	5	> 5
SHORELINE STABILIZATION N/A	1	2	3
SEA LEVEL RISE N/A	1	2	3
GROUNDWATER EXCHANGE	• Potential discharge	• Potential recharge • No exchange	• Unknown

Subjective Evaluation:

In your professional opinion, does the apparent hydrologic values of this wetland match the value listed above? If not, describe on a separate sheet. This is the final summary for hydrologic functions.

PEM

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

SUMMARY: HERITAGE VALUE OF THE WETLAND

	LOW	MEDIUM	HIGH	3 pt
Special Wetland Community (#49)	0		(Any of the answers)	
Natural Heritage Wetland (# 50)	0		Yes	
Archeological/historic site (# 51)	0		Yes	
"Park and Rec Plan" (# 52)	0		Yes	
TOTAL FOR HERITAGE VALUE				

Low = 0 Medium = 3-6 High = > 6

Enter High, Medium or Low in the "Summary of all Functions" at the end of this report on Page 20.

Subjective Evaluation:

In your professional opinion, does the apparent Heritage value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

Subjective Evaluation:

In your professional opinion, does the apparent cultural value of this wetland match the value listed above? If not, describe on separate sheet and adjust the value when inserting it into the "Summary of all Function" on Page 20.

Section VIII: HERITAGE VALUE OF THE WETLAND

49. Does the wetland include any of the following wetland communities which are relatively undisturbed and have < 25% invasive/exotic species?

NO

- *sphagnum bog or fen*
- *estuarine wetland > 1 acre*
- *mature forested wetland (dominant trees are >80 years old or dominant trees are 50-80 years old and with high structural diversity of trees, shrubs, and herbaceous vegetation).*

50. Is the wetland documented by Natural Heritage as a high quality native wetland site, or does it qualify as a Natural Heritage wetland?

No ✓ *Yes*____

51. Is the wetland listed on the National or State Register of Archeological and Historic Sites, or, if not listed, does it have any known archeological features?

No ✓ *Yes*____

52. Does the wetland meet recreation needs that are identified in the local jurisdiction's "Parks and Recreation Plan"?

No ✓ *Yes*____

PEM

Washington State Department of Ecology WETLANDS CHARACTERIZATION

Wetlands Name:_____ Wetlands ID #:_____ Date: _____

SUMMARY - ALL CATEGORIES

FUNCTION	LOW	MEDIUM	HIGH
Human Impacts to Wetland (p. 5)	X		
Buffer around Wetland (p. 6) use sliding scale	X		
Habitat Value (p. 8)	X		
Hydrologic Values (p.15)			
Water Quality		X	
Flood & Stormwater Abatement	X		
Support of Base Flow	X		
Shoreline Stabilization	N/A		
Sea Level Rise	N/A		
Groundwater exchange • Potential recharge • Potential discharge • No exchange • Unknown			
Cultural Value (p. 17)	X		
Heritage Value (p. 19)	X		

NOTES: These wetlands have been impacted by continuous farming practices for over 50 yrs. The primary wildlife value is as a winter foraging area for waterfowl + raptors, which does not value in wetlands, but in open agricultural area. Hydrological values limited by agricultural uses + small isolated nature of wetlands. There is no documented cultural or Heritage values associated with these wetlands. The interaction of the ground water is unknown, but little interaction is suspected based on the silty-clay subsoils underlying wetlands.

Appendix D:
Wetlands Rating Field Form

WETLANDS RATING FIELD DATA FORM

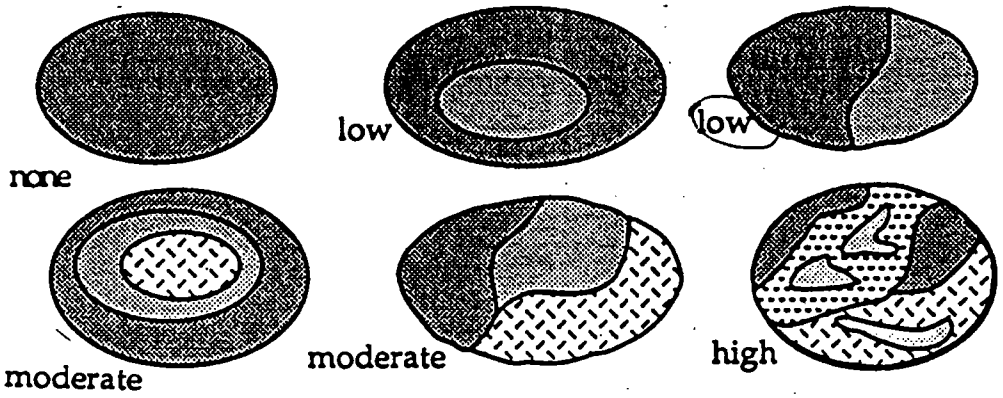
BACKGROUND INFORMATION:
Name of Rater: V Jackson Affiliation: ATSI
Date: _____
Name of wetland (if known): PFO
Government Jurisdiction of wetland: _____ Location:
1/4 S: _____ of 1/4 S: _____ SEC: _____ TWNSHP: _____ RNGE: _____
SOURCES OF INFORMATION: (Check all sources that apply)
Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓
Soils survey: ___
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	Cat III
Q.1. High Quality Natural Heritage Wetland. Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Logging in past	Yes: go to Q.2. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Hom. & Evergreen Blackberries	Yes: go to Q.2. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc.	Yes: go to Q.2. No: Possible Category I
Q.2. Irreplaceable Ecological Functions: Does the wetland:	
- have at a least 1/2 acre of contiguous peat wetland;	Yes: go to 2a.
- or, have a forested class greater than 3 acres; ~~[illegible]~~ then 3 acres	Yes: go to 2b.
- or, have characteristics of an estuarine system;	Yes: go to 2c.
	No If No to all, go to Q.3.

2a. Peat Wetlands.	
2a1. Does at least 1/2 acre of the peat wetland have greater than 75% cover of living sphagnum?	Yes: Category I No: go to 2a2.
2a2. Does at least 1/2 acre of the peat wetland have between 25% and 75% cover of living sphagnum?	Yes: Category II No: go to 2a3.
2a3. Is the peat wetland at least 1/2 acre and has <25% areal cover of any invasive/non-native plant species, and has < 80% areal cover of Spirea douglasii?	Yes: Category II No: go to Q.3.
2b. Mature Forested Wetlands.	
2b1. Is at least 50% of the tree canopy coverage conifers over 80 years in age and/or deciduous trees over 50 years in age?	Yes: Category I No: go to 2b2.
2b2. Is at least 50% of the tree canopy coverage 40-80 years in age, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover?	Yes: Category II No: go to Q.3.
2c. Estuarine Wetlands.	
2c1. Is the wetland listed as National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental or Scientific Reserves designated under WAC 332-30-151?	Yes: Category I No: go to 2c2.
2c3. Does the wetland meet at least 3 of the following 4 criteria: - minimum existing evidence of human related disturbance such as diking, ditching, filling, cultivation, grazing or the presence of non-native plant species; - surface water connection with tidal saltwater or tidal freshwater; - at least 75% of the wetland has a 100' buffer of ungrazed pasture, open water, shrub or forest; - has at least 3 of the following features: low marsh; high marsh; tidal channels; lagoon(s); woody debris; or contiguous freshwater wetland.	Yes: Category I No: Category II

Q.3. Significant Habitat Value. Answer all questions and enter data requested.		Circle scores that qualify
3a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes = 6 Yes = 5 Yes = 4 Yes = 3 Yes = 2 Yes = 1
3b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 7 points in the far right column.	# of classes 1. . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes = 1 Yes = 3 Yes = 5 Yes = 7 Yes = 10

3c. Plant species diversity	Class	# of species	
For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Aquatic bed Aquatic bed Aquatic bed Emergent Emergent Emergent Scrub-Shrub Scrub-Shrub Scrub-Shrub Forested Forested Forested	1-2... 3... >3... 1-2... 3-4... >4... 1-2... 3-4... >4... 1-2... 3-4... >4...	 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3

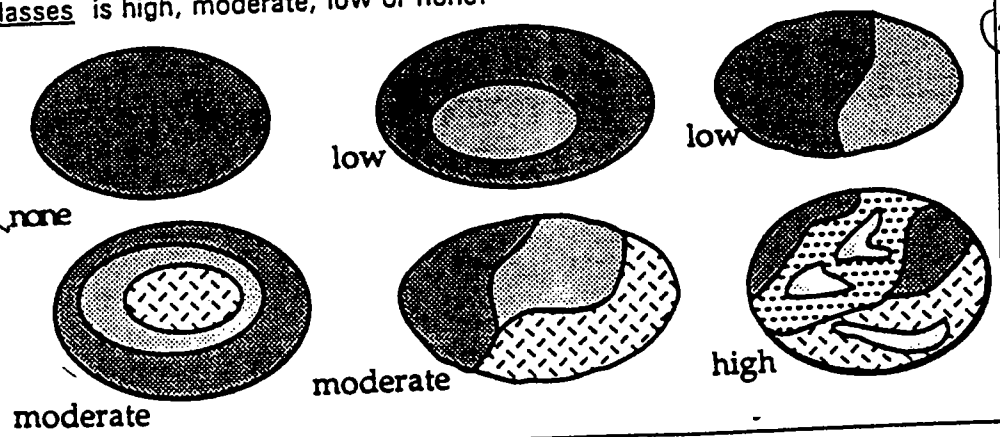
3d. Structural diversity If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall . . . . . . -trees 20'- 49' tall . . . . . . -shrubs. . . . . . -herbaceous ground cover. . . . . very little	 Yes = 1 Yes = 1 Yes = 1 Yes = 1
3e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High = 3 Mod. = 2 Low = 1 None = 0
3f. Habitat Features Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? . . . . . . Is a heron rookery located within 300'? . . . . . . Are raptor nest/s located within 300'? . . . . . . Are there at least 3 standing dead trees (snags) per acre?. . . . . . Are any of these standing dead trees (snags) > 10" in diameter?. . . . . . Are there any other perches (wires, poles or posts)? . . . . . . Are there at least 3 downed logs per acre?.	 Yes = 3 Yes = 2 Yes = 1 Yes = 1 Yes = 1 Yes = 1 Yes = 1
3g. Connection to streams (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; . . . . . . or, to a seasonal stream without fish; . . . . . . or, is not connected to any stream?.	 Yes = 5 Yes = 3 Yes = 0

3h. Buffers STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:		STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:	
roads, buildings or parking lots:	%___ x 0 =	0	
lawn, grazed pasture, vineyards or annual crops:	%___ x 1 =	___x___ = ___	
ungrazed grassland or orchards:	%___ x 2 =	___x___ = ___	
open water or native grasslands:	%___ x 3 =	___x___ = ___	
forest or shrub:	%100 x 4 =	400 x 3 = 1200	
	Add Buffer Total = 1200		
STEP 3. Score points according to table at right : Buffer total 900-1200. . . 600-899. . . . 300-599. . . . 100-299. . . .			Yes = 4 Yes = 3 Yes = 2 Yes = 1
3i. Connection to other habitat areas: - Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?			Yes = 5
- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area? separated by fields			Yes = 3
- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?			Yes = 2
- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?			Yes = 1
NOW: Add the scores circled (for Q.3a - Q.3i above) to get a Total. . . Is the Total greater than or equal to 35 points?. . . . . . Total = 24			Yes:Cat.II No: Go to Q.4.

2a. Peat Wetlands.	
2a1. Does at least 1/2 acre of the peat wetland have greater than 75% cover of living sphagnum?	Yes: Category I No: go to 2a2.
2a2. Does at least 1/2 acre of the peat wetland have between 25% and 75% cover of living sphagnum?	Yes: Category II No: go to 2a3.
2a3. Is the peat wetland at least 1/2 acre and has <25% areal cover of any invasive/non-native plant species, and has < 80% areal cover of Spirea douglasii?	Yes: Category II No: go to Q.3.
2b. Mature Forested Wetlands.	
2b1. Is at least 50% of the tree canopy coverage conifers over 80 years in age and/or deciduous trees over 50 years in age?	Yes: Category I No: go to 2b2.
2b2. Is at least 50% of the tree canopy coverage 40-80 years in age, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover?	Yes: Category II No: go to Q.3.
2c. Estuarine Wetlands.	
2c1. Is the wetland listed as National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental or Scientific Reserves designated under WAC 332-30-151?	Yes: Category I No: go to 2c2.
2c3. Does the wetland meet at least 3 of the following 4 criteria: - minimum existing evidence of human related disturbance such as diking, ditching, filling, cultivation, grazing or the presence of non-native plant species; - surface water connection with tidal saltwater or tidal freshwater; - at least 75% of the wetland has a 100' buffer of ungrazed pasture, open water, shrub or forest; - has at least 3 of the following features: low marsh; high marsh; tidal channels; lagoon(s); woody debris; or contiguous freshwater wetland.	Yes: Category I No: Category II

Q.3. Significant Habitat Value. Answer all questions and enter data requested.		Circle scores that qualify
3a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes = 6 Yes = 5 Yes = 4 Yes = 3 Yes = 2 Yes = 1
3b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 7 points in the far right column.	# of classes 1. . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes = 1 Yes = 3 Yes = 5 Yes = 7 Yes = 10

3c. Plant species diversity	Class	# of species	
For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Aquatic bed Aquatic bed Aquatic bed Emergent Emergent Emergent Scrub-Shrub Scrub-Shrub Scrub-Shrub Forested Forested Forested	1-2... 3... >3... 1-2... 3-4... >4... 1-2... 3-4... >4... 1-2... 3-4... >4...	 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3 Yes = 1 Yes = 2 Yes = 3

3d. Structural diversity If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall . . . . . . -trees 20'- 49' tall . . . . . . -shrubs. . . . . . -herbaceous ground cover.	 Yes = 1 Yes = 1 Yes = 1 Yes = 1
3e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High = 3 Mod. = 2 Low = 1 None = 0
3f. Habitat Features Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? . . . . . . Is a heron rookery located within 300'? . . . . . . Are raptor nest/s located within 300'? . . . . . . Are there at least 3 standing dead trees (snags) per acre?. . . . . . Are any of these standing dead trees (snags) > 10" in diameter?. . . . . . Are there any other perches (wires, poles or posts)? . . . . . . Are there at least 3 downed logs per acre?.	 Yes = 3 Yes = 2 Yes = 1 Yes = 1 Yes = 1 Yes = 1 ~~Yes = 1~~ none = 0
3g. Connection to streams (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; . . . . . . or, to a seasonal stream without fish; . . . . . . or, is not connected to any stream?.	 Yes = 5 ~~Yes = 3~~ Yes = 0

3h. Buffers STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:		STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots:	%___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops:	%100 x 1 =	100 x 3 = 300
ungrazed grassland or orchards:	%___ x 2 =	___x___ = ___
open water or native grasslands:	%___ x 3 =	___x___ = ___
forest or shrub:	%___ x 4 =	___x___ = ___
	Add Buffer Total = 300	

STEP 3. Score points according to table at right :	
Buffer total	
900-1200. . .	Yes = 4
600-899. . . .	Yes = 3
300-599. . . .	Yes = 2
100-299. . . .	Yes = 1

3i. Connection to other habitat areas:	
- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area? Riparian corridor to other wetlands w/in 0.25 mile	Yes = 5
- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?	Yes = 3
- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?	Yes = 2
- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?	Yes = 1
NOW: Add the scores circled (for Q.3a - Q.3i above) to get a Total. . . Is the Total greater than or equal to 35 points?. . . . . . Total = 12	Yes: Cat. II No: Go to Q.4.

Q.4. Category III wetlands.	
4a. Is the wetland 5 acres or larger , or is the wetland contiguous with other wetlands constituting a total area of 5 acres or greater?	Yes: Category III No: go to 4b.
4b. Is the wetland greater than 15,000 square feet and contiguous with stream, river, pond, lake or marine water?	Yes: Category III No: go to 4c.
4c. Is the wetland greater than 15,000 square feet and providing a critical aquifer recharge function?	Yes: Category III No: go to 4d.
4d. Is the wetland greater than 1/2 acre and with a < 80% cover of hardhack, soft rush or older than 20-year-old alder?	Yes: Category III No: go to 4e.
4e. Is the wetland greater than 1/2 acre and with a < 80% cover of non-native plant species, including but not limited to reed canary-grass and cemmon pasture grasses?	Yes: Category III No: go to Q.5.
Q.5. Category IV wetlands 5a. Is the wetland greater than one acre?	Yes: Category IV No: Unregulated wetland

APPENDIX F-2
PRELIMINARY WETLAND MITIGATION PLAN

1.0 EXECUTIVE SUMMARY

The subject parcel is located within unincorporated Whatcom County, east of the City of Ferndale (within Sections 17, 18, and 19 of Township 39 North, Range 1 East of the Willamette Meridian) (Figure 1). The total acreage of the Gateway Pacific Terminal (GPT) property is 1,092, but only the 60 acre area south of Henry Road and a 65 foot wide proposed rail connection was investigated (totaling approximately 100 acres). This is the area that will be impacted by the project and was the original area reviewed by Aqua-Terr Systems, Inc. (ATSI) (ATSI 1995). Additional areas were investigated for mitigation of impacted wetlands.

The proposed project calls for the construction of a deep-water, multi-use, bulk and other cargoes, import and export facility. This property is one of only a few locations along the west coast of the United States where large transport ships can easily maneuver close to shore and is adjacent to a shoreline that can accommodate dry bulk storage and rail loops for ship to rail transport.

The entire area is a mix of forest, abandoned shrub dominated fields, and agricultural fields still in use. The terrain ranges from flat to gently rolling, except a ravine on the southeast portion of the site with moderate slopes, and moderate to steep bluffs along the shoreline. An unnamed seasonal stream is associated with the ravine.

Palustrine emergent, scrub-shrub, and forested wetlands are located in the proposed impact area for this project (ATSI 1995). The wetlands meet all three wetland parameters, but by differing degrees. In general, all on-site wetlands display a predominance of hydric vegetation, hydric soils displaying low chromas and mottling, and soils with wetland hydrology field indicators such as oxidized root channels. The proposed project plan requires filling 5.85 acres of wetlands on this parcel. Of the 5.85 acres proposed to be filled, 4.30 acres are farmed seasonally saturated palustrine emergent wetlands, 1.45 acres are seasonally saturated palustrine scrub-shrub wetlands, and 0.1 acres are seasonally saturated palustrine forested wetlands.

This mitigation project will directly and indirectly compensate for lost wetland acreage and function. **Five goals** have been established for the mitigation project. The **first** goal is to create 5.9 acres of seasonally saturated palustrine forested/scrub-shrub wetland to provide a 1:1 areal replacement ratio with greater functional value for wetlands filled. The **second** goal is to enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse palustrine forested wetland habitat. The **third** goal is to assure the protection of the on-site stream corridor by placing the stream channel and the associated riparian area in a conservation easement recorded on the property deed (this encompasses approximately 50 acres). The **fourth** goal is to conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation within seasonally saturated, palustrine emergent agricultural fields and also investigating the success of selected facultative upland and facultative wetland plants planted over a range of hydrogeomorphic regimes. The **fifth** goal is not directly related to wetland disturbance but addresses cultural functions lost on a regional basis. This goal will provide compensation for the local loss of natural resources, in this case western red cedar trees, important to the Lummi Indian Tribe's culture heritage.

In summary, compensation for filling 5.85 acres of predominately farmed palustrine emergent wetlands, 5.9 acres of palustrine scrub-shrub and palustrine forested wetland will be created, 16.2 acres of low grade palustrine emergent wetland will be enhanced, a 50 acre riparian corridor will be placed in a conservation easement, a research project on wetland ecology will be funded, and cultural resources important to the Lummi Indian Tribe will be provided.

2.0 PROJECT DESCRIPTION

2.1 Project Location

The total acreage of the Gateway Pacific Terminal (GPT) property is 1,092 (+/–), but only the 60 (+/–) acre area south of Henry Road and a 65 foot wide proposed rail connection (totaling approximately 100 acres) was investigated. This is the area that would be impacted by the project and was the original area reviewed by ATSI. Additional areas were investigated for mitigation of impacted wetlands.

The parcel lies within unincorporated Whatcom County, east of the City of Ferndale (within Sections 17, 18, and 19 of Township 39 North, Range 1 East of the Willamette Meridian) (Figure 1). Figure 2, a 1987 aerial photograph, and Figure 3, a map of the delineated wetlands within the impact area, show the size and location of the project site. The site is bordered on the north and west by the ARCO oil refinery, to the east by farms, wooded acreage and State of Washington Department of Natural Resources Trust Lands, and to the south by the Strait of Georgia. This portion of the County, including the subject parcel, is zoned Heavy Industrial. Surrounding land uses include: ARCO and TOSCO oil refineries, INTALCO's aluminum plant, rural residential, agricultural, and wooded tracts used for timber. Several roads border or pass through the property including: Aldergrove Road to the north, Gulf (Powder Plant) Road to the east, and Henry Road through portions of the south. Lonseth Road also passes east–west near the center of the property. Several decaying sheds, old foundations from farm houses and outbuildings are located south of Henry Road and near the intersection of Aldergrove and Gulf Roads.

The entire area is a mix of forest, abandoned shrub dominated fields and agricultural fields still in use. The terrain ranges from flat to gently rolling, except a ravine on the southeast portion of the site with moderate slopes, and moderate to steep bluffs along the shoreline. An unnamed seasonal stream is associated with the ravine.

2.2 Responsible Parties

Jeff Kaspar
Gateway Pacific Terminal
1801 Roeder Avenue, Suite 156
Bellingham, Washington 98225

2.3 Description of Project and History

The proposed project is for the construction of a deep–water, multi–use, bulk and other cargoes, import and export facility. This property is one of only a few locations along the west coast of the United States where large transport ships can easily maneuver close to shore and is adjacent to a shoreline that can accommodate dry bulk storage and rail loops for ship to rail transport. The southerly 60 acre portion of the subject parcel will be the most heavily impacted. The other areas in Figures 2 and 3 will be impacted by the rail line only.

The proposed project site has been under various ownership and was actively farmed up until the late 1960s. Farming included commodity crops such as rye, potatoes, and hay, as well as dairy and chicken farms, and scattered woodlots for firewood and logging. The present condition, with open fields and wood lots, has been stable for at least 50 years as indicated by a 1950 aerial photograph (ATSI 1995) (indicating the southerly parcel). Discussions with retired neighbors that have lived and worked in the Cherry Point area for most of their lives confirm past and current land uses (ATSI 1995).

When the Cherry Point area was rezoned from rural in the early 1970's to Heavy Industrial, various entities began to collect the farmlands into larger blocks of land as speculative ventures. Many of the farms have not actively produced commodity crops since that time, but cattle, hay and limited commodity crops are grown on most fields. The subject parcel has been compiled from two separate owners.

The proposed project plan requires filling 5.85 acres of wetlands on this parcel. Of the 5.85 acres proposed to be filled, 4.30 acres are farmed seasonally saturated palustrine emergent wetlands, 1.45 acres are seasonally saturated palustrine scrub–shrub wetlands, and 0.1 acres are seasonally saturated palustrine forested wetlands.

This mitigation plan will directly and indirectly compensate for lost wetland acreage and function. **Five goals** have been established for the mitigation project. The **first** goal is to create 5.9 acres of seasonally saturated palustrine forested/scrub–shrub wetland to provide a 1:1 areal replacement ratio with greater functional value for wetlands filled. The **second** goal is to enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse palustrine forested wetland habitat. The **third** goal is to assure the protection of the on–site stream corridor by placing the stream channel and the associated riparian area in a conservation easement recorded on the property deed (this encompasses approximately 50 acres). The **fourth** goal is to conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation within seasonally saturated, palustrine emergent agricultural fields and also investigates the success of selected facultative upland and facultative wetland plants planted over a range of hydrogeomorphic regimes. The **fifth** goal is not directly related to wetland disturbance but addresses cultural functions lost on a regional basis. This goal attempts to provide a compensation for the regional loss of natural resources, in this case western red cedar trees, important to the Lummi Indian Tribe's culture heritage.

Table 1 compares acres of wetland lost from proposed impacts with acres of wetland created, enhanced, and protected as part of the proposed mitigation. A total of 5.85 acres of wetlands are proposed to be filled for this project, most of which are low value, seasonally saturated agricultural palustrine emergent wetlands, that are cut for hay on a yearly basis. Compensation for this disturbance will include replacement of the 5.85 acres of palustrine emergent wetlands with 5.9 acres of palustrine forested/scrub–shrub wetlands (seasonally flooded/saturated). In addition, enhancement of 16.2 acres of low value wetland, protection of a high value riparian corridor and its headwaters, and provide funding for a research project on local wetland ecology will also occur. In summary, in compensation for filling 5.85 acres of mostly low value wetland, 73.6 acres of wetlands and uplands will be protected, enhanced, and created.

Table 1. Total area and classes of wetlands to be impacted and proposed compensation for mitigation

Impacts	**Compensation**			
Filled	Created	Enhanced	Protected	Research
4.30 acres seasonally saturated isolated ag. PEM. **1.45** seasonally saturated isolated PSS **0.1** seasonally saturated isolated PFO	**5.9** acres seasonally saturated PSS/PFO connected to riparian corridor	**16.2** ac. seasonally saturated, seasonally flooded PSS/PFO Meanders added to stream channel	100 feet on each side of stream channel in a native growth protection easement recorded on the plat Created wetlands, enhanced wetlands, buffers and research area in a native growth protection easement	Funding for a wetland ecology research project on a **1.5** acre area near the enhancement and creation area
Total wetland acres to be filled: **5.85**	Total wetland acres created: **5.9**	Total enhanced wetland acres: **16.2**	Total acres protected: **50**	Total acres dedicated to research: **1.5**
Total acres of wetland disturbed: **5.85**	Total acreage provided in compensation: **73.6**			

2.4 Wetland Delineation

The project site includes palustrine emergent (PEM), palustrine scrub–shrub (PSS), and palustrine forested (PFO) wetlands (ATSI 1995). The wetlands meet all three wetland parameters, but by differing degrees. In general, all on–site wetlands display a predominance of hydric vegetation, hydric soils with low chromas and mottles, and soils displaying wetland hydrology field indicators such as oxidized root channels.

Most of the wetlands impacted by this project (4.30 out of a total 5.85 acres) are seasonally saturated palustrine emergent wetlands are used as hayfields or pasture for cattle. Of the remaining 1.55 acres of wetlands, 1.45 acres are seasonally saturated palustrine scrub–shrub and 0.1 acre are seasonally saturated palustrine forested.

The wetlands were categorized using both the Whatcom County and the Washington Department of Ecology (DOE) Wetland Rating Systems (ATSI 1995). Using the Whatcom County Wetland Rating Category System (Note: the project is vested with the Whatcom County Critical Areas Ordinance) the PEM wetlands south of Henry Road are unregulated by Whatcom County, but are categorized as Category IV wetlands by the DOE. The remaining PEM wetlands are Category IV wetlands using either system. Both the PSS and PFO wetlands are Category III wetlands using either system.

Using the DOE wetland characterization sheets, identified important wetland functions include: water quality in the palustrine emergent wetlands; human impacts to wetlands, buffer structure and function, breeding, rearing, feeding, and wintering habitat for fish and/or wildlife, water quality, flood and storm drainage protection, and support of baseflow in the palustrine scrub–shrub wetlands; and human impacts to wetlands, buffer structure and function, water quality, and flood and storm drainage protection functions in the palustrine forested wetlands (ATSI 1995).

3.0 ECOLOGICAL ASSESSMENT OF IMPACT SITE

3.1 Vegetation

This parcel includes a variety of vegetation communities including upland forest, upland fields, upland shrub, palustrine emergent wetlands, and palustrine forested/scrub–shrub wetlands. Historically, the large parcels making up the project area were cleared and converted to agricultural fields and pasture. Today, fields south of Henry Road and along Aldergrove Road continue to be farmed in forage crops, but others have been abandoned and support forested and shrub vegetation. Some fields have been used intermittently as pasture for cattle, but the fields south of Henry Road have never been used for livestock grazing.

Seasonally saturated palustrine emergent wetlands are located in minor depressions and along drainages in fields and are dominated by non–native and invasive herbaceous plant species. Seasonally saturated palustrine forested and scrub–shrub wetlands are located within upland forests and shrub habitats and are dominated by native plant species. Below is a description of the on–site plant communities:

Upland Forest – Upland forest occupies the northwestern one–third of the property, as well as patches within fields and along the seasonal drainage. Most of the upland forest is a deciduous forest dominated by red alder (*Alnus rubra*) intermixed with paper birch (*Betula papyrifera*), western red cedar (*Thuja plicata*), and Douglas fir (*Pseudotsuga menziesii*). Understory species include: vine maple (*Acer circinatum*), snowberry (*Symphoricarpos albus*), Indian plum (*Oemleria cerasiformis*), red elderberry (*Sambucus racemosa*), salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), and trailing blackberry (*Rubus ursinus*). The herbaceous layer is heavily shaded and sparse in most areas.

Upland Shrub – Upland shrub dominates logged areas and abandoned agricultural fields. This habitat type is most prominent at the southeast corner of Aldergrove and Gulf Roads, in the logged areas north of Lonseth Road and in isolated patches on the north and south sides of Henry Road. This habitat is typified by a regenerating canopy 15 to 20 feet high of red alder and paper birch. A dense shrub layer with Himalayan and evergreen blackberries (*Rubus discolor* and *R. laciniatus*), salmonberry, red elderberry, snowberry, thimbleberry (*Rubus parviflorus*), trailing blackberry and bracken fern (*Pteridium aquilinum*) standing 6 to 10 feet high. Except for exceptionally tall species (e.g. bracken fern), the herbaceous layer has been shaded out.

Upland Fields – Upland fields dominate along Aldergrove Road, the southwest ridge from Aldergrove Road towards Lonseth Road, and fields south of Henry Road. The fields are dominated by a facultative community of non–native pasture grasses and herbs. Representative species include red fescue (*Festuca rubra*), vernal sweetgrass (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), velvet grass (*Holocus lanatus*), redtop (*Agrostis alba*), hop clover (*Trifolium dubium*), Canadian thistle (*Cirsium arvense*), oxeye daisy (*Chrysanthemum leucanthemum),* reed canarygrass (*Phalaris arundinacea*), English and common plantains (*Plantago lanceolata* and *P. major*), and white clover (*Trifolium repens*).

Palustrine Emergent Wetlands (PEM) – PEM wetlands are located within depressions and shallow swales in the upland fields and along the northern portion of the seasonal drainage (Figure 3). The wetlands are composed of a single vegetation layer (herbaceous) with little complexity. They support non–native and invasive plant species dominated by, reed canary grass, meadow foxtail, red fescue, soft rush (*Juncus effusus*), and velvet grass. Additional species include: sawbeak sedge (*Carex stipata*), hare's–foot sedge (*Carex leporina*), slough sedge (*Carex obnupta*), bird's–foot trefoil (*Lotus corniculatus*), white clover (*Trifolium repens*), redtop, and Pacific silverweed (*Potentilla anserina*).

Palustrine Forested/Scrub–Shrub Wetland (PFO/SS) – Very few true forested wetlands are located within the study area. In most cases, the wetlands are dominated by shrubs, but have an upland canopy that extends over the wetland (Figure 3). The actual wetland plants include: salmonberry, black twinberry (*Lonicera involucrata*), hardhack (*Spiraea douglasii*), Nootka rose (*Rosa nootkana*), Hooker's willow (*Salix hookeriana*), Pacific willow (*S. lasiandra*), and slough sedge. The over reaching canopy is predominately red alder.

3.2 Water Regime

The topography within the study area is generally as flat to gently rolling terrain with shallow swales and small ridges. Moderate to steep bluffs are located along the marine shoreline and within the ravine located in the southeast corner of the study site. Site surface and subsurface drainage is directed towards the south. The majority of site surface drainage, either directly or indirectly, drains into the unnamed seasonal stream that flows into the Strait of Georgia approximately one–quarter mile west of Gulf Road. However, numerous ditches and roads intercept the natural hydrology of some wetlands.

The primary factors influencing the hydrology on this property are direct precipitation, stratigraphy, topography, soil texture, and a seasonally high perched water table. The average annual precipitation is 30 to 40 inches, with most falling in the months of November, December, January, February, and March. The average growing season is about 180 days, and begins mid–March and ends the first part of November. The stratigraphy of Whitehorn silt loams is a series of slowly permeable soil horizons that are composed of layers of silt loams, loams, and sandy loams. Typically, subsoils underlying the wetlands have a silty clay subsoil, but some are very sandy. Dense silty clay prevents surface water collected from direct precipitation from percolating downward, resulting in saturated or inundated surficial conditions whereas sandy subsoils allow surface water to percolate faster, not allowing wetland hydrology to accumulate. The majority of the site wetlands are underlain by Whitehorn silt loam, which technically,

has a seasonal perched high water table at a depth of 0 to 12 inches from the surface November through May. Although, ATSI (1995) data show the high water table varies on this site from 0 to 20 inches from the surface.

Hydrology within the agricultural fields is not well defined and the fields are saturated only on a seasonal basis. No primary field indicators of wetland hydrology were observed in many of the PEM wetlands, but secondary indicators included oxidized root channels in the upper 2 to 3 inches of the soil and local soil survey data indicating the presence of a seasonally high perched water table early in the growing season. Interviews with local farmers suggest that the agricultural fields can be farmed (plowed) late in the season (October and November) and as early as late April in most years, indicating that wetland hydrology is absent in the later growing season and present only very early in the growing season.

The National Wetland Inventory (NWI) indicates both seasonally saturated and seasonally flooded hydrologic conditions within the on-site wetlands. However, on-site data indicates that the majority of the on-site wetlands are seasonally saturated during the growing season and inundation is rare. Within these soil types, seasonally flooded wetlands generally display low matrix chromas and mottling to the surface demonstrating fluctuating water levels near and at the soil surface. However, data collected from some sample plots had matrix chromas between 2 and 3 with no mottles in the upper 12 inches of the soil surface. Chromas were not low enough to indicate prolonged saturation near the surface and the lack of mottles implies a stable water table below the major root zone during the growing season.

3.3 Soils

The Soil Conservation Service (SCS) indicates the presence of five soil series within the study area. The dominant soil series is Whitehorn silt loam, which occupies approximately 90 percent of the site. Whitehorn silt loam is listed as hydric on the local Hydric Soils List (SCS 1991). A ridge of non-hydric Birchbay silt loam extends from the corner of Aldergrove and Gulf Roads southwest to the west end of Henry Road. A ribbon of non-hydric Kickerville silt loam parallels the southwestern Birchbay soil on the west portion of the site, but most of this has been extensively disturbed by borrow pit activities. Non-hydric Whatcom silt loams are found on the western portion of the property between Aldergrove and Henry Roads as well as within the ravine on the eastern side of the parcel. Non-hydric Neptune very gravelly sandy loam occurs along the marine shoreline.

Indicators of wetland hydrology and vegetation were often difficult to distinguish within the agricultural fields. In those cases, the hydric soil criteria was used as the primary indicator for wetland determination in combination with any wetland hydrology or vegetation indicators available. Most on-site agricultural fields are underlain by Whitehorn silt loam. Although this soil series is indicated as hydric, hydric indicators were not located at all sample plots. Plots that displayed a topsoil color of 10 YR 3/2 or 3/3 with no evidence of mottling were designated as uplands: whereas soils within plots with topsoil colors of 10YR 2/1, 2/2 or 3/2 with mottles were considered hydric. The depth of the topsoil in the uplands exceeded 12 inches, but was usually less than 12 inches in the wetland soils. The subsoil was similar throughout the Whitehorn series, with a matrix color of 10YR 5/1-5/3 with distinct to prominent mottles. In some cases the matrix had a chroma of 3; not typically considered an indicator chroma, in others the matrix chroma was 2 without mottles.

3.4 Fauna

Wildlife utilizing this parcel are typical of species found in agricultural and deciduous forested areas in the marine shoreline areas of Whatcom County. In-depth studies have been performed on terrestrial birds and amphibians on the site, and other studies have included additional data on mammals, fish and invertebrate populations (ATSI 1995, Shapiro and Associates 1994).

A study was conducted by ATSI of the inland bird populations on this site in 1995 (ATSI 1995). The results of the study indicate the parcel supports birds typical of the local area. A total of 564 birds of 44 different species were observed during the spring of 1995 (ATSI 1995). The greatest numbers of birds were observed in the field habitats and the lowest numbers in the forests. The greatest species diversity was observed in the field and edge habitats, however other habitats had only slightly lower diversity.

The only priority bird species observed during the ATSI bird survey were bald eagles (*Haliaeetus leucocephalus*), great blue herons (*Ardea herodias*) and pileated woodpeckers (*Dryocopus pileatus*) (ATSI 1995). Bald eagles are a federal and state listed threatened species (WDFW 1995). Bald eagles were observed flying over the parcel in three instances. One mature and one immature eagle were observed, at separate times, flying parallel to the shoreline. In a third observation, a mature bald eagle was observed on the north side of the parcel. During another observation period in the Fall of 1995, two mature bald eagles were observed perched in a cottonwood tree at the mouth of the ravine and an immature eagle was observed flying from this location northwest, along the shoreline (ATSI staff, Nov. 1995).

Pileated woodpeckers are a state listed Candidate Species (WDFW 1995). Two observations of a single pileated woodpecker were made on different days along the shoreline. Because these observations were made on different days, it was not determined whether this was the same individual or if two birds utilize the site. Within the areas the pileated woodpeckers were observed, no trees were observed large enough to serve as nesting sites, but these habitats may serve as forage areas.

A great blue heron rookery is located northwest of the site on ARCO property (Norman per. comm.). Approximately 200 nests are present within this rookery. A regular flight pattern of great blue herons occurs near the seasonal stream corridor. The birds appeared to be flying to and from the rookery and shallows near Sandy Point during low tides (ATSI 1995). The great blue heron is listed as a State Monitor species and their breeding areas are listed as priority areas by the Washington Department of Fish and Wildlife (WDFW 1995, WDW 1994).

A large concentration of surf scoters (*Melanitta perspicillata*) was observed off-shore on May 9. Large concentrations of this species are known to congregate in this area to feed on herring spawn (Wahl 1994).

An amphibian and reptile survey was conducted by Shapiro and Associates, Inc. in 1993 (Shapiro 1994). Two frog species, two salamander species, and one reptile species were observed on the property. Red-legged frogs (*Rana aurora)* and Pacific chorus frogs (*Pseudacris regilla),* adults and tadpoles, were observed on the property. Tadpoles were observed in stagnant water pools and the brackish marsh. Northwestern salamander (*Ambystoma gracile*) and long-toed salamander (*A. macrodactylum*) were encountered under woody debris. A dead rough skinned newt (*Taricha granulosa*) was observed by ATSI staff on Gulf Road. According to distribution maps, five other amphibian species may occur in the vicinity of the project area (Leonard, et. al. 1993) including the Pacific giant salamander (*Dicamptodon tenebrosus*), western redback salamander (*Plethodon vehiculum*), ensatina (*Ensatina eschscholtzii*), western toad (*Bufo boreas*), and the non-native bullfrog (*Rana catesbeiana*).

Evidence of the following mammal use on the site has been documented: black-tailed deer (*Odocoileus hemionus*), coyote (*Canis latrans*), raccoon (*Procyon lotor)*, opossum (*Didelphis marsupialis*) and mink (*Mustela vison*) (ATSI 1995 and Shapiro 1994). Other species may include: shrews, voles, deer mice, weasel, and skunk (Shapiro 1994).

Little information is available concerning fish populations on the parcel. The only possible fish habitat observed on the site are portions of the seasonal stream. The Shapiro Stream Habitat Survey (1994) indicates the possibility of chum (*Oncorhynchus keta)* or cutthroat trout (*O. clarkii)* use of the stream, but this was not confirmed and is doubtful. The Shapiro report goes on to state (ATSI staff concurs) the

hydroperiod of flow within the stream is not sufficient to provide habitat for these species. Other possible resident fish may include three–spine stickleback (*Gasterosteus aculeatus*) and sculpin (*Cottus sp.*). The only fish species observed during stream surveys performed by Shapiro staff was three–spine stickleback. To summarize, this is a seasonal stream that will not support fish from mid–Spring to mid–Fall due to absence of water. A large log and debris pile at the mouth of the stream also limits access to the stream to high tides only.

3.5 Functions and Values of Impacted Wetlands

Wetland Characterization sheets developed by the Washington Department of Ecology were used to assess the functional values of the on–site wetlands that would be impacted as the result of this project. Wetland functions have been divided into primary categories of wetland condition, buffers, wildlife habitat, fisheries habitat, hydrology, cultural values, shoreline stabilization, and heritage value. Within these primary categories individual functions are assessed point values of 1–3. Functions having values of 1 are considered low value; functions with values of 2 have moderate value; and functions with 3 points have high values.

Table 2 indicates the functions addressed for the PEM wetlands south of Henry Road and their associated values (Figure 3). Only water quality functions received values "moderate" or greater. The remaining functions received "low" values.

The overall wetland condition has a moderate to low value. The wetlands have been extensively impacted by past agricultural practices. The acreage south of Henry Road has been actively farmed for over 50 years. The wetlands and surrounding uplands are fields dominated by non–native pasture grasses that are presently mowed for hay. Each PEM wetland within this area is under one–half acre in size and is hydrologically isolated. Hydrological alterations include ditches within the fields and along Henry Road. The ditches along Henry Road may have had the greatest impact by separating wetlands in the southern fields from upgradient surface and subsurface drainage from wetlands on the north side of Henry Road.

The buffer surrounding these wetlands is mowed agricultural upland fields dominated by non–native grasses with small areas of forested/shrub habitat. The wetlands are greater than 100 feet from any other habitat type, but marine, forest, and shrub habitats are located within one–quarter mile. The vegetation cover between the wetlands and other habitats is mowed grass, providing low cover values.

Table 2. Palustrine Emergent Wetlands Functions and Values south of Henry Road

FUNCTION	VALUE
Human impacts to wetlands	1.5
Buffer structure and function	1.5
Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife	1
Water quality	2
Flood and storm drainage protection	1
Support of baseflow	1
Shoreline stabilization	N/A
Sea level rise	N/A
Groundwater exchange	1
Cultural values	0
Heritage value	0

Habitat value within these wetlands is low. The low value is associated with their small size, isolated nature, and lack of structural diversity. As mentioned previously, the PEM wetlands are all under one-half acre in size and are hydrologically isolated. The buffer area is predominately mowed agricultural fields. Vegetation within the wetlands is dominated by non-native plant species consisting of a single vegetation class. The wetlands have a simple shape and no interspersion of wetland classes, resulting in reduced edge habitat. No significant habitat structures (e.g. downed logs, snags and/or perches) were observed within these wetlands or their associated buffers. The only connection to other habitat types is via mowed open fields. There is no connection to fish habitat.

The PEM wetlands serve "low" to "moderate" hydrological functions. The wetlands are located in shallow depressions underlain with silt and clay. The average surrounding slope is low (<3%). There is no apparent inlet or outlet to the wetlands. The wetlands are isolated and water is removed primarily through direct evaporation and evapotranspiration. The ditches have altered the natural hydrology of the wetlands, separating them from upgradient drainage. The wetlands are vegetated with pasture grasses, that may aid water quality during the growing season.

Cultural and Heritage values of these wetlands are "low". This is based on the small size, dominance by non-native and invasive plant species, disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

Table 3 indicates the functions addressed for the palustrine scrub-shrub wetlands (immediately north and south of Henry Road) and their associated values. Functions with the highest values are: human impact, buffer structure and function, wildlife habitat, water quality, flood and stormwater protection, and support of baseflow. The remaining functions received "low" values.

Human impact to these wetlands has been moderate. The wetlands have experienced alterations resulting from past logging, agriculture, and livestock grazing, but are now regenerating. Based on aerial photographs and interviews with local farmers, most of these fields were cleared and used in the past for agricultural crops and livestock grazing. The fields are now abandoned and support dense shrub communities. Other disturbances include logging within wetlands and ditches that have interrupted the natural hydrology to the wetlands. The wetlands are dominated by non-native vegetation, but also include native plants. Probable pollutants could include sedimentation and nutrient inputs from past agricultural and logging activities.

Table 3. Palustrine Scrub-Shrub Wetland Functions and Values.

FUNCTION	VALUE
Human impacts to wetlands	2
Buffer structure and function	2.5
Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife	2
Water quality	3
Flood and storm drainage protection	2
Support of baseflow	2
Shoreline stabilization	N/A
Sea level rise	N/A
Groundwater exchange	1
Cultural values	0
Heritage value	0

The wetlands are buffered by a mix of forested/shrub, mowed agricultural fields and roads. The buffer is greater than 100 feet where forest, shrub and fields occur.

These wetlands have moderate wildlife habitat values. The wetlands include both palustrine emergent and palustrine scrub–shrub wetland classes with moderate interspersion and shape. Although open water is present and the wetlands are dry during the summer. Clumps of willows and small trees serve as perches for raptors in these fields. No other habitat features were identified. The wetlands are connected to other habitats via the on–site seasonal stream, but much of the riparian vegetation is limited to reed canarygrass. Fish do not inhabit these wetlands.

Water quality functions have "high" values. The wetlands have a combined large size, moderate level of disturbance, slow rate of water movement, and dense vegetation combined to provide significant water quality functions. These same features combined with the wetlands direct and indirect association with the on–site stream, allowing them to provide moderate values in flood and stormwater abatement, and support of the base flow of the stream. There is little data associated with the wetlands interaction with groundwater, but some on–site wetlands have a sandy subsoil indicating a possible interaction.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

Table 4 indicates the functions addressed for the palustrine forested/scrub–shrub wetlands, located immediately north and south of Lonseth Road, and their associated values. Functions that have the highest values are: the overall wetland condition, buffer structure and function, water quality and flood and stormwater abatement. The remaining functions received "low" values.

Human impacts to these wetlands have been moderate. Logging has occurred in the past which has reduced the total canopy cover and allowed non–native blackberries to invade in some and in others the wetlands have recovered from logging that occurred more than 10 years ago. Peripheral ditches along the roads may have altered the original hydrology, but sufficient hydrology remains to support these communities. Past logging may have temporarily increased sediment loads, but no pollutants are currently apparent.

Table 4. Palustrine Forested/Scrub–Shrub Wetland Functions and Values.

FUNCTION	VALUE
Human impacts to wetlands	3
Buffer structure and function	2.5
Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife.	1.5
Water quality	3
Flood and storm drainage protection	2
Support of baseflow	1
Shoreline stabilization	N/A
Sea level rise	N/A
Groundwater exchange	1
Cultural values	0
Heritage value	0

Buffers around the wetlands are composed of forest and shrub vegetation greater than 100 feet wide. These wetlands have low to moderate wildlife habitat functions. No open water component is present. Palustrine forested and scrub–shrub wetland classes are both present. Emergent vegetation is present, but makes up less than 10 percent of the community. Simple interspersion occurs between the wetland classes with moderate to complex wetland shapes. Habitat features include fallen logs, small snags and perches. There are narrow corridors with forested to herbaceous vegetation cover to other habitats. There is no documentation that these wetlands are connected to a fish habitat.

Water quality functions have "high" values. The wetlands are moderately (30 to 75% areal cover) vegetated with persistent and non–persistent vegetation. Because the wetlands are located in isolated depressions, water movement is slow to non–existent. The surrounding area around the wetlands has low (3% to 8%) slopes. These features provide the wetlands with high nutrient trapping features.

Cultural and Heritage values of these wetlands are "low". This is based on the disturbance, location on private property, and because the parcel is not known to be listed as a local, State, or Federal heritage site.

3.6 Water Quality

No surface water observed.

3.7 Buffers

Buffers surrounding the palustrine emergent wetlands are predominately closely mowed agricultural upland fields dominated by non–native grasses, with small areas of forested/shrub habitat. The wetlands are greater than 100 feet from any other habitat type, but marine, forest, and shrub habitats are located within one–quarter mile. The vegetation cover between the wetlands and other habitats is mowed grass, providing little cover for wildlife.

The palustrine forested and scrub–shrub wetlands are buffered by a mix of forested/shrub, mowed agricultural fields and roads. The buffers are greater than 100 feet where forest, shrub and fields occur.

3.8 Wetland Rating

Based on the Whatcom County and the DOE Wetland Rating System, the PEM wetlands (south of Henry Rd and on the west edge of the site) are unregulated Category IV wetlands; the remaining PEM wetlands (to the north and extreme east) are regulated Category IV wetlands. The DOE four tiered rating system designates these wetlands as Category IV wetlands. These ratings are based on small size (less than one–half acre in size), isolation, hydrological alteration, and the presence of a single wetland class dominated by vegetation that is primarily non–native, invasive wetland species.

The Whatcom County Wetland Rating System indicates the palustrine scrub–shrub wetlands are Category III wetlands. The DOE four tiered rating system designates these wetlands as Category III wetlands. These ratings are based on combined size of greater than 5 acres, hydrological connection to a seasonal stream, and the presence of two wetland classes dominated by both non–native and native vegetation.

The Whatcom County Wetland Rating System places the palustrine forested/scrub–shrub wetlands (predominately north of Lonseth Road) in Category III. The DOE four tiered rating system designates these wetlands as Category III wetlands. These ratings are based on a total size greater than 5 acres, hydrological isolation, moderate complexity, forested class and vegetation dominated by a mix of native and non–native plant species.

Based on the Whatcom County Water Categories rating system, the on-site stream is a Type 4 Water below Henry Road and a Type 5 Water above. This rating is based on the streams seasonal nature, no records of use by anadromous fish or game fish, and no domestic use. The average channel width is between 2 and 3 feet in most areas and 3 to 6 feet south of Henry Road, although some areas of the channel have been widened by ditching in the fields on the north part of the site near Aldergrove Road.

3.9 Position and Function of Wetlands in Landscape

The proposed impact area lies within the watershed of the on-site stream. This unnamed stream is a small, seasonal drainage that flows into the Strait of Georgia. The stream is approximately 1.25 miles long and has a drainage area of approximately 800 acres (Shapiro 1994). The headwaters of the stream are located on a relatively flat terrace, most of which is ditched. The lower reaches of the stream flows through a ravine into the Strait of Georgia.

A forested and shrub dominated riparian corridor is present along most of the stream, except near its headwaters. Vegetation in the headwaters vicinity is predominately reed canarygrass.

4.0 MITIGATION GOALS, OBJECTIVES AND PERFORMANCE STANDARDS

4.1 Goals

This mitigation plan will directly and indirectly compensate for lost wetland acreage and functions. **Five goals** have been established for the mitigation project. The **first** goal is to create 5.9 acres of seasonally saturated palustrine forested/scrub-shrub wetland to provide a 1:1 areal replacement ratio with greater functional value for wetlands filled. This 5.9 acres of seasonally saturated palustrine forested/scrub-shrub wetlands will be created to compensate for filling 4.30 acres of seasonally saturated farmed palustrine emergent wetland, 1.45 acres of seasonally saturated scrub-shrub wetland and 0.10 acre of seasonally saturated forested wetland.

The **second** goal is to enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse forested wetland habitat. In order to meet this goal, the dominance of reed canarygrass in 16.2 acres of the field in the southwest corner of Aldergrove and Gulf Roads will be reduced. Native tree, shrub, and herbaceous plants will be planted and large organic debris (logs and root masses) placed, to diversify the community and provide habitat and food chain support for native mammals, birds, amphibians and aquatic macroinvertebrates. A complex hydrologic regime of seasonally flooded to seasonally saturated wetlands will be created.

The **third** goal is to assure the protection of the on-site stream corridor. The stream channel and the associated riparian area (100 feet on both sides of channel) would be placed in a conservation easement recorded on the property deed (encompassing approximately 50 acres).

The **fourth** goal is to conduct a study on a designated 1.5 acre plot. The study will research the natural regeneration of vegetation within seasonally saturated, palustrine emergent agricultural fields. It addition the study will investigate the success of selected upland, facultative upland, and facultative wetland plants planted over a range of hydrogeomorphic regimes.

The **fifth** goal is not directly related to wetland disturbance but addresses cultural functions lost on a regional basis. This goal will provide compensation for the local loss of natural resources (specifically western red cedar) important to the Lummi Indian Tribe's culture heritage.

4.2 Objectives and Performance Standards

To achieve the above goals the following objectives have been defined. Performance standards have been included to provide measurable values of specific variables to establish that objectives have been met.

Goal 1: Create 5.9 acres of seasonally saturated palustrine forested/scrub–shrub wetland to provide a 1:1 areal replacement ratio with greater functional value for wetlands filled.

Water Regime

A. A seasonally saturated hydrologic regime will be present within the created wetland areas.

> Performance Standard: A minimum of 5.9 acres will be saturated within the upper 12 inches of the soil horizon for at least 21 days during the early growing season (March/April) (Figure 5).

Vegetation Structure

A. The created wetland areas will be vegetated with a minimum of 5.9 acres of palustrine forested/scrub–shrub vegetation class with canopy, shrub, and herbaceous vegetation layers. Partial planting of the plants will occur one year after construction to allow confirmation of the hydrological regime. Monitoring will occur over a ten year period on a seasonal basis with reports written the 1st, 3rd, 5th, 7th, and 10th years post construction/planting.

> **First year monitoring.** Performance Standard: Native plant species will have a minimum cover of 15% after the first year.
>
> **Third year monitoring.** Performance Standard: Native plant species will have a minimum cover of 25% after the third year.
>
> **Fifth year monitoring.** Performance Standard: Native plant species will have a minimum cover of 50% after the fifth year.
>
> **Seventh year monitoring.** Performance Standard: Native plant species will have a minimum cover of 75% after the seventh year.
>
> **Tenth year monitoring.** Performance Standard: Native wetland forest vegetation will cover the 5.9 acre site with 50% canopy cover, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Goal 2: Enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse palustrine forested wetland habitat.

Water Regime

A. Both seasonally saturated and seasonally flooded hydrologic regimes will be present within the enhancement area.

> Performance Standard: A minimum of 16.2 acres will be a complex (an approximate 8.1 acres of each) of seasonally saturated and seasonally flooded soils. The saturated zone will occur within the upper 12 inches of the soil horizon for at least 21 days during the early growing season

(March/April). The flooded zone will also occur for 21 days during the growing season with an approximate depth of 24 inches.

Vegetation Structure

A. The dominance of reed canarygrass will be reduced within the mitigation area within ten years.

Performance Standard: Less than a 25% cover of reed canarygrass, measured along permanent transects with at least 20X50 cm rectangular quadrats systematically placed along transects, will be present after ten years.

B. The wetland will be vegetated with a minimum of 16.2 acres of palustrine forested, scrub–shrub and emergent vegetation classes composed of native plant species. Percent cover of the vegetation and number of live and dead plants (by species) will be measured along permanent transects using at least 20X50 cm quadrats. Partial planting of the plants will occur one year after construction to allow confirmation of the hydrological regime. Monitoring will occur over a ten year period on a seasonal basis with reports written the 1st, 3rd, 5th, 7th, and 10th years post construction/planting.

First year monitoring. Performance Standard: Native plant species will have a minimum cover of 15% after the first year.

Third year monitoring. Performance Standard: Native plant species will have a minimum cover of 25% after the third year.

Fifth year monitoring. Performance Standard: Native plant species will have a minimum cover of 50% after the fifth year.

Seventh year monitoring. Performance Standard: Native plant species will have a minimum cover of 75% after the seventh year.

Tenth year monitoring. Performance Standard: Native wetland forest vegetation will cover the 16.2 acre site with 50% canopy cover, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Habitat Attributes

A. The enhancement area will provide habitat for at least four species of **amphibians** within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for both terrestrial and aquatic amphibian species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present within the enhancement area early in the growing season (Feb.–July). To restrict occupation by bullfrogs (*Rana catesbeiana*) year–long inundation within the enhancement area will be avoided.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

B. The enhancement area will provide habitat for at least four species of **aquatic insects** within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for aquatic invertebrates. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present within the enhancement area early in the growing season (Feb.–July).

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

C. The enhancement area will provide habitat for at least three **waterfowl** species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide nesting sites, cover and forage areas for waterfowl species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present within the enhancement area early in the growing season (Feb.–July).

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Performance Standard: A minimum of 5 temporary nesting boxes suitable for cavity nesting waterfowl (e.g. wood duck, hooded merganser) will be placed around the mitigation area.

D. The enhancement area will provide habitat for at least two **mammal** species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for mammal species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years to provide cover and forage for mammal species.

E. The enhancement area will provide habitat for at least five **passerine** bird species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide nesting sites, cover and forage areas for passerine species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present within the enhancement area early in the growing season (Feb.–July).

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Performance Standard: A minimum of 5 temporary nesting boxes suitable for passerine species will be placed around the mitigation area (e.g. tree and violet green swallows, black-capped chickadee, Bewick's wren).

Goal 3: Assure the protection of the on-site stream corridor. The stream channel and the associated riparian area (100 feet on both sides of channel) will be placed in a conservation easement recorded on the property deed (total area encompasses approximately 50 acres).

Goal 4: Conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation over time of a seasonally saturated, palustrine emergent agricultural field and investigate the success of selected upland, facultative upland, and facultative wetland plants planted over a range of hydrogeomorphic regimes within this field.

A. Record the natural successive changes over time in an agricultural palustrine emergent wetland over a range of hydrogeomorphic regimes.

B. Investigate the success of selected upland, facultative upland, and facultative wetland plant species planted over a range of hydrogeomorphic regimes.

Goal 5: This goal is not directly related to wetland disturbance, but addresses cultural functions lost on a regional basis. This goal will provide compensation for the local loss of natural resources important to the Lummi Indian Tribe's culture heritage.

A. Natural resources available for harvest by the Lummi Indian Tribe will be established to provide totem pole stock and cedar bark for future cultural uses by the Lummi Indian Tribe.

5.0 PROPOSED MITIGATION SITE

5.1 Site Description

The proposed mitigation areas are located on the parcel and within the on-site watershed. The parcel lies within unincorporated Whatcom County, east of the City of Ferndale (within the northeast quarter of Section 18, Township 39 North, Range 1 East of the Willamette Meridian) (Figure 1). The subject area is located in a farmed 40 acre field in the southwest corner of Aldergrove and Gulf Roads and along the riparian corridor (Figure 4). This plan includes creation of 5.9 acres of palustrine forested/scrub-shrub wetland, enhancement of 16.2 acres of a reed canarygrass dominated palustrine emergent wetland, protection of a high quality riparian corridor, and funding for a research project on wetland ecology.

5.2 Ownership

Jeff Kaspar (contact person)
Pacific International Terminals
Gateway Pacific Terminal
1801 Roeder Avenue, Suite 156
Bellingham, Washington 98225

5.3 Rational for Choice

The entire parcel (1,092 acres) was searched for potential mitigation sites. The final site selection was based on future protection, connection to an existing riparian corridor, degraded conditions of existing wetlands, access for heavy equipment, and ownership. Since much of the immediate area is presently designated as wetland palustrine forested (PFO), palustrine scrub–shrub (PSS), palustrine emergent (PEM), or high quality upland, a degraded 16.2 acre, low value PEM wetland and ditched stream channel were chosen for enhancement. In addition, 5.9 acres of PFO/PSS will be created in the same area, further enhancing this area.

Water regime

The site currently supports wetlands and the upland soils have a silty/clay subsoil that is suitable for wetland creation. The primary factors influencing the hydrology in the mitigation area are seasonal flooding, direct precipitation, and topography. Seasonal flooding from the on–site seasonal stream and upgradient runoff appear to be the forces driving on–site's wetland hydrology. In addition, a seasonal perched high water table may contribute to the hydrology in the late winter and early growing season. The wetland area is underlain by Whitehorn silt loam, that technically has a seasonal perched high water table at a depth of 0 to 1 foot from the surface November through May.

The National Wetland Inventory map indicates seasonally flooded hydrologic conditions within the chosen mitigation area. Typically, on–site wetland soils display low matrix chromas and mottling to the surface demonstrating fluctuating water levels near and at the soil surface.

A hydrology study was conducted in the area of the proposed mitigation, and other areas of the site by Shapiro and Associates, Inc. from November 1994 through October 1995 (Shapiro and Associates 1995. Their monitoring data indicate soils within the enhancement area are saturated to the surface or flooded with up to 6 inches of water from December until mid–May. After May the water table quickly drops and remains at 2 feet or below the surface throughout the summer.

Buffers

The proposed mitigation site is currently buffered by field and forest vegetation. The buffer within 100 feet of the existing wetland is dominated by non–native grasses on the northwest side, Gulf Road on the east, and regenerating shrub and forest vegetation on the south. Beyond the immediate buffer, forest and shrub vegetation dominate on the east side of Gulf Road and to the south and west of the mitigation area: the ARCO Refinery is located on the north side of Aldergrove Road. A shrub and forested community forms a dense riparian system up and down gradient of the on–site stream. The on–site reach of the seasonal stream lays within a ditch choked with reed canarygrass. Prior to ditching, the stream was probably a headwaters wetland with no channel. The ditch was presumably dug to facilitate drainage for agricultural use.

Surrounding land uses include: fallow fields to the east, forested tracts to the west and south, and Heavy Industry with rail to the north. The immediate use of the land for the selected mitigation site is a seasonally mowed hay field.

Soils

The silty Whitehorn silt loam soils on this site are suitable for wetland enhancement as is the neighboring Kickerville silt loam. They will provide sufficient hydrology as evidenced by the existing wetland. A silty–clay subsoil, found in both soil series, ensures slow percolation rates.

Reed canarygrass currently dominates the site and will require treatment. Because reed canarygrass occurs upstream and cannot be controlled, fumigation or importation of "clean" soils is not cost effective. The money saved will be used in a regular maintenance program. Site soils are also discussed in detail in Section 4.2 of this document.

Zoning

Current zoning for this site and the immediate area is Heavy Industrial.

6.0 Ecological Assessment of Mitigation Site

6.1 Vegetation

Vegetation within the proposed mitigation site is predominately agricultural palustrine emergent wetlands, but also includes agricultural upland fields. This site is currently farmed for forage crops. Seasonally saturated palustrine emergent wetlands are located in a flat depression southeast of a prominent upland ridge. The vegetation within the uplands and wetlands is dominated by non–native herbaceous plant species. Seasonally saturated and flooded scrub–shrub wetlands are located south and east of the mitigation site and are dominated by both non–native and native plant species. A ditched seasonal stream passes through the wetland, but is choked with reed canarygrass (Figure 4). Below is a description of the vegetation communities within the mitigation (creation, enhancement, and study) areas:

Upland Fields – Upland fields dominate the ridge running from Aldergrove Road towards Lonseth Road. Approximately 13 acres of upland field are located within the proposed mitigation area. The fields are dominated by a facultative community of non–native pasture grasses that is mowed annually. Representative species include: red fescue (*Festuca rubra*), vernal sweetgrass (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), velvet grass (*Holocus lanatus*), redtop (*Agrostis alba*), hop clover (*Trifolium dubium*), Canadian thistle (*Cirsium arvense*), oxeye daisy (*Chrysanthemum leucanthemum),* reed

canarygrass (*Phalaris arundinacea*), English and common plantains (*Plantago lanceolata* and *P. major*), and white clover (*Trifolium repens*).

Palustrine Emergent Wetlands (PEM) – PEM wetlands are located within a flat depression at the headwaters of the seasonal stream corridor. Approximately 16.2 acres of PEM wetlands are located within the immediate proposed mitigation area. The wetlands are composed of a single vegetation class (herbaceous) with little complexity and is mowed annually. These wetlands support non–native and invasive plant species, predominately reed canarygrass, but meadow foxtail, red fescue, soft rush (*Juncus effusus*), velvet grass, sawbeak sedge (*Carex stipata*), bird's–foot trefoil (*Lotus corniculatus*), white clover (*Trifolium repens*), and redtop (*Agrostis alba*) are also present.

6.2 Water Regime

The topography within the mitigation area can be generally defined as flat to gently rolling terrain with a prominent ridge along the northwest side. Site surface and subsurface drainage is directed towards the south, off the adjacent ridge. A ditched seasonal stream crosses the subject area, although the ditch has not been maintained and is choked with reed canarygrass. The majority of the surface drainage either directly or indirectly drains into the unnamed seasonal stream, which flows into the Strait of Georgia approximately one mile south of the mitigation site.

A significant portion of the hydrology supporting this wetland originates from seasonal flooding of the site stream and poor soil percolation. Other factors influencing the hydrology within this wetland are direct

precipitation, stratigraphy, topography and soil texture. The average annual precipitation is 30 to 40 inches, with most falling in the months of November, December, January, February, and March. The average growing season is about 180 days and begins mid-March and ends the first part of November. The majority of the site wetland is underlain by Whitehorn silt loam, that, for this location, has a seasonal perched high water table at a depth of 0 to 12 inches from the surface November through May. The stratigraphy of Whitehorn silt loams is a series of slowly permeable soil horizons that are composed of layers of silt loams, loams, and sandy loams. Typically, subsoils underlying the wetlands have a silty clay subsoil. Dense silty clay prevents surface water collected from direct precipitation from percolating downward, resulting in saturated or inundated soil conditions, forming a perched high water table.

6.3 Soils

The Soil Conservation Service (SCS) indicates the presence of two soil series within the mitigation area. The dominant soil series is Whitehorn silt loam, which occupies the low areas within the site. Whitehorn silt loam is listed as hydric on the local Hydric Soils List (SCS 1991). A ridge of non-hydric Birchbay silt loam extends from the corner of Aldergrove and Gulf Roads southwest to the end of Lonseth Road.

6.4 Fauna

Although no sample plot was located in the mitigation area during bird surveys, notes were kept during site visits to this area (ATSI 1995). Birds observed included marsh wren, northern shrike, song sparrow, Savannah sparrow, common yellowthroat, barn and cliff swallows, northern harrier, and red-tailed hawk. Pacific chorus frogs were heard calling in the area and one dead rough-skinned newt was collected from the adjacent road (Gulf Road). No mammals were observed within the mitigation area, but frequent observation of coyote and deer, scat and prints, indicates these species commonly use the area. Refer to Section 3.4 for further information.

6.5 Existing Functions and Values

The Wetland Characterization system developed by the Washington Department of Ecology was used to assess the functional values of the wetland currently located within the proposed mitigation site. Wetland functions are divided into primary categories of wetland condition, buffers, wildlife habitat, fisheries habitat, hydrology, cultural values, shoreline stabilization, and heritage value. Within these primary categories individual functions are assessed point values of 1-3. Functions having values of 1 are considered low value; functions with values of 2 have moderate value; and functions with 3 points have high values. Below is a summary for the palustrine emergent, reed canarygrass wetland proposed for enhancement.

Table 5 indicates the functions and associated values for the wetland currently present in the proposed mitigation area. Functions which serve "moderate to high" values are: human impact, water quality, flood and storm drainage protection, and support of baseflow. The remaining functions received "low" values.

Table 5. Wetland Functions Currently Present at Mitigation Site.

FUNCTION	VALUE
Human Impact	2
Buffer structure and function	1.5
Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife.	1
Water quality	3
Flood and storm drainage protection	2
Support of baseflow	3
Shoreline stabilization	N/A
Sealevel rise	N/A
Ground water exchange	1
Cultural values	1
Heritage value	1

Several sources of human impact to this wetland have been observed. The surrounding land uses include regenerating forested tracts that were logged approximately 5 years ago, mowed agricultural land, and the ARCO refinery across Aldergrove Road. Gulf Road abuts the eastern side of the wetland. The headwaters to the on-site seasonal stream are the ditches along Gulf Road. Runoff from the roads may be a potential source of moderate pollutants entering the system. Other impacts include past ditching of the on-site seasonal stream and yearly mowing of the surrounding fields and wetland vegetation. The wetland is currently dominated by invasive plant species (reed canarygrass). The immediate buffers around the wetland are a mix of regenerating forest, mowed hay fields, and Gulf Road.

The current habitat value within this wetland is low. The wetland is composed of a single vegetation class dominated by non-native and invasive herbaceous plant species. No open water is present. The wetland has a moderate percentage of edge area for its shape. Habitat features such as snags, logs, or perches are absent from the wetland or the immediate buffer, except to the south, where low perches are present. Due to it's seasonal nature, the wetland and stream do not provide habitat for fish, but downstream the stream flows into a brackish marsh (one mile south) that may support fish. No fish have been found and are not considered to be present within the wetland.

Based on the Wetland Characterization forms, the wetland serves high water quality functions. This value is based on a relatively large size (> 10 acres, including off-site), moderate pollution inputs, slow water movement within the wetland, dense emergent vegetative cover, and moderately low slopes surrounding the wetland. Water movement is slow during flood periods to non-existent outside the flood season. The rate of movement within the wetland is slowed by low gradients and dense emergent vegetation.

The wetland serves moderate flood and stormwater abatement functions. The wetland is adjacent to a seasonal stream and is located at the headwaters of the stream. The wetland is located in a slight depression, providing low to moderate storage capacity. The dense emergent vegetation aids in reducing velocities and settling suspended sediment.

Because the wetland is adjacent to a seasonal stream, upgradient from a brackish marsh system, it has significant value in supporting the baseflow for the stream.

The wetland is not associated with any large body of water (lake, river, marine system), so does not serve functions associated with shoreline stabilization or sea level rise.

Heritage and Cultural values associated with this wetland are low. The wetland does not provide any apparent aesthetic value. It is a reed canarygrass dominated agricultural field. The wetland is not of a sensitive class and is not documented by the Natural Heritage Society as a high quality wetland. The site is not known to be on the National or State Register of Archaeological and Historic Sites and is not known to support any endangered, threatened, sensitive, or priority plant or animal species. The site is not identified in the any local Parks or Recreation Plans.

6.6 Expected Wetland Functions Post-Creation and Enhancement

Functional value will increase with most functions and at a minimum remain the same as a result of the proposed enhancement activities (Table 6). The only functions not expected to increase in value after enhancement are groundwater exchange and heritage value (heritage should however increase significantly as the created and enhanced wetlands mature). The soils underlying the wetland have a dense silt-clay layer restricting interaction with groundwater, enhancement activities would not change this. Heritage values are base on the presence of rare wetland communities and/or the presence of rare or sensitive plants or animals. Although the mitigation project will create palustrine forested wetlands, it will take many decades before the site would fit the description of a mature forested wetland.

Table 6. Expected Changes in Wetland Functional Values within Enhanced Wetlands.

Function	Current Value	Post-Enhancement Value
Human Impact	2	3
Buffer structure and function	1.5	3
Breeding, rearing, feeding, and wintering habitat for fish and/or wildlife	1	3
Water quality	3	3
Flood and storm drainage protection	2	2
Support of baseflow	3	3
Shoreline stabilization	2	3
Sea level rise	N/A	N/A
Ground water exchange	1	1
Cultural value	1	2
Heritage value	1	1

Surrounding landscapes will include forested and shrub habitat to the south and west and a connection to the protected stream corridor. This adjoining stream corridor is a naturally vegetated corridor that extends from the mitigation site to the marine environment. This mitigation proposal places the stream corridor (100 feet on both sides of stream high water mark) in a conservation easement recorded on the property deed.

A rail line will be located approximately 50 feet west of the enhancement area and will lie between the creation areas. The area surrounding the rail line will be planted with native upland shrubs and trees to provide sound and visual buffers. Gulf Road is adjacent to the east side of the project with no upland buffer per se, however the current emergent vegetation will be enhanced with native tree and shrub species, providing a buffer with more diversity and structure.

The wetland lies at the headwaters of the seasonal stream. Wetland hydrology is currently provided by a straight ditch surrounded by non-native, herbaceous vegetation. The ditch will be rerouted to flow through

a series of seasonal pools and re-vegetated with native herbaceous, shrub, and tree species. Water movement through the existing wetland is slow and passes through dense emergent vegetation. Water movement through the mitigation area would continue to be slow and pass through a dense combination of herbaceous and woody vegetation. Although the wetland currently provides significant water quality functions, addition of woody plant species and increased structural diversity of the topography and vegetation will further increase water quality functions.

Current human impacts to the on-site wetland include ditching, road run-off, seasonal mowing, and past logging in the forested buffer to the south. Much of the water entering the wetland originates from road side ditches along Gulf Road. This water may contain some pollutants typical of road runoff (e.g. petroleum products and heavy metals). Increased channel area and floral diversity would increase the mechanical and biological treatment of pollutants within the mitigation area.

Habitat value within the mitigation area will increase in functional value. The wetlands are currently dominated by a single vegetation class (dominated by an invasive plant species) with no interspersion between wetland classes. No significant habitat features currently exist within the wetland. Enhancement of this area would increase the number of wetland classes from one to four and increase the percentage of native wetland plants. Habitat features (e.g. snags, logs, perches, islands) will be added during the construction and also will naturally form as the community matures. As mentioned previously, the mitigation area is connected to a larger riparian-marine corridor that will be protected under a conservation easement.

At present there is little cover over the stream channel other than reed canarygrass. Plantings of dense woody plant species will provide a canopy that will shade the water to maintain low water temperatures. Large organic matter (e.g. logs and root masses) will provide shelter for invertebrates and amphibians, add structural diversity, and will act as nurse logs.

6.7 Functions Summary

Table 7 provides a comparison of the existing wetlands to be filled with the changes in functions and values as the result of this project. A total of 5.85 acres of existing wetlands and their associated functions will be lost due to fill. The lost wetland acreage will be replaced by creating an equal area of wetlands within the proposed mitigation area. In addition, the values of all the functions found in the filled wetlands will be replaced and increased. The increase in value will be associated with a greater floral, faunal, and structural diversity; association with a seasonal stream and a riparian corridor; and placed in a native growth protection area.

Proposed enhancement of a wetland that is currently of low value will increase in value in most functions (Table 7). The vegetation diversity, both in species and structure will be increased, improving wildlife and water quality and quantity functions. The resultant project will also provide more diverse scenic opportunities therefore increasing the culture functions.

Table 7. Summary of the functions and values for the impacted and mitigated wetlands.

Functions	Existing PEM Wetlands (4.3 acres)	Existing PSS Wetlands (1.45 acres)	Existing PFO Wetlands (0.1 acres)	Created PSS/PFO Wetlands (5.9 acres)	Enhanced Wetlands (16.2 acres)
Wetland Condition	1.5	2	3	3	3
Buffer Structure and Function	1.5	2.5	2.5	3	3
Wildlife Habitat	1	2	1.5	3	3
Water Quality	2	2	3	3	3
Flood and Stormwater Protection	1	2	2	2	2
Support of Baseflow	1	2	1	3	3
Shoreline Stabilization	n/a	n/a	n/a	n/a	n/a
Groundwater Exchange	1	1	1	1	1
Cultural Value	0	0	0	2	2
Heritage Value	0	0	0	1	1

6.8 Existing Water Quality

No water quality data has been collected to date.

6.9 Existing Buffers

The proposed mitigation site is currently buffered by field and forest vegetation. The buffer within 100 feet of the existing wetland is dominated by non-native grasses on the north and west side, Gulf Road on the east, and regenerating shrub and forest vegetation on the south. Beyond the immediate buffer, forested and shrub vegetation dominate on the east side of Gulf Road and to the south and west of the mitigation area, the ARCO refinery is located on the north side of Aldergrove Road.

Surrounding land uses include: fallow fields to the east, forested tracts to the west and south, and Heavy Industry with rail to the north.

6.10 Wetland Rating and Water Type

Based on the Whatcom County Wetland Rating System, this palustrine emergent wetland is a Category III wetland. The DOE four tiered rating system also designates this wetland as a Category III wetland. These ratings are based on a size of greater than 5 acres, hydrological connection to a seasonal stream, and the presence of one wetland class dominated by non–native and invasive vegetation (ATSI 1995).

Based on the Whatcom County Water Categories Rating System, the on–site stream is a Type 5 Water within the reach on the mitigation site. This rating is based on the streams seasonal nature, no records of use by anadromous fish or game fish, and no domestic use. The average channel width is between two and three feet in most areas. Within the reach on the mitigation site, the stream has been ditched and is currently choked with reed canarygrass.

6.11 Position and Function of Wetland in Landscape

The proposed mitigation enhancement site is located at the headwaters of an unnamed seasonal stream. Water collects from upstream ditches and flows southwest across the subject area. The stream flows within a ditch across the subject field and enters a braided channel south of the mitigation area. The stream flows through a large ravine, approximately 1/2 mile down gradient from the proposed mitigation area.

6.12 Site Constraints

None identified.

7.0 FINAL SITE PLAN

7.1 Methods

Goal 1: Create 5.9 acres of seasonally saturated palustrine forested/scrub–shrub wetland to provide a 1:1 areal replacement ratio for wetlands filled.

Water Regime

A. A seasonally saturated hydrologic regime will be present within the created wetland areas.

> Performance Standard: A minimum of 5.9 acres will be saturated within the upper 12 inches of the soil horizon for at least 21 days during the early growing season (March/April).
>
> **Method for Performance Standard**: Seasonally saturated wetlands will be created by removing the top 12 to 24 inches of topsoil to expose the perched water table from a total of 5.9 acres of upland (hydrology data from Shapiro 1995).

Vegetation Structure

A. The created wetland areas will be vegetated with a minimum of 5.9 acres of palustrine forested/scrub–shrub vegetation class with canopy, shrub, and herbaceous vegetation layers. Partial planting of the plants will begin one year after construction to allow confirmation of the hydrological regime. Monitoring will occur over a ten year period on a seasonal basis with reports written the 1st, 3rd, 5th, 7th, and 10th years post construction/planting.

First year monitoring. Performance Standard: Native plant species will have a minimum cover of 15% after the first year.

Third year monitoring. Performance Standard: Native plant species will have a minimum cover of 25% after the third year.

Fifth year monitoring. Performance Standard: Native plant species will have a minimum cover of 50% after the fifth year.

Seventh year monitoring. Performance Standard: Native plant species will have a minimum cover of 75% after the seventh year.

Tenth year monitoring. Performance Standard: Native wetland forest vegetation will cover the 5.9 acre site with 50% canopy cover, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Methods for Performance Standard: Native emergent, shrub, and tree plant species from the list in Appendix C will be planted in random groupings of species. Plant sources will be from local nurseries using plants from the local gene pool. A combination of sprigs and seeds will be used in planting herbaceous plants. Plant material will be installed according to the specifications in Appendix C.

Goal 2: Enhance a 16.2 acre monotypic stand of reed canarygrass into a diverse forested wetland habitat.

Water Regime

A. Both seasonally saturated and seasonally flooded hydrologic regimes will be present within the enhancement area.

Performance Standard: A minimum of 16.2 acres will be a complex (an approximate 8.1 acres of each) of seasonally saturated and seasonally flooded soils. The saturated zone will occur within the upper 12 inches of the soil horizon for at least 21 days during the early growing season (March/April). The flooded zone will also occur for 21 days during the growing season with an approximate depth of 24 inches.

Methods for Performance Standard: Seasonally saturated and shallow seasonally flooded wetlands currently exist for the enhancement area. Additional deep (24 inches) flooded areas will be created by removing the top 6 to 12 inches of topsoil to expose the perched water table from approximately 1/2 of the area. In addition, small "islands" approximately 6 to 12 inches in height, using clean upland soil from adjacent areas, will be deposited within the flooded area. An excavator will be used to add meanders to the current straight, ditched stream channel. Soils removed for adding depth to the mitigation site will be transported off-site.

Vegetation Structure

A. The dominance of reed canarygrass will be reduced within the mitigation area within ten years.

Performance Standard: Less than a 25% cover of reed canarygrass, measured along permanent transects with 20X50 cm rectangular quadrats, will be present after ten years.

Method for Performance Standard: Reed canarygrass will be sprayed with glyphosate in the Spring. Several weeks after glyphosate application the field will be plowed, disked, and planted with a cover crop (Appendix C, such as annual rye). The field will be either entirely or spot sprayed between 30 to 45 days later and replanted with a cover crop. All spraying will be performed by a certified pesticide–herbicide applicator and monitored by a qualified biologist. If the reed canarygrass is greater than 24 inches high, it will be cut and bailed and will be allowed to grow approximately 2 inches prior to spraying.

B. The wetland will be vegetated with a minimum of 16.2 acres of palustrine forested, palustrine scrub–shrub and palustrine emergent vegetation classes composed of native plant species. Percent cover of the vegetation and number of live and dead plants (by species) will be measured along permanent transects using 20X50 cm quadrats. Partial planting of the plants will occur one year after construction to allow confirmation of the hydrological regime. Monitoring will occur over a ten year period on a seasonal basis with reports written the 1st, 3rd, 5th, 7th, and 10th years.

First year monitoring. Performance Standard: Native plant species will have a minimum cover of 15% after the first year.

Third year monitoring. Performance Standard: Native plant species will have a minimum cover of 25% after the third year.

Fifth year monitoring. Performance Standard: Native plant species will have a minimum cover of 50% after the fifth year.

Seventh year monitoring. Performance Standard: Native plant species will have a minimum cover of 75% after the seventh year.

Tenth year monitoring. Performance Standard: Native wetland forest vegetation will cover the 16.2 acre site with 50% canopy cover, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Methods for Performance Standard: Entire area will be planted with a representative sampling of the listed tree and shrub species (Figure 5 and Appendix C), bare root or 1 gallon containers, within groups of 5 to 10 plants spaced 20 to 100 feet apart, one year post excavation. The entire area will also be planted with a representative sampling of the below listed herbaceous species (herbs), bare root or seeds, within groups of 10 to 20 plants spaced 20 to 50 feet apart, two years post excavation. The herbaceous species will also be seeded (with seed hand collected locally), if practicable, randomly along the entire perimeter of the seasonally flooded areas, additional native plants may be included. The buffer and remaining area will be planted with annual rye. These plants and seeds will be planted in late winter (assume late February or mid March at the latest). This lapse of time will allow for a complete and thorough understanding of the seasonal variation within the water table, therefore increasing the success rate of the plantings. If natural recruitment of desired plants occurs prior to two years, planting will discontinue. Actual monitoring will begin the following summer (approximately one year after excavation) to allow time to observe natural vegetation recruitment and success of seed stock, bare root, and container plantings. It is the belief of the designer that natural recruitment of many plants will occur within one to two years of construction. It is therefore our intent to allow all natural non–invasive plants to become established and document their presence. Measurement of re–vegetation success will follow the first two years of construction and will consist of 50% cover (or one healthy plant per square meter of entire site). Success following three years post construction will be 100% cover of native and/or non–invasive species. If after the first two years following construction the goal

of one healthy plant per square meter is not obtained, the bare areas will be planted. Two as–built reports will be written, one post construction in the fall and the second post planting in early spring. All subsequent monitoring will occur on an annual basis during the fall (prior to the first killing frost) and reports the 1st, 3rd, 5th, 7th, and 10th year.

Habitat Attributes

A. The enhancement area will provide habitat for at least four species of **amphibians** within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for both terrestrial and aquatic amphibian species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present throughout the enhancement area early in the growing season (Feb.–July). To restrict occupation by bullfrogs (*Rana catesbeiana*) year–long inundation within the enhancement area will be avoided.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Methods for Performance Standards: Amphibian breeding habitat will be created by excavating pools with a variety of depths and sizes to maximize the potential breeding areas for a number of amphibian species (Figure 5). A variety of emergent plant species will be planted to provide support for amphibian egg masses. Pools will be excavated with low slopes and seasonal, but long duration standing water to provide breeding areas of northwestern salamanders, rough–skinned newts, red–legged frogs, Pacific chorus frogs, and long–toed salamanders that have long maturation rates. Pools with short inundation periods (3 to 5 weeks) will be created to facilitate Pacific chorus frogs and long–toed salamanders that utilize temporary pools. Approximately 200 each of logs and root masses will be spread throughout wetland areas to provide cover for amphibians.

B. The enhancement area will provide habitat for at least four species of **aquatic insects** within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for aquatic invertebrates. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present throughout the enhancement area early in the growing season (Feb.–July).

Method for Performance Standard: Snags will be installed at a variety of heights and angles. Root masses and logs in various stages of decay will be scattered randomly throughout the enhancement area. Logs or root masses located within 25 feet of the stream channel will be partially buried to prevent movement.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Method for Performance Standard: See above under Section A.

C. The enhancement area will provide habitat for at least three **waterfowl** species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide nesting sites, cover and forage areas for waterfowl species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present throughout the enhancement area early in the growing season (Feb.–July).

Method for Performance Standard: Snags will be installed at a variety of heights and angles. Root masses and logs in various stages of decay will be scattered randomly throughout the enhancement area.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Method for Performance Standard: Native emergent, shrub, and tree plant species from the list in Appendix C will be planted in random groupings of species. Plant sources will be from local nurseries using plants from the local gene pool. A combination of sprigs and seeds will be used in planting herbaceous plants. Plant material will be installed according to the specifications in Appendix C.

Performance Standard: A minimum of 5 temporary nesting boxes suitable for cavity nesting waterfowl (e.g. wood duck, hooded merganser) will be placed around the mitigation area.

Method for Performance Standard: Boxes will be constructed of cedar and measure 12" wide by 24" high. They will be installed on posts or snags throughout the enhancement area.

D. The enhancement area will provide habitat for at least two **mammal** species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide cover and forage areas for mammal species. Woody material will be > 12 inches in diameter and > 15 feet long.

Method for Performance Standard: Snags will be installed at a variety of heights and angles. Root masses and logs in various stages of decay will be scattered randomly throughout the enhancement area.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years to provide cover and forage for mammal species.

Method for Performance Standard: Native emergent, shrub and tree plant species from the list in Appendix C will be planted in random groupings of species. Plant sources will be from local nurseries using plants from the local gene pool. A combination of sprigs and seeds will be used

in planting herbaceous plants. Plant material will be installed according to the specifications in Appendix C.

E. The enhancement area will provide habitat for at least five **passerine bird** species within five years.

Performance Standard: A minimum of 50 snags, 200 logs, and 200 root masses will be randomly placed throughout the wetlands to provide nesting sites, cover and forage areas for passerine species. Woody material will be > 12 inches in diameter and > 15 feet long.

Performance Standard: Multiple areas (1 to 2 acres) of standing water with maximum depths of 24 inches shall be present within the enhancement area early in the growing season (Feb.–July).

Method for Performance Standard: Snags will be installed at a variety of heights and angles. Root masses and logs in various stages of decay will be scattered randomly throughout the enhancement area. Logs or root masses located within 25 feet of the stream channel will be partially buried to prevent movement.

Performance Standard: Three vegetation classes, dominated by native wetland forest vegetation, will cover at least 16.2 acres with a minimum canopy closure of 50%, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Method for Performance Standard: Native emergent, shrub, and tree plant species from the list in Appendix C will be planted in random groupings of species. Plant sources will be from local nurseries using plants from the local gene pool. A combination of sprigs and seeds will be used in planting herbaceous plants. Plant material will be installed according to the specifications in Appendix C.

Performance Standard: A minimum of 5 temporary nesting boxes suitable for passerine species will be placed around the mitigation area (e.g. tree and violet green swallows, black–capped chickadee, Bewick's wren).

Method for Performance Standard: Boxes will be constructed of cedar and measure 4" wide by 5" high. They will be installed on posts or snags throughout the enhancement area.

Goal 3: Assure the protection of the on–site stream corridor.

A. A sufficient buffer shall remain to maintain the current riparian corridor and habitat attributes.

Performance Standard: A 100 foot corridor on both sides of the on–site stream will be placed in a Native Growth Protection Area and protected.

Method for Performance Standard: Stream side buffer shall be field flagged prior to any nearby construction.

Goal 4: Conduct a study on a designated 1.5 acre plot researching the natural regeneration of vegetation over time within a seasonally saturated, palustrine emergent agricultural field, and investigate the success of selected upland, facultative upland, and facultative wetland plants planted over a range of hydrogeomorphic regimes within this field.

A. Record the natural successive changes over time in an agricultural palustrine emergent wetland over a range of hydrogeomorphic regimes.

Performance Standard: A minimum of 3 permanent transects will be established perpendicular to the water gradient within the 0.75 acre (1/2 of the 1.5 acre area) agricultural field (Figure 5).

Method for Performance Standard: Transects will be marked with rebar in the field. Data will be collected on numbers and types of species present, their percent cover, and their heights will be recorded from representative sample plots along the transects over a period of ten years. Statistical analysis will be performed to compare the above mentioned data between and among hydrological regimes.

B. Investigate the success of selected upland, facultative upland, and facultative wetland plant species planted over a range of hydrogeomorphic regimes.

Method for Performance Standard: The following plants will be planted approximately 1 meter apart in rows spaced approximately 2 meters apart: *Abies grandis, Acer circinatum, Acer macrophyllum, Betula papyrifera, Crataegus douglasii, Cornus stolonifera, Holodiscus discolor, Lonicera involucrata, Oemleria cerasiformis, Physocarpus capitatus, Picea sitchensis, Pinus contorta, Prunus emarginata, Pseudotsuga menziesii, Pyrus fusca, Rosa gymnocarpa, Rosa nutkana, Rubus spectabilis, Rhamnus purshiana, Sambucus racemosa, Spiraea douglasii, Symphoricarpos albus, and Tsuga heterophylla.*

Method for Performance Standard: Data will be collected on numbers and types of species present, their percent cover, and their heights will be recorded from representative sample plots along the transects over a period of ten years. Statistical analysis will be performed to compare the above mentioned data between and among species.

Goal 5: This goal is not directly related to wetland disturbance, but addresses cultural functions lost on a regional basis. This goal attempts to provide compensation for the regional loss of natural resources important to the Lummi Indian Tribe's culture heritage.

A. Natural resources available for harvest by the Lummi Indian Tribe will be established to provide totem pole stock and cedar bark for future cultural uses by the Lummi Indian Tribe.

Method for Performance Standard: Specific locations and numbers of trees outside the mitigation areas will be determined in a joint planning effort between the proponent and the Lummi Indian Tribe.

7.2 Soil Amendments

Although reed canarygrass is present, the original wetland soil will be used with minor modifications in topography. Treatment of the soil will include spraying with glyphosate, plowing, and planting with cover crops and native vegetation.

Approximately nine (9) acres of (clean, no invasive plants present) soil from the forest to the west, within the proposed rail loop, will be transferred and placed in approximately 200, 50 foot diameter seasonally saturated islands. These islands will be randomly scattered throughout the seasonally flooded area within the enhancement and creation site to create seasonally saturated zones in existing and created flooded areas (Figure 5). These soils are Birchbay silt loam with a loamy texture. The donor areas are dominated by native forest plant species such as red alder, paper birch, vine maple, red elderberry, western snowberry, and baldhip rose. No non–native or invasive plant species were observed in these areas during site visits (ATSI 1995).

7.3 Plant Material

Plantings in the enhancement area are categorized according to four broad water regimes: upland, forested, scrub–shrub, and emergent. The species included in each of these water regimes are listed in Appendix C.

This water regime system allows plant species to be chosen that take advantage of select but different hydrologic conditions, assuring a diversity of species and a successful project. Plant species and density of planting described in Appendix C will be followed.

All excavation, woody material placement, and planting of all wetland areas will be done **in the presence of a wetlands biologist familiar with the project according to the drawings and plan**. Soil quality will be one of the major determinants of the success of the project, therefore excavation may deviate slightly from the construction drawing at the discretion of the biologist.

Planting will take place in the late winter or early spring as indicated above (7.1, Goal 2, Section C, item B, **Methods for Performance Standard** (page 27) . Plant stock will primarily come from off–site sources for quantities sufficient for adequate cover. A contract will be made with a local nursery for plant materials. Appendix C indicates the condition (e.g. bare–root, balled–and–burlapped, cutting, seed) of the plant material for each species and the water regime it will be placed. Additional species noted at the bottom of Appendix C will likely be introduced by wind and waterfowl.

7.4 Habitat Features

Snags and downed logs will be added at a densities discussed above (7.1, Goal 2, pg. 26). Snags provide a variety of wildlife with food, habitat, and substrate. Cavity nesting species such as woodpeckers, chickadees, wrens, some owls, wood ducks, and hooded mergansers use snags for nesting sites. Insects inhabiting decaying wood in snags and downed logs provide food for a number of species including, woodpeckers, squirrels, rough skinned newts, northwestern salamander, and western red–backed salamander. Logs within the wetland provide pathways through the wetlands and substrate for wetland vegetation.

Inundated areas within the wetland increase the value of the wetland to wildlife by providing potential breeding and rearing areas for amphibian species such as western red–backed salamander, northwestern salamander, rough skinned newts, red–legged frogs, and Pacific chorus frogs. These species require a diversity of terrestrial and aquatic habitats that do not currently exist in this area.

No habitat features are suggested for the riparian corridor. Sufficient material occurs within the corridor and natural vegetation will continue to add to the number of downed woody material and snags over time. Significant damage to existing vegetation may occur from heavy equipment if additional woody material were to be added.

7.6 Erosion Control

In order to rapidly establish ground cover, bare ground within mitigation areas will be planted with a mix of the following species (*Lolium multiflorum, Alopecurus geniculatus, Agrostis stolonifera, Holcus lanatus, or Lotus corniculatus)* at a minimum rate of 50 lbs/acre. This will inhibit invasion by weedy exotic species, reduce erosion, and improve the quality of the soil.

8.0 MONITORING PLAN

Monitoring will occur on a seasonal basis for 10 years post construction/planting. However, monitoring reports written specifically for the regulatory agencies will be performed by a qualified wetland biologist at the peak of the growing season for 10 years (years 1, 3, 5, 7, 10) after the wetland construction and planting is completed. A quantitative analysis of biotic and abiotic conditions will be made in July/August during years 1, 3, 5, 7 and 10. The written report will summarize the findings and will be provided to the Army Corps of Engineers and other relevant agencies after each monitoring session. These reports will include an assessment of plant survival and percent cover, conditions of plants, natural plant recruitment, soil conditions, hydrology, invasion by exotic plant species and percent cover, observations of fauna, and an overall project description and suggested maintenance procedures.

Any changes that occur in this mitigation shall first be reviewed by a qualified wetlands biologist and if the change/s are/is considered significant, the U.S. Army Corps of Engineers will be contacted.

8.1 Vegetation

Permanent transects and photo points will be established for data collection. Percent cover of vegetation, survivorship of planted material, height of trees and shrubs, and total canopy cover will be tabulated at the peak of the growing season (July/August). Mitigation success will be staged as follows:

First year monitoring. Performance Standard: Native plant species will have a minimum cover of 15% after the first year.

Third year monitoring. Performance Standard: Native plant species will have a minimum cover of 25% after the third year.

Fifth year monitoring. Performance Standard: Native plant species will have a minimum cover of 50% after the fifth year.

Seventh year monitoring. Performance Standard: Native plant species will have a minimum cover of 75% after the seventh year.

Tenth year monitoring. Performance Standard: Native wetland forest vegetation will cover the mitigation site with 50% canopy cover, an 80% cover of native shrubs, and 25% cover of native herbaceous plants within ten years.

Planted and natural recruitment of plants will be noted and discussed. If a performance standard is not met within the time specified in the mitigation plan an analysis of the cause of failure will be determined, proposed corrective action will be made, and a time frame for implementing these actions will be presented. Minor corrective measures will be included in routine maintenance and will be identified in the subsequent monitoring report.

8.2 Water Regime

The water table will be measured during the beginning of the growing season (April) and once in the summer (August) for the entire monitoring period during the 1st, 3rd, 5th, 7th, and 10 year.

8.3 Development of Habitat Structure

Habitat variables of plant species present and percent cover (plus height for shrubs and trees), total canopy cover, density of dead wood, and vertical vegetation density will be measured along 3 permanent transects. Permanent photo points will be established along each transect and photographs will be taken at the peak of each growing season (July/August).

8.4 Fauna

Aquatic macro–invertebrates will be sampled by dip net in the spring and late summer during the monitoring years. Insects will be keyed to genus. Records of taxa observed will be kept.

Amphibians will be sampled by visual observation in the spring and fall of each monitoring year. Counts will be made of amphibian egg masses in the spring of each year. Records of observations will be maintained of species observed and egg masses.

Birds will be identified by call, song, pecking and drumming patterns, and visual sighting during 15 minute observations at two permanent census stations during April/May and December/January of the monitoring years.

9.0 SITE PROTECTION

9.1 Legal protection

The mitigation site, study site, and riparian buffer will be designated as a Native Growth Protection Area recorded on the property deed and will read as follows:

All land within the Native Growth Protection Area shall remain in a natural state. There shall be no clearing, vegetation removal, grading, filling, or construction of any kind within this area without the written approval of Whatcom County or responsible agency. The only exception to this requirement shall be in the case of emergencies for the protection of private property and public health, safety, and resources, such as for the removal of diseased or hazardous trees, or maintenance of existing roads, or installation of utilities, or transportation corridors that "may" be required to cross the seasonal stream, only. Any disturbance of vegetation that may occur through such emergency activities shall be repaired. For possible permanent damage to this area, a permit from the relevant agencies shall be obtained. The mitigation site, study site, and riparian buffer will be protected in perpetuity.

10.0 MAINTENANCE AND CONTINGENCY PLANS

10.1 Maintenance schedule

The following maintenance activities will be funded for this site for ten years after construction and planting: site inspection and reports, weed control, plant replacement, erosion control, and protection from herbivores.

Weed control will begin immediately after planting and will occur monthly if necessary during the growing season for the first two years and yearly after that. Plants will be replaced if a survival rate of less than 80 percent of a given species is observed and if natural recruitment has not occurred. Plants will be inspected during seasonal visits for significant damage from herbivores. Spot spraying of glyphosate for control of reed canarygrass will occur on the same regime. If predation of young plants becomes a

problem (reduction of greater than 50% of plantings), animal repellents such as METHOCARB® for geese or ROPEL® for deer may be used.

10.2 Contingency Plan

If a performance standard is not met within the time specified in the mitigation plan an analysis of the cause of failure will be determined, proposed corrective action will be made, and a time frame for implementing these actions will be presented. Minor corrective measures will be included in routine maintenance and will be identified in the subsequent monitoring report.

If significant reduction of reed canarygrass cannot be accomplished through herbicide application, plowing and planting with a competitive cover crop, flooding of the field will occur. Flooding can be accomplished by use of the installed weir. With the presence of the berm and weir most of the field can be flooded to depths of between three to six feet.

11.0 IMPLEMENTATION SCHEDULE

11.1 Construction Schedule

Initial spraying of glyphosate for control of reed canarygrass will occur in the early Spring, followed by plowing and disking (if practicable), and application of an erosion/competitive cover crop (Appendix C). An additional application of glyphosate will occur in 30 to 45 days following the initial spraying, if required, and the site will again be seeded with an annual cover crop. Excavation will be in the dryer summer months (July/August/September). **If practicable, all spraying and plowing will occur the first year prior to the construction of the terminal.**

11.2 Monitoring Schedule

An "as-built" report will be provided upon completion of construction and planting, and updated as both progress if extended over a one year period. This site will be monitored on a seasonal basis for 10 years following construction and planting. These seasonal site visits are intended to be qualitative and will give the assigned biologist the necessary information to understand the subtle changes (hydrological, flora, and faunal use) of the site. A more intensive monitoring will occur on the 1st, 3rd, 5th, 7th, and 10 year post planting. A report will be written as discussed in the above sections to be provided to the relevant agencies (U.S. Army Corps of Engineers, etc.)

12.0 PERFORMANCE BOND

A bond will be purchased before construction begins. A total construction bond of $509,620.00 based on $2.00 a square foot of wetland disturbed. The bond will be divided into three phases: construction, planting, and maintenance and monitoring. Two-thirds ($339,938.00) of the bond will be placed in the construction phase and will be released upon completion of construction and submittal of and approval of the as-built report, by U.S. Army Corps of Engineers. One-sixth ($84,857.00) will be held until planting has been completed and will be released with the submittal of the first year monitoring report with approval by the U.S. Army Corps of Engineers. The remaining one-sixth ($84,857.00) will be applied towards maintenance and monitoring and will be released at the end of the monitoring period (10 years research and monitoring for the creation, enhancement, and study sites).

The bond figures mentioned above are not the anticipated costs, but are for the assurance that the project will be completed. If at any time a portion of said work is completed, that relative portion of the bond will be released.

Figure 2. Project location on a 1987 aerial photograph.

WETLAND IMPACT AREAS

Area 1	53,663	(PEM)
Area 2	9,231	(PEM)
Area 3	14,788	(PEM
Area 4	119	(PEM)
Area 5	4,675	(PFO/SS)
Area 6	551	(PSS)
Area 7	5,233	(PEM)
Area 8	152	(PEM)
Area 9	4,152	(PEM/SS)
Area 10	3,339	(PEM/SS)
Area 11	6,114	(PEM/SS)
Area 12	404	(PEM/SS)
Area 13	12,745	(PEM/SS)
Area 14	243	(PEM)
Area 15	10,015	(PEM)
Area 16	1,665	(PEM)
Area 17	948	(PEM)
Area 18	126,869	(PEM/SS)

Palustine emergent	4.3 acres
Paustrine scrub/shrub	1.4 acres
Palustrine forested	0.1 acres

Total area	254,936	(5.85 acreas)

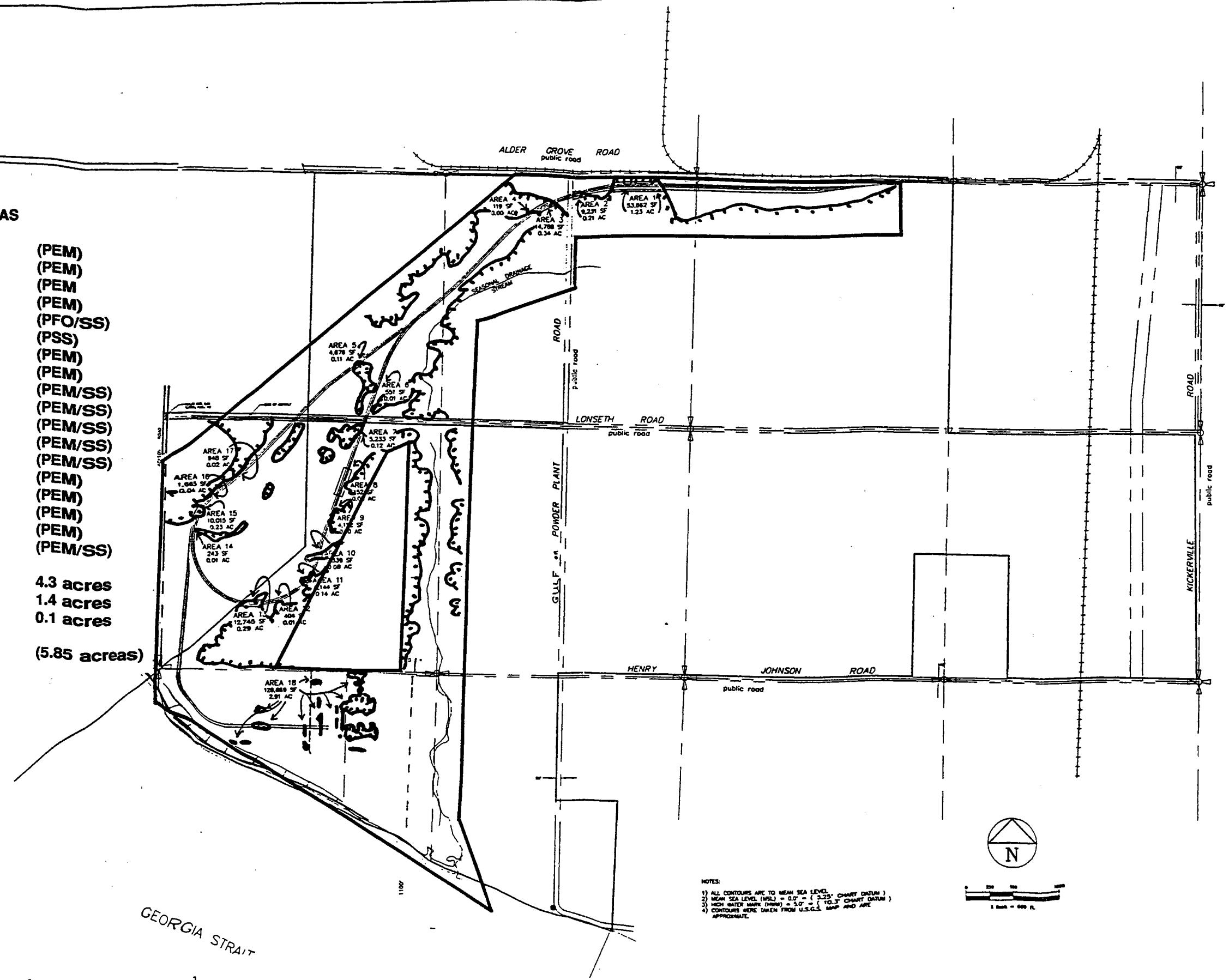


Figure 3. Delineated and surveyed wetlands, indicating fill areas. Total disturbance 5.85 acres.

GATEWAY PACIFIC TERMINAL
WETLAND IMPACT MAP

DAVID EVANS AND ASSOCIATES, INC.

REVISIONS

1 of 1 SHEETS

SCALE 1"=500'

DATE 10-27-95

DRAWN DWMA

APPENDIX A

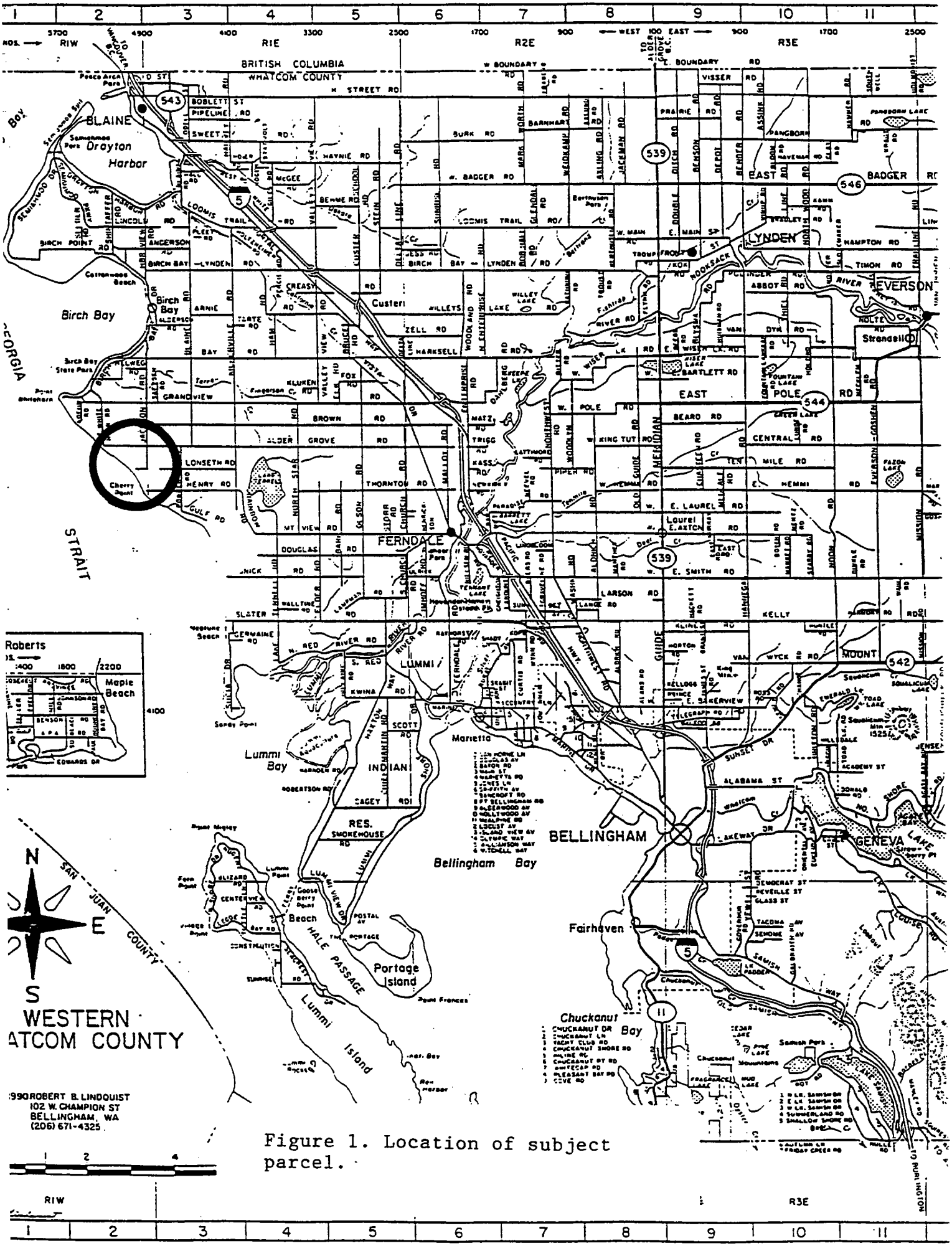


Figure 1. Location of subject parcel.

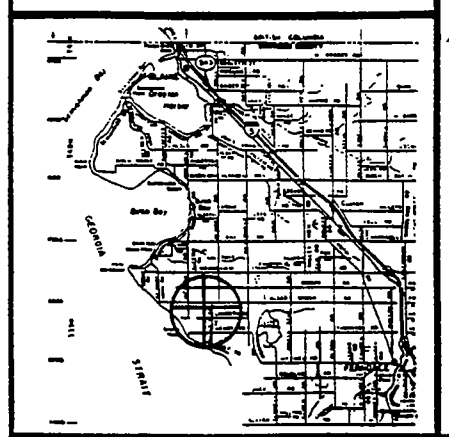
Figure 4. Native Growth Protection areas. Including mitigation site and creek channel area.

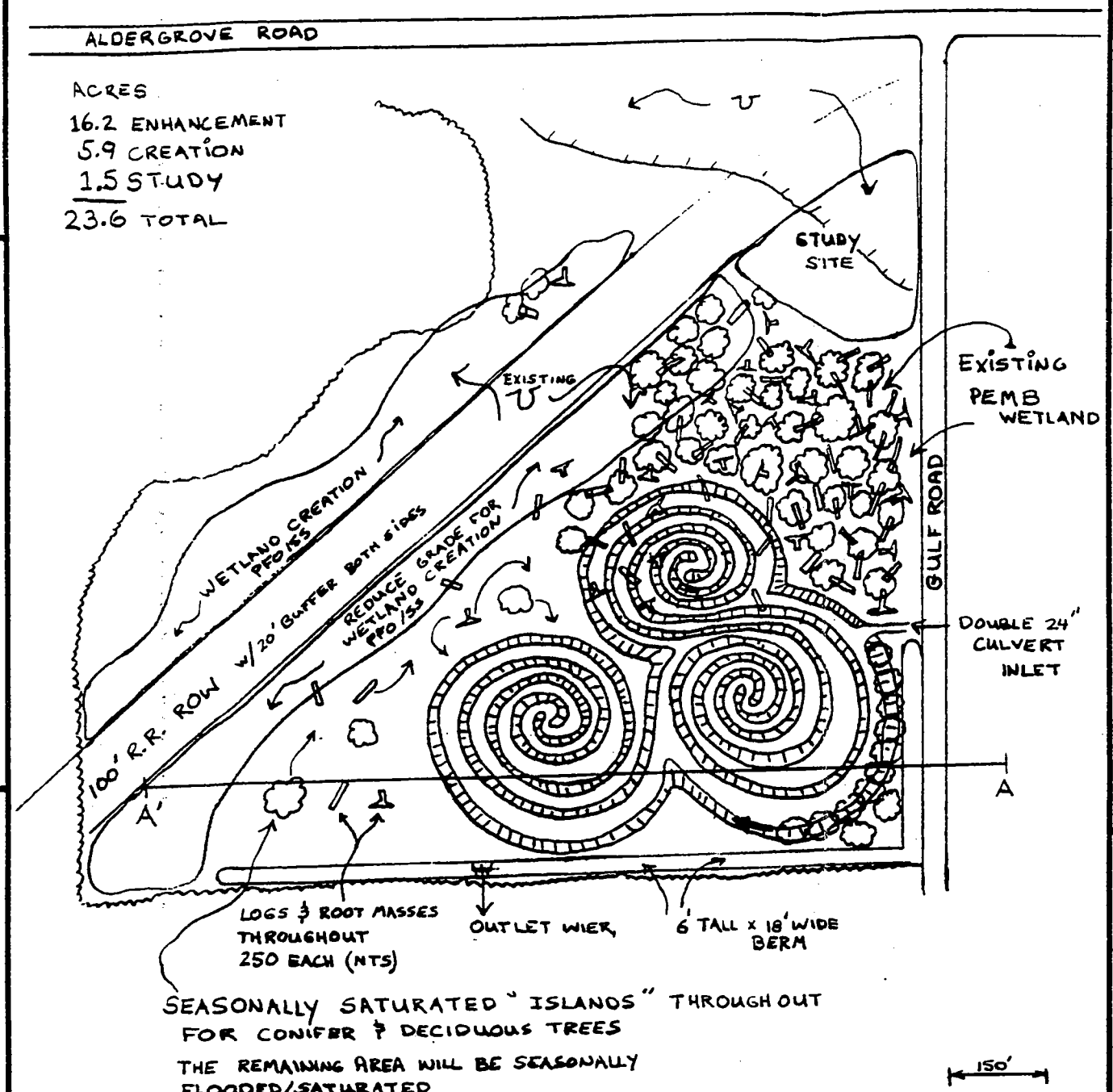
CELTIC SPIRAL

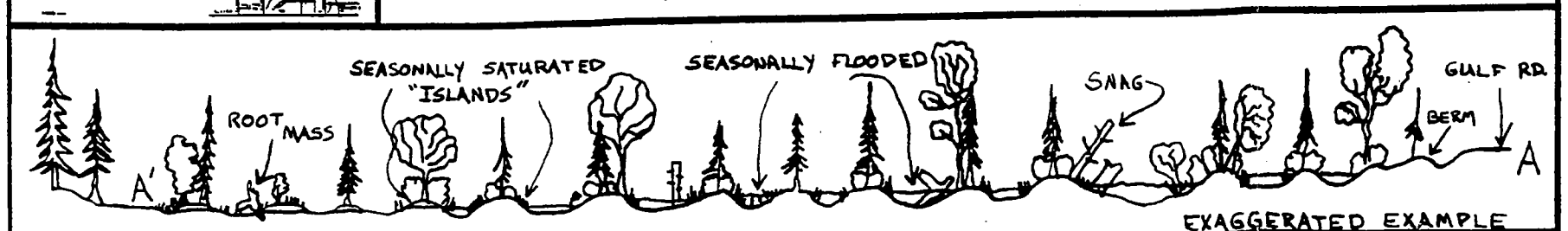
* ENHANCEMENT
* CREATION
* STUDY

A.T.S.I.

AQUA-TERR SYSTEMS, INC.





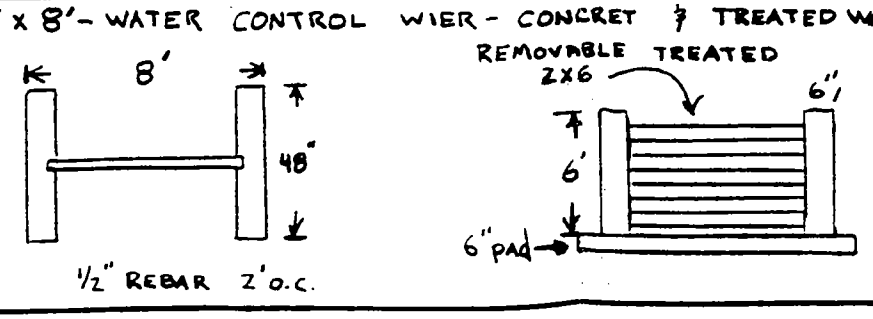


STUDY SITE:

This entire area will be treated the same as the adjacent restoration site during site preparatory work. One half will be planted with the below mentioned plants in rows extending from the upland into the seasonally flooded area. The other half will remain untouched after earth work. The intent of this study area is to document natural recruitment of a farmed wetland and to identify which plant species will successfully grow in each area (upland to wetland). A discussion of the entire study site will be documented for ten years on a seasonal basis. Data of soil hydrology, plant height, plant aerial cover, and a qualitative assessment of the viability of each plant will be collected. A statistical comparison of each species will be performed. The following is a list of species to be used in this study:

Abies grandis, Acer circinatum, Acer macrophyllum, Betula papyrifera, Crataegus douglasii, Cornus stolonifera, Holodiscus discolor, Lonicera involucrata, Oemleria cerasiformis, Physocarpus capitatus, Picea sitchensis, Pinus contorta, Prunus emarginata, Pseudotsuga menziesii, Pyrus fusca, Rosa gymnocarpa, Rosa nutkana, Rubus spectabilis, Rhamnus purshiana, Sambucus racemosa, Spiraea douglasii, Symphoricarpos albus, Tsuga heterophylla

6' x 8' - WATER CONTROL WIER - CONCRET & TREATED WOOD



HABITAT FEATURES AND CONDITIONS

* Construction will occur during the late summer months.
* At least 50 snags, > 12" diameter, > 15 ' tall, will be randomly placed.
* At least 200 floating logs, > 12" diameter, > 15 ' long, will be randomly placed.
* At least 200 root masses (from trees greater than 6 feet diameter) will be randomly placed.
* Annual rye (*Lolium multiflorum*) will be seeded @ 50 lbs/acre on all bare ground, post construction.
* All contractor selection, construction, planting, maintenance, and monitoring will be supervised by a qualified wetlands biologist familiar with the site and plans. Any and all changes to this plan need to be approved by the qualified wetlands biologist prior to implementation.
* Ten temporary cardboard bird boxes of varying sizes will be placed randomly on the snags and surrounding trees.
* Entire area will be planted with a representative sampling of the below listed tree and shrub species, bare root or 1 gallon containers, within groups of 5 to 10 plants spaced 20 to 100 feet apart, one year post excavation. Entire area will also be planted with a representative sampling of the below listed herbaceous species (herbs), bare root or seeds, within groups of 10 to 20 plants spaced 20 to 50 feet apart, two years post excavation. The herbaceous species will also be seeded (with seed hand collected locally), if practical, randomly along the entire perimeter of the openwater areas, additional native plants may be included. The buffer and remaining area will be planted with annual rye. These plants and seeds will be planted in late winter (assume late February or mid March at the latest). This lapse of time will allow for a complete and thorough understanding of the seasonal variation within the water table, therefore increasing the success of the plantings. If natural recruitment of desired plants occurs prior to two years, planting will discontinue. Actual monitoring will begin the following summer (approximately one year after excavation) to allow time to observe natural vegetation recruitment and success of seed stock, bare root, and container plantings. It is the belief of the designer that natural recruitment of many plants will occur within one to two years of construction. It is therefore our intent to allow all natural non-invasive plants to become established and document their presence. Measurement of re-vegetation success will follow the first two years of construction and will consist of 50% cover (or one healthy plant per square meter of entire site). Success following three years post construction will be 100% cover of native and/or non-invasive species. If after the first two years following construction the goal of one healthy plant per square meter is not obtained, the bare areas will be planted. Two as-built reports will be written, one post construction in the fall and the second post planting in early spring. All subsequent monitoring reports will occur on an annual basis during the fall (prior to the first killing frost).
* Ten year maintenance schedule for invasive species and planting success will occur. Ten years of monitoring post construction to describe all construction, human manipulation (planting, snag and log placement, etc.) and natural recruitment of vegetation will occur. All amphibians, birds, aquatic insects, and mammal usage observed, water level, and percent cover of all plants will be recorded on a seasonal basis. Permanent photograph plots will be established and taken on a seasonal basis. Both natural plant recruitment and planted stock will be noted for growth and viability. A comparison of both for success will be discussed in the annual reports.
* Glyphosate will be used to maintain reed canarygrass and himalayan and evergreen blackberries if they occur. If either red alder or black cottonwood trees become established greater than one plant per square meter, they will be hand thinned. To initially rid the area of reed canarygrass (pre construction) the site will be sprayed with glyphosate (or approved herbicide) in the early spring, followed by plowing, disking, and planting with a cover crop to compete with the reed canarygrass. An additional application of glyphosate will occur in 60 to 90 days following plowing, and the site will again be seeded with an annual cover crop.
* Seasonally saturated islands (approximately 200, about 12 inches above existing grade, 50 feet in diameter) constructed with clean topsoil that contains shrubs, herbaceous plants, root stock, and seeds taken from the adjacent forested area where the railroad will be constructed, will be placed in the seasonally saturated area.

WETLAND MITIGATION
VEGETATION ZONES AND TYPICAL SPECIES TO BE PLANTED
ALL PLANTS (AND SEEDS) WILL BE LOCALLY GROWN AND FROM A LOCAL GENETIC STRAIN

WETLAND

Trees
Abies grandis
Alnus rubra
Fraxinus latifolia
Picea sitchensis
Populus trichocarpa
Thuja plicata

Shrubs
Alnus sinuata
Cornus stolonifera
Lonicera involucrata
Physocarpus capitatus
Pyrus fusca
Rosa gymnocarpa
Rosa nutkana
Rubus spectabilis
Salix spp.
Spiraea douglasii

Herbs
Athyrium filix-famina
Carex obnupta
Carex stipata
Glyceria spp.
Hippuris vulgaris
Lemna minor
Lysichitum americanum
Nuphar luteum
Nuphar polysepalum
Oenanthe sarmentosa
Polygonum spp.
Potamogeton spp.
Scirpus acutus
Scirpus microcarpus
Sparganium spp.
Veronica americana

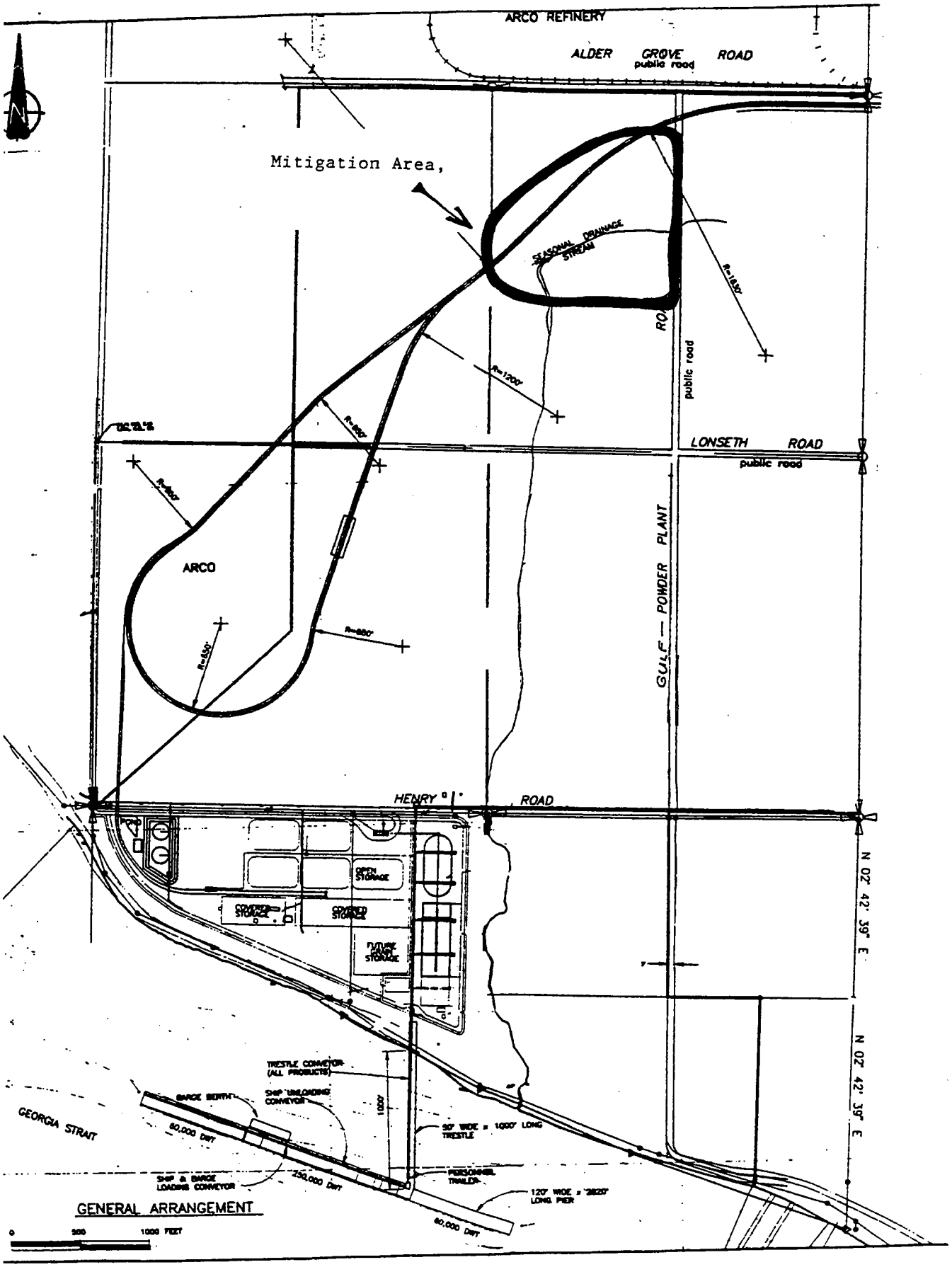
UPLAND BUFFER AND INTO FORESTED WETLAND

Trees
Abies grandis
Acer macrophyllum
Alnus rubra
Betula papyrifera
Picea sitchensis
Prunus emarginata
Pseudotsuga menziesii
Rhamnus purshiana
Tsuga heterophylla

Shrubs
Corylus cornuta
Holodiscus discolor
Ribes sanguineum
Rosa gymnocarpa
Rosa nutkana
Rubus spectabilis
Symphoricarpos albus

GATEWAY PACIFIC TERMINAL WHATCOM COUNTY, WASHINGTON		
SCALE:	APPROVED BY: A.T.S.I.	DRAWN BY: WIGGY
DATE: 2-22-96		REVISED #2
CELTIC SPIRAL		
FORESTED WETLAND		DRAWING NUMBER 2

Figure 5. Mitigation drawing.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ALDER GROVE ROAD
public road
Mitigation Area,
SEASONAL DRAINAGE STREAM
R=1830'
R=1200'
R=850'
R=650'
R=650'
R=650'
public road
LONSETH ROAD
public road
ARCO
GULF — POWDER PLANT
HENRY ROAD
POND
OPEN STORAGE
COVERED STORAGE
COVERED STORAGE
FUTURE GRAIN STORAGE
N 02° 42' 39" E
N 02° 42' 39" E
TRESTLE CONVEYOR (ALL PRODUCTS)
SHIP UNLOADING CONVEYOR
BARGE BERTH
1000'
GEORGIA STRAIT
60,000 DWT
50' WIDE x 1000' LONG TRESTLE
PERSONNEL TRAILER
SHIP & BARGE LOADING CONVEYOR
250,000 DWT
120' WIDE x 2820' LONG PIER
60,000 DWT
GENERAL ARRANGEMENT
0
500
1000 FEET

CELTIC SPIRAL

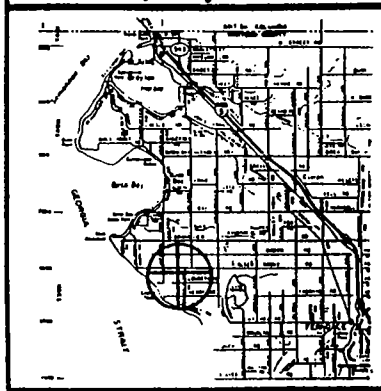
* ENHANCEMENT
* CREATION
* STUDY

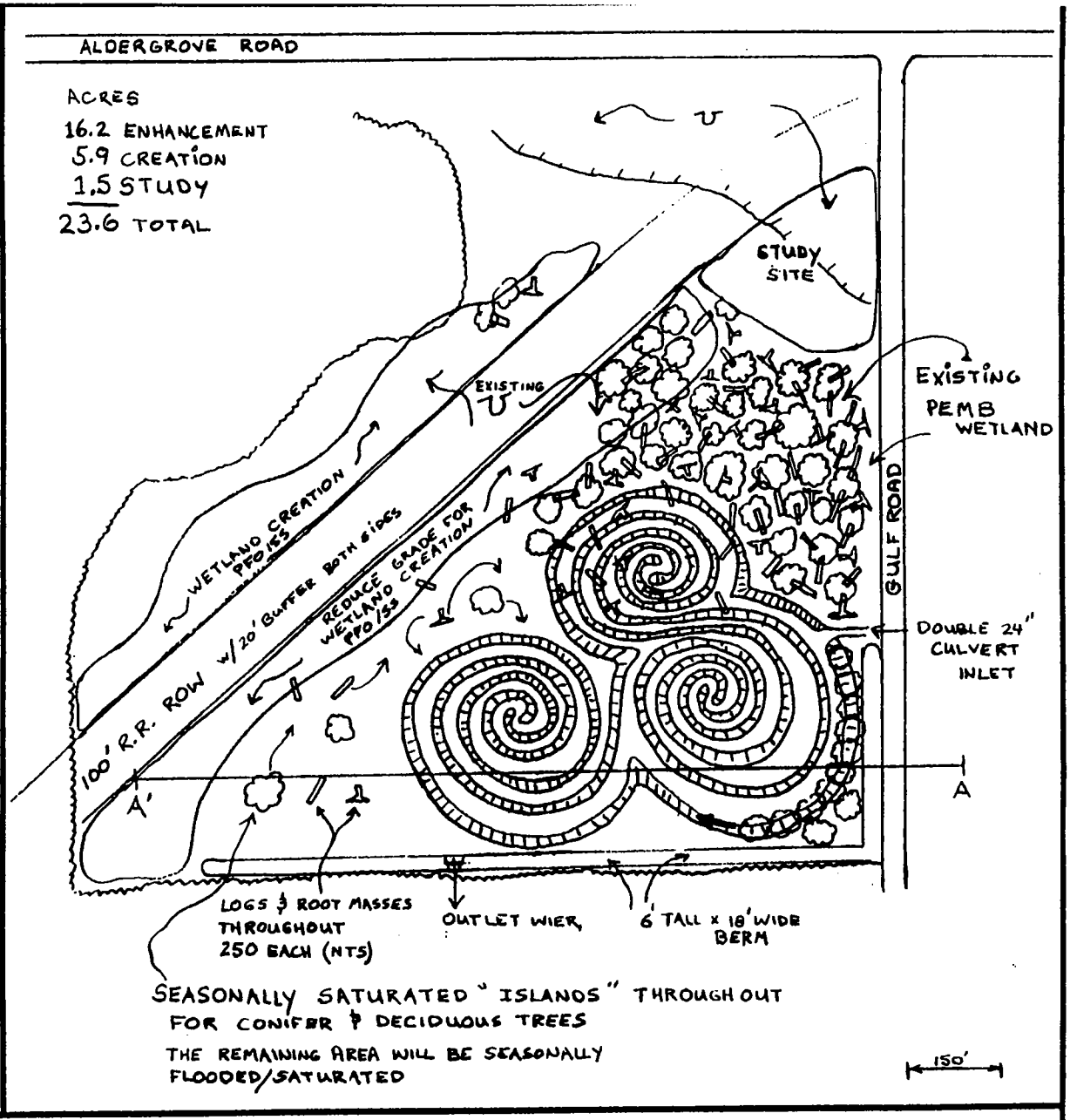
A.T.S.I.

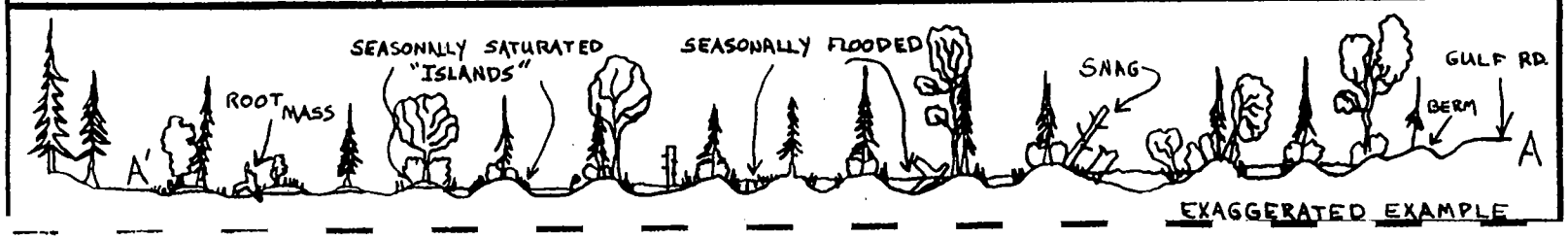
AQUA-TERR SYSTEMS, INC.

N

GATEWAY SITE







APPENDIX B

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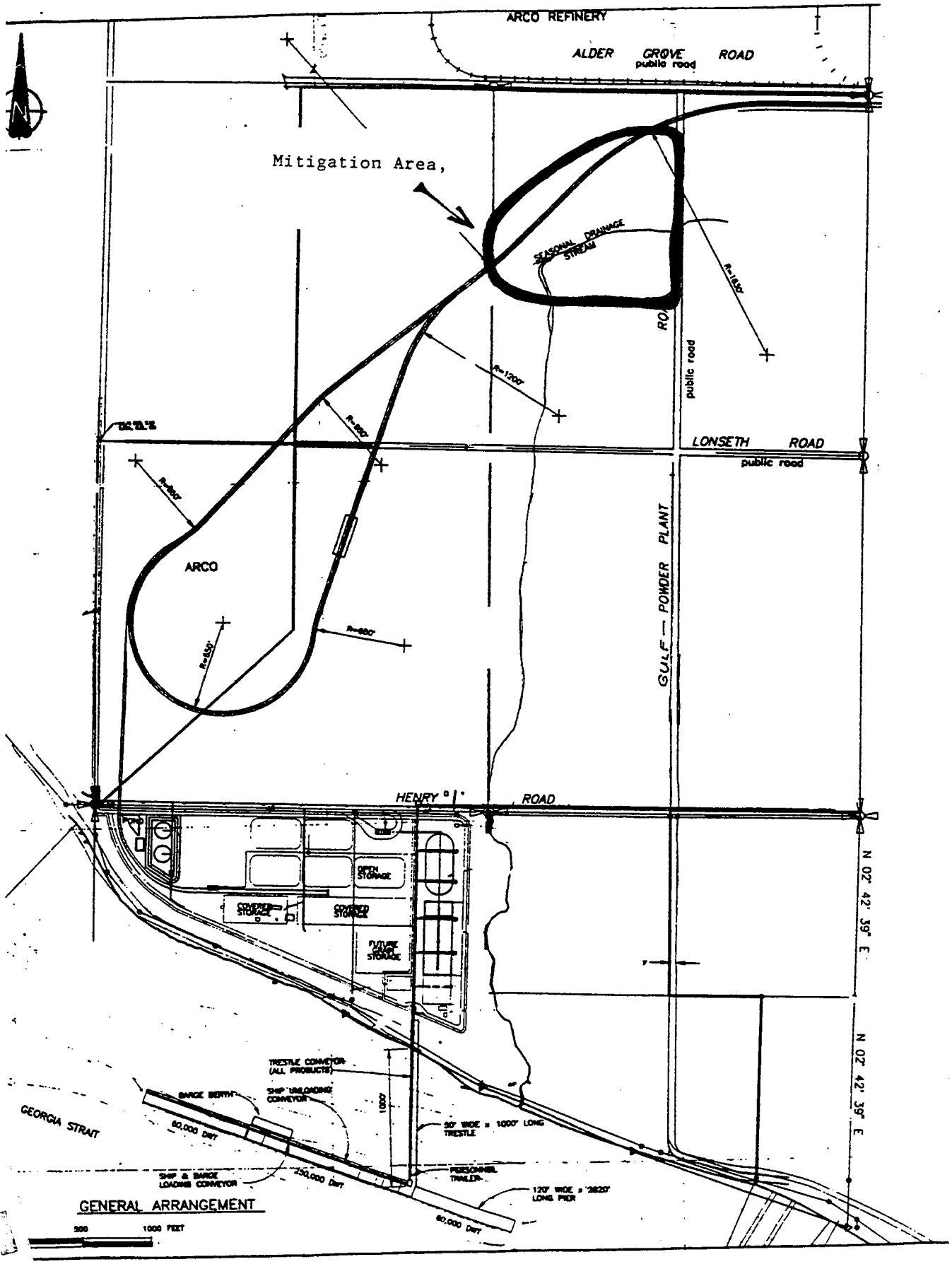
APPENDIX C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ALDER GROVE ROAD
public road
Mitigation Area,
SEASONAL DRAINAGE STREAM
R=1830'
R=1200'
R=860'
R=650'
R=680'
public road
LONSETH ROAD
public road
ARCO
GULF — POWDER PLANT
HENRY ROAD
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OPEN STORAGE
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COVERED STORAGE
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N 02° 42' 39" E
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TRESTLE CONVEYOR (ALL PRODUCTS)
BARGE BERTH
SHIP UNLOADING CONVEYOR
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GEORGIA STRAIT
60,000 DWT
50' WIDE x 1000' LONG TRESTLE
SHIP & BARGE LOADING CONVEYOR
250,000 DWT
PERSONNEL TRAILER
120' WIDE x 2820' LONG PIER
60,000 DWT
GENERAL ARRANGEMENT
500
1000 FEET

APPENDIX C

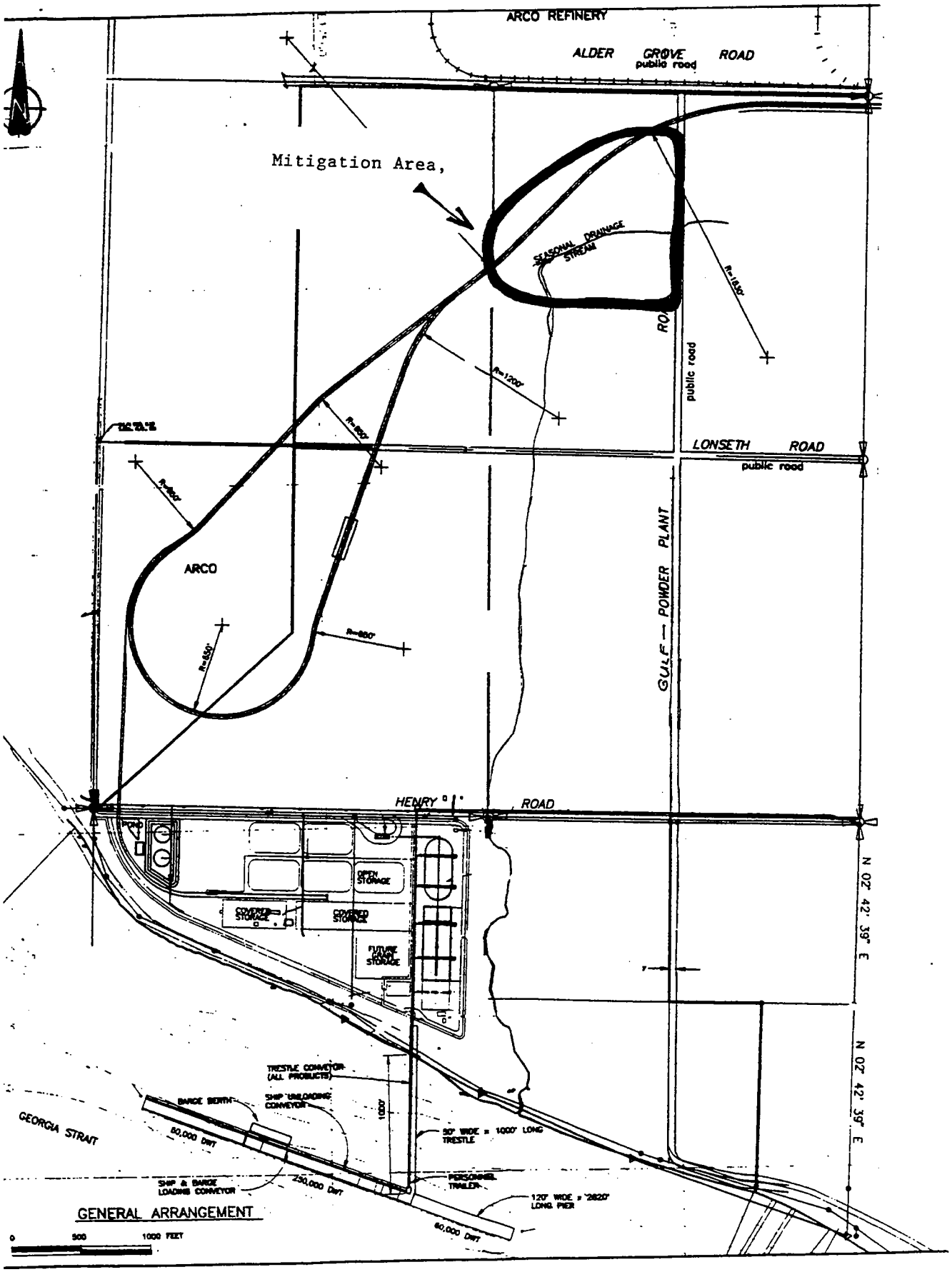
Proposed planting schedule for wetland mitigation. This schedule includes plant species, condition (bare–root, balled–and–burlapped, container, sprig, rhizome, cutting, seed), plant spacing, water regime (**PF**–permanently flooded; **SF**–seasonally flooded; **PS**–permanently saturated; **SS**–seasonally saturated), and wildlife values (Washington Department of Ecology, 1993 and Martin et al., 1952).

TREES

Species	Condition	Spacing	Water Regime	Wildlife Values
Abies grandis, grand fir	bare–root or balled–and–burlapped	groups of 5, 100' o.c.	upland	Provides nesting, roosting, and winter cover for birds; food for grouse, passerine birds, and deer.
Picea sitchensis, Sitka spruce	bare–root or balled–and–burlapped	groups of 5, 100' o.c.	SF PS SS	Provides nesting, roosting, and winter cover for birds; food for grouse, passerine birds, and deer.
Pseudotsuga menziessii, Douglas fir	bare–root or balled–and–burlapped	groups of 5, 100' o.c.	upland	Provides nesting, roosting, and winter cover for birds; food for grouse, passerine birds, and deer.
Thuja plicata, western red cedar	bare–root or balled–and–burlapped	groups of 5, 100' o.c.	SF PS SS	Provides nesting, roosting, and winter cover for birds; food for grouse, passerine birds, and deer.

SHRUBS

Species	Condition	Spacing	Water Regime	Wildlife Values
Lonicera involucrata, black twinberry	bare–root or container	groups of 5, 50'o.c.	SF PS SS	Fruits eaten by passerine birds.
Physocarpus capitatus, Pacific ninebark	bare–root or container	groups of 5, 50'o.c.	PS SS	Not determined.
Pyrus fusca, western crabapple	bare–root or container	groups of 5, 50'o.c.	PS SS	Fruits and seeds eaten by birds and mammals.
Rubus spectabilis, salmonberry	bare–root or container	groups of 5, 50'o.c.	SF PS SS upland	Nectar an important food for hummingbirds and bees; fruits eaten by many bird and mammal species.
Salix lasiandra, Pacific willow	bare–root or cutting	groups of 5, 50'o.c.	SF PS SS	Provides food, cover, and nesting habitat to fish, insect, mammal, and bird species.
Salix sitchensis, Sitka willow	bare–root or cutting	groups of 5, 50'o.c.	PS SS	Provides food, cover, and nesting habitat to fish, insect, mammal, and bird species.


ARCO REFINERY
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Mitigation Area,
SEASONAL DRAINAGE STREAM
R=1830'
R=1200'
R=850'
R=650'
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1000 FEET

CELTIC SPIRAL

* ENHANCEMENT
* CREATION
* STUDY

A.T.S.I.

AQUA-TERR SYSTEMS, INC.

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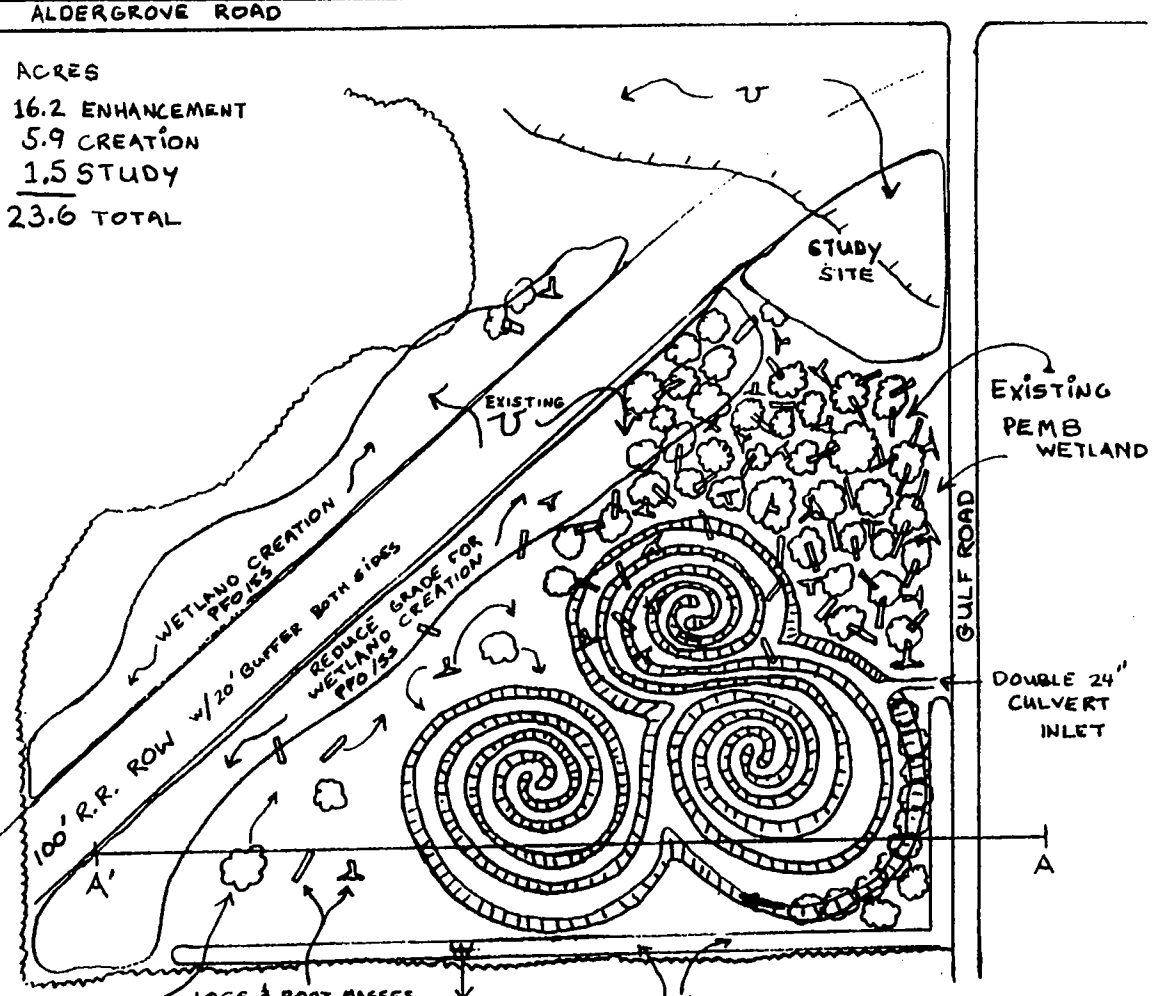
GATEWAY SITE

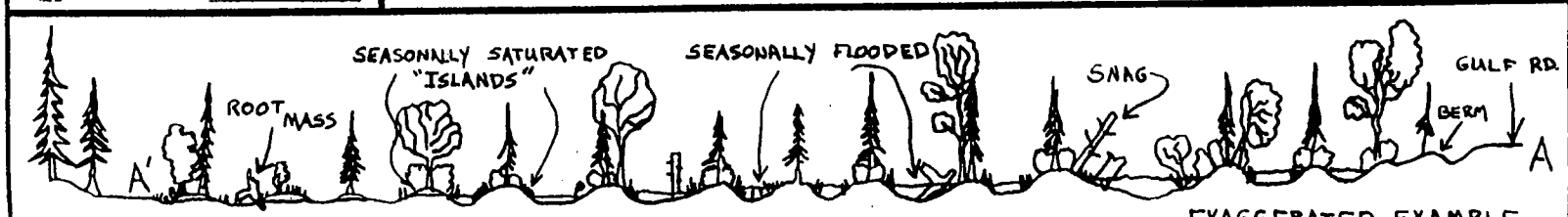
ALDERGROVE ROAD

ACRES
16.2 ENHANCEMENT
5.9 CREATION
1.5 STUDY
23.6 TOTAL



SEASONALLY SATURATED "ISLANDS" THROUGHOUT FOR CONIFER & DECIDUOUS TREES

THE REMAINING AREA WILL BE SEASONALLY FLOODED/SATURATED



EXAGGERATED EXAMPLE

IERBS

Species	Condition	Spacing	Water Regime	Wildlife Values
Alisma plantago–aquatica, water plantain	sprig or rhizome	groups or 10, 20' o.c.	SF PS	Not determined.
Carex obnupta, slough sedge	sprigs and seed	groups of 20, 20' o.c.	SF PS	Seeds eaten by waterfowl, sora, snipe, grouse, junco, and sparrows.
Carex stipata, sawbeak sedge	sprigs and seed	groups of 20, 20' o.c.	SF PS	Seeds eaten by waterfowl, sora, snipe, grouse, junco, and sparrows.
Glyceria spp., manna grass	seed	scattered	PF SF PS	Shoots and seeds eaten by waterfowl, marshbirds, and shorebirds.
Hippuris vulgaris, common mare's tail	sprigs	groups of 20, 20' o.c.	PS PF	Not determined.
Polygonum spp., smartweed	seed	scattered	PF	Food for at least 32 western Wash. species (including waterfowl and passerine birds).
Scirpus acutus/validus, hardstem bulrush	rhizomes	groups of 20, 20' o.c.	PF	Seeds and rhizomes eaten by waterfowl, marshbirds, and shorebirds.
Scirpus microcarpus, small–fruited bulrush	seed	scattered	SF PS	Cover for small birds and small mammals; food for waterfowl.
Sparganium eurycarpum, broad–fruited burreed	rhizome	groups of 20, 20' o.c.	PF	Provides food and cover for waterfowl.

EXPECTED VOLUNTEER SPECIES

Species	Water Regime	Wildlife Values
Alnus rubra, red alder	SS upland	Provides food for grouse and small seed and insect eating passerine birds.
Juncus effusus, soft rush	PS SF SS	Not determined.
Juncus ensifolius, dagger–leaf rush	PS SF SS	Not determined.
Juncus tenuis, slender rush	PS SF SS	Not determined.
Populus balsamifera, black cottonwood	PS SS upland	Provides food for beaver and deer; harbors insects that are food for many bird species.
Spirea douglasii, hardhack	PS SF SS	Not determined.
Typha latifolia, common cattail	PS SF SS	Provides food for muskrat, beaver, and geese; nesting habitat for waterfowl and passerine birds.

* For erosion control and typical cover of bare ground, use annual rye (*Lolium multiflorum*) at 50 pounds per acre. Other grasses may be used as listed in the text or at the discretion of a wetlands biologist.

HABITAT FEATURES AND CONDITIONS

* Construction will occur during the late summer months.
* At least 50 snags, > 12" diameter, > 15 ' tall, will be randomly placed.
* At least 200 floating logs, > 12" diameter, > 15 ' long, will be randomly placed.
* At least 200 root masses (from trees greater than 6 feet diameter) will be randomly placed.
* Annual rye (*Lolium multiflorum*) will be seeded @ 50 lbs/acre on all bare ground, post construction.
* All contractor selection, construction, planting, maintenance, and monitoring will be supervised by a qualified wetlands biologist familiar with the site and plans. Any and all changes to this plan need to be approved by the qualified wetlands biologist prior to implementation.
* Ten temporary cardboard bird boxes of varying sizes will be placed randomly on the snags and surrounding trees.
* Entire area will be planted with a representative sampling of the below listed tree and shrub species, bare root or 1 gallon containers, within groups of 5 to 10 plants spaced 20 to 100 feet apart, one year post excavation. Entire area will also be planted with a representative sampling of the below listed herbaceous species (herbs), bare root or seeds, within groups of 10 to 20 plants spaced 20 to 50 feet apart, two years post excavation. The herbaceous species will also be seeded (with seed hand collected locally), if practical, randomly along the entire perimeter of the openwater areas, additional native plants may be included. The buffer and remaining area will be planted with annual rye. These plants and seeds will be planted in late winter (assume late February or mid March at the latest). This lapse of time will allow for a complete and thorough understanding of the seasonal variation within the water table, therefore increasing the success of the plantings. If natural recruitment of desired plants occurs prior to two years, planting will discontinue. Actual monitoring will begin the following summer (approximately one year after excavation) to allow time to observe natural vegetation recruitment and success of seed stock, bare root, and container plantings. It is the belief of the designer that natural recruitment of many plants will occur within one to two years of construction. It is therefore our intent to allow all natural non–invasive plants to become established and document their presence. Measurement of re–vegetation success will follow the first two years of construction and will consist of 50% cover (or one healthy plant per square meter of entire site). Success following three years post construction will be 100% cover of native and/or non–invasive species. If after the first two years following construction the goal of one healthy plant per square meter is not obtained, the bare areas will be planted. Two as–built reports will be written, one post construction in the fall and the second post planting in early spring. All subsequent monitoring reports will occur on an annual basis during the fall (prior to the first killing frost).
* Ten year maintenance schedule for invasive species and planting success will occur. Ten years of monitoring post construction to describe all construction, human manipulation (planting, snag and log placement, etc.) and natural recruitment of vegetation will occur. All amphibians, birds, aquatic insects, and mammal usage observed, water level, and percent cover of all plants will be recorded on a seasonal basis. Permanent photograph plots will be established and taken on a seasonal basis. Both natural plant recruitment and planted stock will be noted for growth and viability. A comparison of both for success will be discussed in the annual reports.
* Glyphosate will be used to maintain reed canarygrass and himalayan and evergreen blackberries if they occur. If either red alder or black cottonwood trees become established greater than one plant per square meter, they will be hand thinned. To initially rid the area of reed canarygrass (pre construction) the site will be sprayed with glyphosate (or approved herbicide) in the early spring, followed by plowing, disking, and planting with a cover crop to compete with the reed canarygrass. An additional application of glyphosate will occur in 60 to 90 days following plowing, and the site will again be seeded with an annual cover crop.
* Seasonally saturated islands (approximately 200, about 12 inches above existing grade, 50 feet in diameter) constructed with clean topsoil that contains shrubs, herbaceous plants, root stock, and seeds taken from the adjacent forested area where the railroad will be constructed, will be placed in the seasonally saturated area.