Revised Wetland Delineation Report

Spokane International Airport 4-Acre Parcel
Spokane, Washington

for

Spokane International Airport

March 9, 2018

GeoEngineers
Earth Science + Technology

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File No. 3485-063-00

March 9, 2018

Prepared for:

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Attention: Matt Breen, Director

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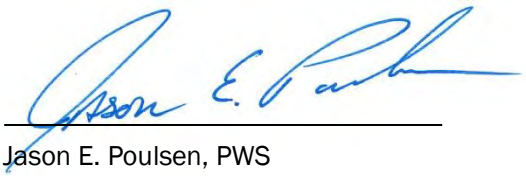

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INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) was retained by Spokane International Airport (SIA) to complete a wetland delineation and rating assessment for a 4-acre parcel located adjacent to, and east of West Airport Drive, and west of airport long-term parking lots in Spokane, Washington (Vicinity Map, Figure 1). GeoEngineers understands the SIA is considering this project area for additional parking facilities.

PROJECT LOCATION/GENERAL SETTING

The project site is located within the Northwest ¼ of the Northwest ¼ of Section 31 Township 25 North, Range 42 East of the Willamette Meridian, as depicted in the Airway Heights, Washington (Spokane County) 7.5-minute Series Topographic Map dated 1986 (Topographic Map, Figure 2). The total site encompasses approximately four acres and is largely undeveloped except for landscaping and a storm drain swale along the western and eastern boundary. West Airport Drive is adjacent to the site on the west and SIA surface parking lots border the northern, eastern and southern project site boundaries.

SCOPE OF SERVICES

GeoEngineers was retained to conduct wetland delineation and rating assessment services within the boundary of the proposed parking facility expansion. The scope of services associated with this delineation/rating assessment included:

1. **Literature Review/Field Preparation:** GeoEngineers reviewed appropriate reference materials pertinent to the site, including; the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, United States Geological Survey (USGS) topographic maps, United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Web Soil Survey for Spokane County, Washington, recent aerial photographs and other readily available background information to assist in preparation of the wetland delineation/rating assessment. GeoEngineers also reviewed the applicable Spokane County and Washington State Department of Ecology (Ecology) documentation/regulations related to wetlands, as appropriate, to identify standards for rating and minimum buffer requirements.
2. **Field Delineation/Assessment:** GeoEngineers mobilized to the site to conduct wetland delineation/rating assessment services within the property boundary on December 13, 2017. Wetland boundaries were determined after consideration of three wetland parameters: (1) vegetation, (2) soils, and (3) hydrology in accordance with the *U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0 dated September 2008). Soil pits were hand-excavated throughout the project site, as needed and appropriate, to record soil conditions relative to hydric indicators. GeoEngineers assessed the vegetative cover near each soil pit and estimated the relative abundance of hydrophytic species. GeoEngineers also prepared an Eastern Washington Wetland Rating form (Version 2 – October 2008) for each identified wetland in accordance with the Washington State Rating System for Eastern Washington guidance dated March 2007.

   Wetland boundaries were delineated and flagged in the field for surveying and subsequent mapping. Each wetland boundary determination point, and data plots were flagged in the field and located by global positioning system (GPS) equipment.

3. **Report Preparation:** GeoEngineers prepared this wetland delineation/rating assessment report to describe the wetland delineation and rating classification results of the wetland identified, in accordance with regulatory requirements and guidance. The report includes documentation of the wetland areas and a wetland rating classification, supporting illustrations, photographs and reference citations, as applicable. Map excerpts and appropriate appendices are also presented to support GeoEngineers' findings and conclusions.

METHODS

Literature Review

GeoEngineers researched existing information on wetlands, streams, ditches and other man-made aquatic features documented within the project boundary prior to conducting the site visit. The list below includes readily available literature, which was reviewed.

- USGS Topographic Map
- USFWS NWI maps
- USDA/NRCS Web Soil Survey for Spokane County Washington
- Current and historical aerial photographs

Wetland Delineation

The wetland delineation and assessment was conducted in accordance with the guidance set forth in the 1987 USACE Wetland Delineation Manual (Environmental Laboratory 1987), the Washington State Wetlands Identification and Delineation Manual (Ecology 1997) and the 2008 Regional Supplement to the USACE Wetland Delineation Manual: Arid West Region Version 2.0 (USACE 2008). These manuals follow the three-parameter approach for conducting wetland determinations. This approach documents: (1) the presence of hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology, all of which are described in further detail below. With the exception of wetlands with special characteristics, the presence of all three criteria is required for a given area to be classified as a wetland. Please note, because of timing constraints and the need to rapidly respond to SIA's requests, GeoEngineers conducted the delineation/assessment outside of the typical growing season. Therefore, hydrology and hydric soil parameters were used as the primary indicators of wetland conditions. If both wetland hydrology and hydric soil parameters were observed, in a given soil pit, it was assumed that conditions would be present during the growing season to support hydrophytic vegetation. No information was gathered in regards to hydrophytic vegetation other than general observations within the area of the soil pits.

Field Methods

Prior to visiting the site, a health and safety briefing was completed, field gear and travel plans were prepared, and a communications protocol for the field crew was established. A GeoEngineers Professional Wetlands Scientist (PWS) conducted the field assessment and delineation services on site December 13, 2017. An initial visual assessment of the site was conducted to identify potential upland and wetland areas.

Based on site observations relative to topography, hydrology and vegetation, wetland boundaries were estimated for subsequent testing to compare upland and wetland characteristics within the depressional

and adjacent areas. Soil pits were hand dug to approximately 10 to 17 inches below ground surface (bgs) until refusal on basalt bedrock, or until groundwater was encountered. Soil pits were advanced within and outside a given wetland boundary to assess soil conditions in wetland and upland areas. Soils in each pit were evaluated for texture, matrix color, presence or absence of redoximorphic features or gleying and depth of saturation. This information was used to determine the presence/absence of hydric soils and to assist developing wetland boundaries. Details regarding soils evaluation methodology are described in the "Soils" section below.

Wetland hydrology indicators, including drainage patterns, presence of surface water, depth of groundwater within soil pits and vegetation community were also noted at sample plots surrounding soil pits (approximate 25-foot radius). Vegetation, soil and hydrology information, collected during the field study, are presented on the standard wetland delineation data forms, which are included in Appendix B.

Wetland boundaries were delineated and flagged in the field for subsequent mapping. A photographic record of site conditions during our field study is provided in Appendix A, Figures A-1 through A-7.

Vegetation

The USACE manual defines hydrophytic vegetation as the community that s within areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present (USACE 2010). Hydrophytic plant species have the ability to grow, compete, and establish in areas where anaerobic conditions exist due to the presence of surface water and/or groundwater. In 1988, the USACE and USFWS (Reed 1988) developed plant indicator categories that describe the probability of vegetation species to occur in wetlands. This list was updated in 2013 and is now the USACE National Wetlands Plant Inventory (NWPI) Version 3.1. Each plant species observed, within a given on-site sample plot, was categorized according to the Arid West indicator status under the NWPI. Table 1 provides summarized definitions of the indicator status categories.

TABLE 1. PLANT INDICATOR STATUS CATEGORIES

Indicator Status	Indicator Symbol	Description
Obligate Wetland Plants	OBL	Plants that occur in wetlands, under natural conditions, greater than 99 percent of the time
Facultative Wetland Plants	FACW	Plants that occur in wetlands, under natural conditions, between 67 to 99 percent of the time
Facultative Plants	FAC	Plants that occur in wetlands, under natural conditions, between 34 to 66 percent of the time
Facultative Upland Plants	FACU	Plants that occur in wetlands, under natural conditions, between 1 to 33 percent of the time
Obligate Upland Plants	UPL	Plants that occur in wetlands, under natural conditions, less than 1 percent of the time
No Indicator	NI	Indicator status has not been identified for the species
No Occurrence	NO	No known occurrence of the plant in the region

The prevalence of wetland vegetation is characterized by the dominant species comprising the plant community within a wetland. A dominant species is considered any plant species that represents 20 percent or greater total aerial coverage for each vegetative stratum (tree, shrub, herbaceous or aquatic

bed). If more than 50 percent of the dominant plant species in an area were categorized as OBL, FACW or FAC, the plant community is classified as hydrophytic, and therefore, meets that wetland indicator parameter. Additional observations of hydrophytic plant characteristics included: morphological adaptations (water roots or shallow root systems); physiological adaptations (inflated stems or polymorphic leaves); and reproductive adaptations (delayed flowering or floating seeds).

On-site wetland vegetation communities, identified by field scientists, were classified according to the Cowardin Classification System (Cowardin, et al. 1979). Vegetation nomenclature described in this report follows the format outlined in the book titled *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973).

Hydrology

Hydrologic patterns that may create wetlands can be influenced by precipitation, stratigraphy, topography, soil permeability, plant cover and human disturbance. Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Primary and secondary hydrologic indicators used by field biologists to assist the identification of potential wetlands included the following (USACE 2008):

- Surface water or inundation
- High water table or saturated soil within 12 inches of the ground surface for 14 or more consecutive days at a minimum frequency of 5 years out of 10
- Water marks
- Sediment and drift deposits
- Algal mat or crust
- Iron deposits
- Surface soil cracks
- Salt crust
- Inundation visible on aerial photography
- Sparsely vegetated concave surface
- Aquatic invertebrates
- Water-stained leaves
- Hydrogen sulfide odor
- Oxidized rhizospheres along living roots
- Presence of reduced iron
- Stunted or stressed plants

Secondary indicators include (USACE 2008):

- Drainage patterns
- Dry-season water table

- Saturation visible on aerial photography
- Geomorphic position
- Shallow aquitard
- FAC-neutral test
- Raised ant mounds
- Frost-heave hummocks

The growing season for a region is dependent upon climate, precipitation and topography. Hydrology must be present for at least 14 consecutive days and within 12 inches of the ground surface during the growing season to be considered a wetland. Indicators of the onset of the growing season include: (1) a soil temperature at 41 degrees Fahrenheit (°F) measured at 12 inches bgs and/or; (2) aboveground growth and development of vascular plants (USACE 2008).

The growing season initiates on a given site when two or more different non-evergreen vascular plants exhibit one or more of the following indicators of biological activity:

- Emergence of herbaceous plants
- New growth on vegetative crowns
- Coleoptiles/cotyledon emergence from seed
- Bud burst on woody plants
- Emergence or elongation of woody plant leaves
- Emergence or opening of flowers

The growing season terminates on a given site when woody deciduous species lose their leaves, and/or the last herbaceous plants cease flowering and their leaves become dry or brown. Additional information may be obtained from the Climate Analysis for Wetlands Tables (WETS) available from the USDA NRCS National Water and Climate Center (http://www.wcc.nrcs.usda.gov/). The objective of the WETS tables is to define the normal range for monthly precipitation and growing season to assess climatic characteristics for a geographic area over a representative interval. The growing season dates in the WETS tables provide an estimate of air temperature averages above 28°F.

Soils

Hydric soils are formed under conditions of saturation, flooding or ponding for a period long enough during the growing season that anaerobic conditions develop in the upper soil strata (0 to 20 inches commonly) (USACE 2008). These anaerobic conditions exhibit certain soil characteristics that can be identified in the field to investigate (confirm or deny) the hydric soil wetland parameter. Prolonged anaerobic soil conditions eventually lead to a chemically-reduced state where soil components (iron, manganese, sulfur and carbon compounds) develop soil colors and other physical characteristics indicative of hydric status. These chemically reduced soil components persist when the soil is either wet or dry. Specific hydric soil characteristics GeoEngineers' wetland scientist used to identify hydric soils include:

- Reduced iron resulting in a soil color that is known as gley (bluish-gray or greenish-gray)

- Loss of iron resulting in a soil color that is known as redox depletion (gray or reddish-gray)
- Loss of iron resulting in concentrated soil patches known as redoximorphic concretions (orange or red)
- Sulfidic odor
- High organic matter content (peat or muck) in the upper 32 inches of the soil profile

GeoEngineers' study methods for hydric soil analysis included digging soil pits wherever drainage patterns, ponded areas, or indicators of water presence was observed. Soil pits were hand dug to depths between 10 and 17 inches bgs (as described previously in Field Methods) along a transect perpendicular to the predicted wetland boundary in a gradient from dry to wet. Soils obtained from each soil pit were observed for color profile, odor and redoximorphic condition. Hydric soil conditions must be met within 12 inches of the ground surface to consider the soil types hydric.

Soil colors were determined using Munsell® Soil Color Charts (Gretag/Macbeth 2000) and their appropriate Hue: spectral colors (e.g. 10YR), Value: degree of lightness (e.g. 2/) and Chroma: strength or purity of the color (e.g. /1). Soil profiles must have a dominant chroma of 2 or less or the layer with dominant chroma of more than 2 must be less than 6 inches thick to meet any hydric soil indicators. Hydric soil indicators commonly found in wetlands are identified in the technical document *Field Indicators of Hydric Soils in the United States, a Field Guide for Identifying and Delineating Hydric Soils, Version 7.0* (USDA 2010). These indicators help identify soils formed under saturated, flooded, or ponded conditions long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile.

Wetland Characterization

The wetlands delineated in this study were characterized according to the Cowardin classification (Cowardin, et al. 1979), which categorizes wetlands and deep-water habitats according to five separate systems: Marine, Estuarine, Riverine, Lacustrine and Palustrine. These systems are then stratified into subsystems based on plant community types and are further stratified into classes and subclasses from substrate material. Each class and subclass is then annotated with specific modifiers for water regimes, water chemistry, soil and other special modifiers. The USFWS uses this classification system in their NWI maps.

Site wetlands were also identified according to their hydrogeomorphic (HGM) classification to determine their location and function within the watershed. HGM classifications include the following:

- Depressional
- Riverine
- Lake-fringe
- Slope
- Flats
- Freshwater tidal

Ordinary High Water Mark Identification

To estimate the presence of stream (lotic) features within the study area, we applied the methods utilized by the USACE in their Regulatory Guidance Letter titled *Ordinary High Water Mark Identification* (USACE 2005) and various indicators outlined with the USACE's *A Guide to the Identification of the OHWM in the Arid West Region of the Western United States* documentation (USACE 2008). GeoEngineers' scientists used the Arid West Ordinary High Water Mark (OHWM) definition for this study, as described below:

> The term "OHWM" means that line on the shore established by the fluctuations of weather and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (USACE 2008).

During the field investigation, we walked the site to identify physical characteristics present on the shoreline of a given watercourse. Conditions may vary depending on the type of water body and conditions of the area. There are no required physical indicators that must be present to make an OHWM determination. However, the following physical characteristics were considered when making the OHWM determination:

- Natural line impressed on the bank
- Shelving or topographic breaks
- Changes in the character of soil
- Destruction of terrestrial vegetation
- Presence of litter or debris (drift lines)
- Wracking
- Vegetation matted down, bent or absent
- Sediment sorting
- Leaf litter disturbed or washed away
- Scour
- Deposition
- Multiple observed flow events
- Bed and banks
- Water staining
- Change in plant community

Other methods for determining the OHWM that do not include physical observation:

- Lake and stream gauge data
- Elevation data
- Spillway height

- Flood predictions
- Historic records of water flow
- Statistical evidence

Wetland Classification and Rating

Wetland parameters were delineated and characterized using the wetland classes defined by the Cowardin system (Cowardin *et al.* 1979). The Cowardin system describes wetlands by the plant communities, soils and hydrologic regimes present. The hierarchical order identifies five major types of wetland systems: Marine, Estuarine, Riverine, Lacustrine and Palustrine. These systems are further stratified into classes and subclasses based on substrate materials, flooding regime and vegetation life form. Each class and subclass is then annotated with specific modifiers for water regimes, water chemistry, soil and other special conditions. The naming convention was developed by USFWS for the NWI maps.

Wetlands were also rated using the categories according to Washington State Wetland Rating System for Eastern Washington (Hruby, 2004). This four-tier rating system was used to determine the HGM class of, and to rate the water quality, hydrologic, and habitat functions for each wetland (SCC 11.20.050(B); Hruby, 2004). The completed wetland rating forms are included in Appendix B, Eastern Washington Wetland Rating Forms. Wetland buffer width is determined from the wetland category, land intensity use and habitat function points.

RESULTS

Literature Review

Soils

The Spokane County, Washington NRCS Web Soils Soil Survey (USDA 2017) identified one soil type within the project site boundary (Soils Map, Figure 3). A general description of the soil type, as defined by the NRCS Web Soil Survey, is provided below. The identified soil type is identified on the National Hydric Soils List as a hydric soil.

- **3044 – Cheney Ashy Silt Loam:** 0 to 8 percent slopes / Landform: Outwash plains / Available water storage: Moderate / Parent material: Loess mixed with minor amounts of volcanic ash / Drainage class: Well drained.

The Spokane County, Washington NRCS Web Soils Soil Survey (USDA 2017) also indicates that this soil type is only hydric under one under the three environmental conditions listed below:

- Map unit components that are frequently ponded for long duration or very long duration during the growing season that:
    - Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    - Show evidence that the soil meets the definition of a hydric soil
- Map unit components that are frequently ponded for long duration or very long duration during the growing season that:

- Based on the range of characteristics for the soil series will at least, in part, meet one or more Field Indicators of Hydric Soils in the United States, or
- Show evidence that the soils meet the definition of a hydric soil

- Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
  - Based on the range of characteristics for the soil series will at least, in part, meet one or more Field Indicators of Hydric Soils in the United States, or
  - Show evidence that the soils meet the definition of a hydric soil

Potion of the subject site contain slight depressional areas that can collect precipitation/snowpack for sufficient enough time to be identified as a hydric soil.

NWI Map

The USFWS NWI map (USFWS 2017) did not identify wetlands within the project site (National Wetlands Inventory Map, Figure 4).

Topographical Maps

GeoEngineers reviewed the 1954, 1963, 1973, and photo-revised 1986 Spokane, Washington 7.5-minute Series Topographic maps for the project site. The maps do not depict water bodies or channelization at the site during the dates reviewed (Figure 2).

Historical Aerial Photographs

GeoEngineers reviewed the following readily available historical aerial photographs associated with the site to assist with the evaluation process. Please note, these aerial photographs were not reproduced in the attached figures due to copyright restrictions.

- **July 1995:** The 1995 aerial photograph depicts the site as undeveloped. Areas of darker colored vegetation are observed in the northern and southern portions of the site. Adjacent land to the north, east and west is shown as undeveloped. West McFarlane Road is shown farther to the north. Two small buildings and West McFarlane Road are shown to the northeast. The West Airport Terminal Loop Road bounds the site to the south-southeast. South and southeast across the Loop Road are paved parking areas associated with the airport terminal.
- **July 2003:** The 2003 aerial photograph shows three small tree clusters on the north, east central and south site areas. Green vegetation is also shown along the eastern and western boundaries. Paved airport surface parking lots bound the site on the north and east. The West Airport Terminal Loop Road bounds the site to the south-southeast. West Airport Drive bounds the site to the west.
- **September 2003:** This 2003 aerial photograph shows little or no change from the 1995 and July 2003 photographs.
- **August 2005:** The 2005 aerial photograph shows, what appear to be, mowing or grading marks in the central and southern site areas. Surrounding land is relatively unchanged from the previously-reviewed aerial photographs.
- **February 2006:** The site is relatively unchanged from the August 2005 aerial photograph.

- **May 2009/November 2011/April 2015/April 2016/June 2017:** These aerial photographs depict little change from the previously mentioned photographs.

Field Investigation

Wetland Delineation/Assessment

As mentioned above, wetland boundaries were delineated and flagged in the field for surveying and subsequent mapping. As wetland indicators were determined to meet the modified wetland criteria, described above, appropriate pin flagging was labeled and inserted into the ground or hung from an appropriate tree branch along the estimated wetland boundary. The delineated wetland boundaries are illustrated on Figure 5, Wetland Delineation Map.

Visual observations, during the site visit, indicated that the entire 4-acre parcel has been significantly disturbed/graded due to the development of the SIA access roads and parking areas surrounding the site. The soils in the area of the subject site vary in depth and appear to have little native soils remaining on site.

Soil and Hydrology

The GeoEngineers' scientist established a total of six soil pits (SP-1 through SP-6) within the project site. Soil pits were located based on site observations such as topography gradient or low points within the terrain, general vegetative cover or color change. Table 2 provides a summary of soil and hydrology data conditions encountered during the delineation/assessment.

TABLE 2. SOIL/HYDROLOGY DATA SUMMARY

Soil Pit ID	Approximate Depth (inches bgs)	Hue, Value, Chroma	Redox Features	Soil Description	Sulfide Odor	Depth to Water / Saturation (inches bgs)	Hydric Soils Present? (Yes / No)
SP-1	0 – 16	7.5YR 3/3	No	Silty Sand	No	No water in soil pit	No
SP-2	0 – 16	7.5YR 3/3	No	Silty Sand	No	No water in soil pit	No
SP-3	0 – 17	10YR 3/3	No	Sand w/silt	No	No water in soil pit	No
SP-4	0 – 2 2 – 6 6 – 13	-- 10YR 2/2 7.5YR 4/2	No	Organic Layer Silt Silty Sand	No	12	Yes
SP-5	0 – 17	10YR 3/3	No	Sand w/silt	No	>12	No
SP-6	0 – 2 2 – 6 6 – 10	-- 10YR 2/2 7.5YR 4/2	No	Organic Layer Silt Silty Sand	No	6	Yes

Soils in pits SP-4 and SP-6 were generally consistent with depleted matrices based on values of 4 or more and chroma of 2 or less. Soil data gathered from both test pits revealed darker clay composition to depths of 6 inches (10YR 2/2), with a darker (7.5YR 4/2) silty sand layer to between 10 and 13 inches. This type

of soil profile is identified by the NRCS as "depleted matrix" (NRCS 2010). Since the low-chroma matrix appeared to be the result of saturation, soils in SP-4 and SP-6 were considered hydric. Saturated conditions were identified in soil test pits SP-4 and SP-6 during the field investigation.

A photographic record of the soil pit conditions is provided in Appendix A. The wetland determination sample plot data forms are provided in Appendix B.

General Vegetation

Hydrophytic vegetation was characterized based on general dominant species observed within approximately 25-foot-diameter sample plot surrounding each soil pit. The majority of the site is situated within a heavily disturbed bunchgrass-dominated landscape typical of local uplands in the Spokane area. Hydrophytic vegetation was restricted to the depressional area on the southeast section of the site, as described in Table 3 below.

TABLE 3. DOMINANT VEGETATION

Wetland	Herbaceous Layer	Scrub/Shrub Layer	Forested Layer
Wetland A	• Mullein - FACU (*Verbascum thapsus.*)	*Oregon grape (Mahonia aquifolium)*	Poplar – (*Populus deltoides*) Willow (*Salix sp.*)
Wetland B	• Mullein - FACU (*Verbascum thapsus.*)	*Oregon grape (Mahonia aquifolium)*	Poplar – (*Populus deltoides*)

Regulatory Review

According to the *Washington State Wetlands Identification and Delineation Manual*, dated March 1997, the USACE, U.S. Environmental Protection Agency (EPA), Washington State Shoreline Management Act (SMA) and the Growth Management Act (GMA), a wetland is 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. Wetlands generally include swamps, marshes, bogs, and similar areas.

Based on this regulatory definition, field observations, historical site data and previous report documentation, GeoEngineers identified two wetlands (Wetland A and B) that meet USACE, EPA and Ecology's wetland criteria within the site. Wetland A and Wetland B are classified as palustrine depressional emergent wetland approximately 1,155 square feet (0.03 acres) and approximately 6,263 square feet (0.14 acres) in size in size respectively.

Wetland Classification Rating and Buffers

Both Wetland A and Wetland B were rated as Category IV systems based on their functional attributes; scoring a total of 13 points each on the Eastern Washington Rating (EWR) form. Both wetlands meet criteria consistent with a Category IV rating with a score of 5 points for water quality functions, 5 points for hydrologic functions and 3 points for habitat functions (Appendix C). Based on these ratings, the City of Spokane, Washington Municipal Code (Title 17E Chapter 070, Section 110 Paragraph B) requires a minimum buffer of 50 feet for a Category IV wetland in a high impact area.

Stormwater Runoff Swales

While conducting the field work, GeoEngineers' scientist identified two stormwater swales. One swale was a landscaped (grass covered) depression along the southwestern portion of the site that appeared to collect stormwater runoff from West Airport Drive and convey the runoff through two separate 12-inch culverts. A round storm drain was also observed in the southern portion (lowest point) of the grass swale. It is GeoEngineers' opinion that this storm drain connects to the main storm drain system associated with the overall SIA complex. No surface water was observed within this swale at the time field work was completed. However, GeoEngineers' scientist did conduct a general mapping of the top of slope associated with this swale using a handheld GPS device (Figure 5).

The second stormwater swale was located parallel to the eastern project site boundary. This swale was not landscaped and appeared to be deeper with surface water ponding through the swale. This swale appears to collect stormwater runoff associated with the parking area immediately east of the subject site. Runoff from the eastern parking lot appears to enter surface parking lot drains east of the site that convey the water to an oil/water separator before discharging to the swale. ditch deeper than the western swale. Surface water was observed with this swale at the time field work was completed. GeoEngineers' scientist also mapped what appeared to be the OHWM of the swale using a handheld GPS device (Figure 5).

Because both of these swales appear to have been constructed for the purpose of stormwater control in an upland area, it is GeoEngineers opinion that they do not meet the definition of a wetland and/or Water of the U.S. established by the USACE, Ecology, and City of Spokane, Washington and therefore are not jurisdictional wetlands.

CONCLUSIONS

GeoEngineers identified, delineated and assessed two wetlands (Wetland A and B) within the project site boundary. Wetland A and Wetland B are both classified as palustrine, depressional, emergent wetlands. Wetland A is approximately 1,155 square feet (0.03 acres) and Wetland B is approximately 6,263 square feet (0.14 acres) in size. Both Wetland A and Wetland B were rated as Category IV systems based on their functional attributes; scoring a total of 13 points each on the Eastern Washington Rating (EWR) form. Both wetlands meet criteria consistent with a Category IV rating with each having a score of 5 points for water quality functions, 5 points for hydrologic functions and 3 points for habitat functions (Appendix C). Based on these ratings, the City of Spokane, Washington Municipal Code (Title 17E Chapter 070, Section 110 Paragraph B) requires a minimum buffer of 50 feet for a Category IV wetland in a high impact area.

Based on the information obtained from field observations, literature review, historical documentation, previous reports and regulation requirements/definitions outlined above, GeoEngineers' concludes Wetlands A and B, as delineated on December 13, 2017 (Figure 5), meet the wetland characteristics criteria to be considered a jurisdictional wetland by Ecology and the City of Spokane, Washington. However, these two depressional wetlands are isolated and would most likely not be regulated by the USACE under their current wetland definitions because they not connected to larger water bodies or streams.

The two storm swales, located on the east and western portion of the site, appear to have been constructed for the purpose of stormwater control in an upland area. It is GeoEngineers' opinion that they do not meet the definition of a wetland and/or Water of the U.S. established by the USACE, Ecology, or City of Spokane, Washington and therefore are not jurisdictional wetlands.

This report contains opinions from GeoEngineers based on specific site data and previous professional experience, however, final determinations will be made by the proper local (Ecology and City of Spokane) and Federal (USACE) agencies.

LIMITATIONS

GeoEngineers has prepared this wetland delineation report in general accordance with the scope and limitations of our proposal. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices for wetland delineation in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

This report has been prepared for the exclusive use by Spokane International Airport and their authorized agents following the described methods and information available at the time of our services. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. The information contained herein should not be applied for any purpose or project except the one originally contemplated.

REFERENCES

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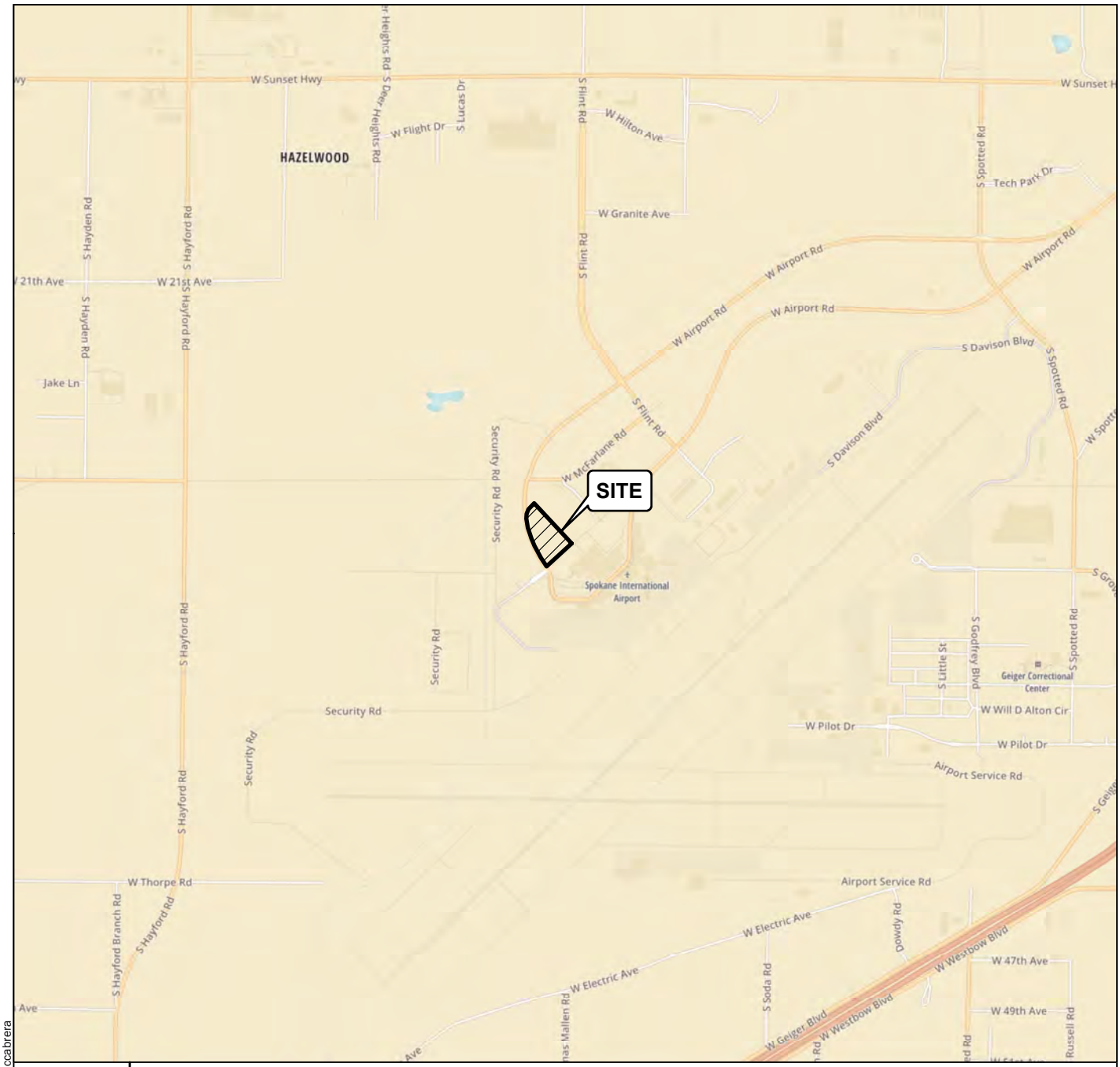
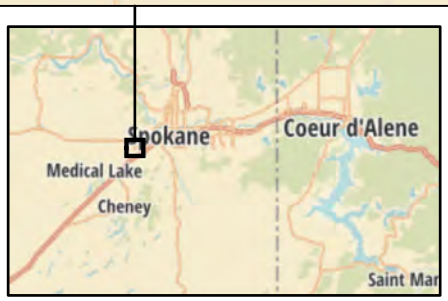
FIGURES

GeoEngineers





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Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2017

Projection: NAD 1983 UTM Zone 11N

Vicinity Map

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure 1

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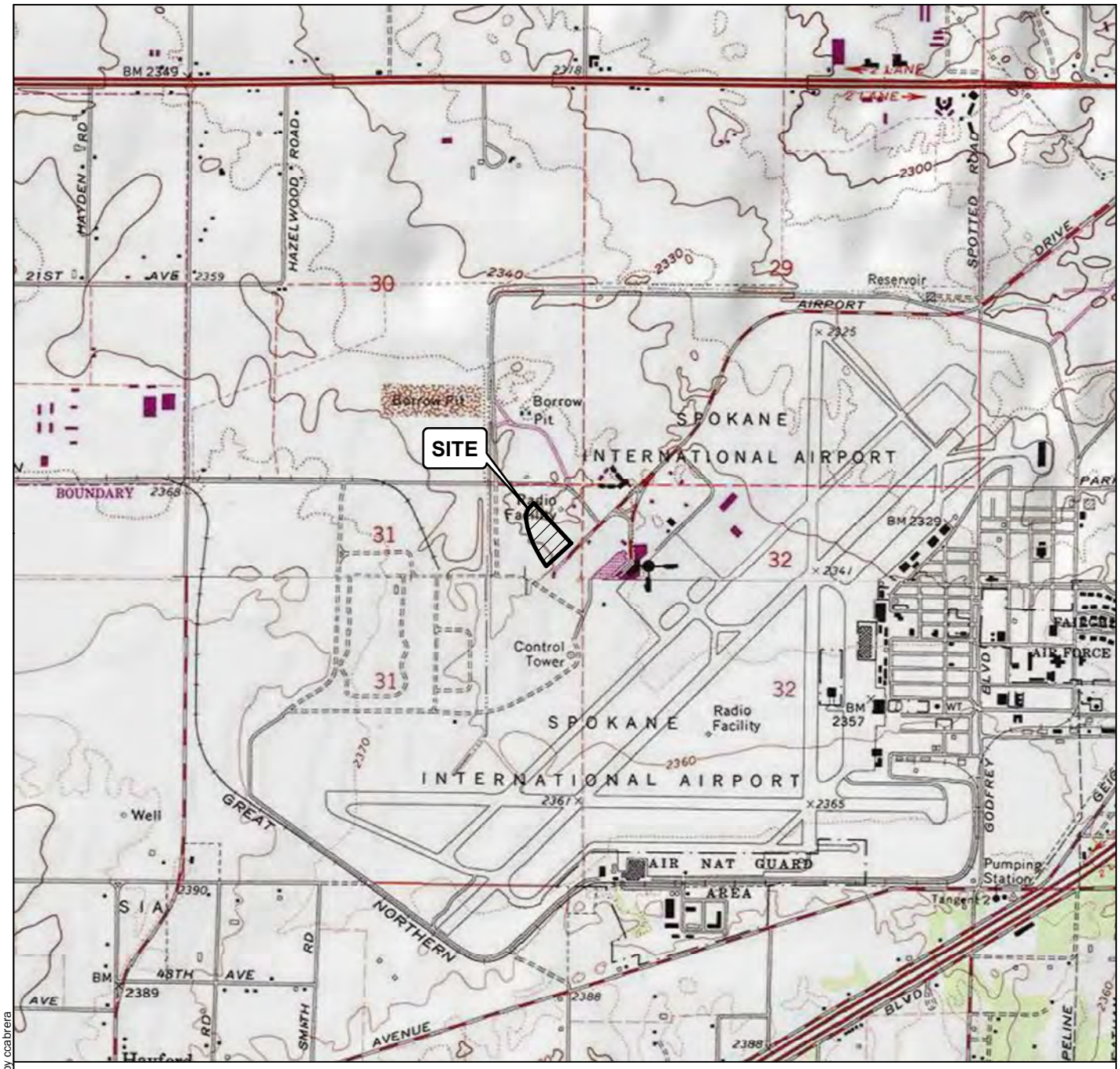

Legend

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Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Topo base from ESRI ArcGIS Online.

Projection: NAD 1983 UTM Zone 11N

Topographic Map

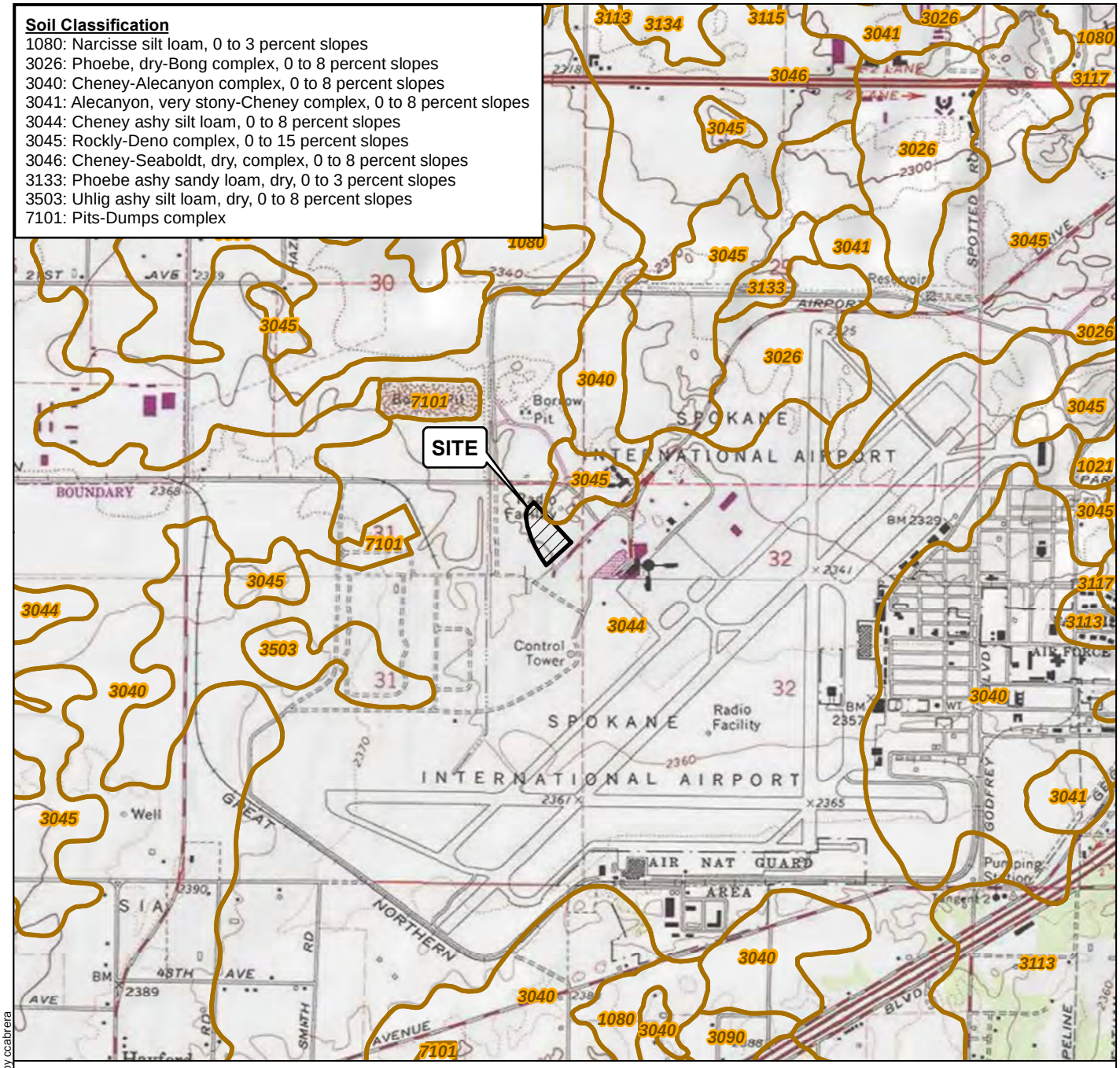
Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure 2

P:\3\3485063\GIS\MXD\348506300_F02_Topo.mxd Date Exported: 02/08/18 by ccabrera

Soil Classification
1080: Narcisse silt loam, 0 to 3 percent slopes
3026: Phoebe, dry-Bong complex, 0 to 8 percent slopes
3040: Cheney-Alecanyon complex, 0 to 8 percent slopes
3041: Alecanyon, very stony-Cheney complex, 0 to 8 percent slopes
3044: Cheney ashy silt loam, 0 to 8 percent slopes
3045: Rockly-Deno complex, 0 to 15 percent slopes
3046: Cheney-Seaboldt, dry, complex, 0 to 8 percent slopes
3133: Phoebe ashy sandy loam, dry, 0 to 3 percent slopes
3503: Uhlig ashy silt loam, dry, 0 to 8 percent slopes
7101: Pits-Dumps complex



Legend
Site
Soils Boundary

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Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Topo base from ESRI ArcGIS Online.
Soils data from NRCS, https://websoilsurvey.sc.egov.usda.gov/.

Projection: NAD 1983 UTM Zone 11N

Soils Map

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure 3

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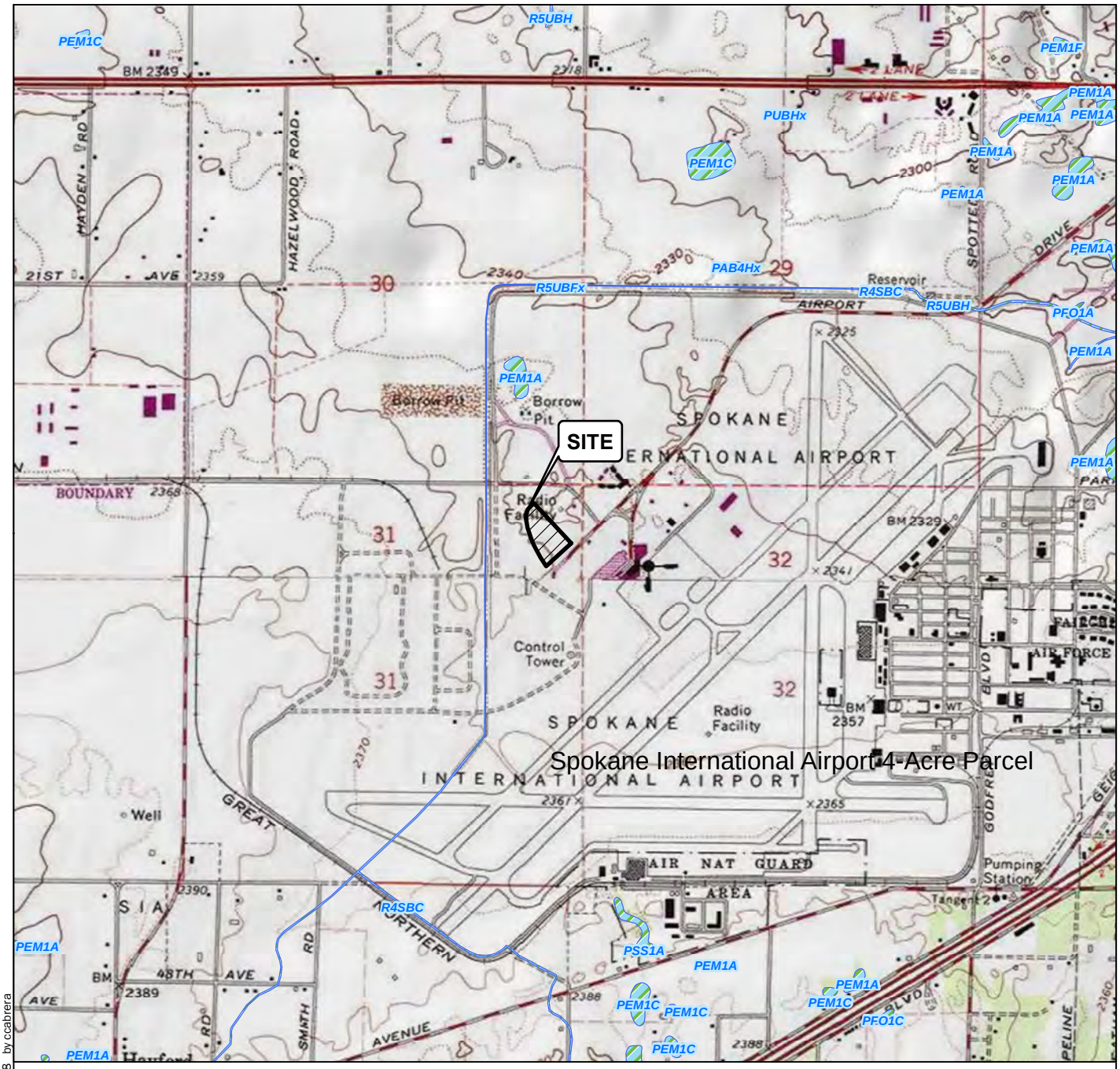

Legend

- Site
- NWI Wetland Boundary

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Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Topo base from ESRI ArcGIS Online.
NWI Data from US Fish and Wildlife, https://www.fws.gov/wetlands/.

Projection: NAD 1983 UTM Zone 11N

National Wetlands Inventory Map

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure 4

P:\3\3485063\GIS\MXD\348506300_F04_Wetland.mxd Date Exported: 02/08/18 by ccabrera

P:\3\3485063\GIS\MXD\348506300_F05_WetlandDelineation.mxd Date Exported: 02/08/18 by ccabrera

Legend

- Stormdrain
- Sample Plots
- Culvert
- GEI Delineated Wetland
- Stormwater Swale

60 0 60

Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Aerial base from Spokane County GIS Map Service, http://gis.spokanecounty.org/arcgis/services.

Projection: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

Wetland Delineation Map

Spokane International Airport 4-Acre Parcel
Spokane, Washington

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Figure 5

APPENDICES

GeoEngineers

APPENDIX A
Site Photographs

General view of the site from the central portion of the 4-acre parcel (generally facing south).

General view of the site from the central portion of the 4-acre parcel (generally facing east).

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-1

3485-063-00 Date Exported: 02/12/18

General view of the site from the central portion of the 4-acre parcel (generally facing southeast).

General view of the site from the central portion of the 4-acre parcel (generally facing northwest).

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-2

SP-1

SP-1

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-3

3485-063-00 Date Exported: 02/12/18

SP-2

SP-2

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-4

SP-3

SP-3

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-5

SP-4

SP-4

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-6

SP-5

SP-6

Site Photographs

Spokane Internal Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure A-7

3485-063-00 Date Exported: 02/12/18

APPENDIX B
Wetland Sample Plot Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-1

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.626716° | Long: -117.542113° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2.			
3.			
4.			
Total Cover:	15 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	15	x 3 =	45
FACU species	30	x 4 =	120
UPL species		x 5 =	0
Column Totals:	45 (A)		165 (B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: SP-1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 15	7.5YR 3/3	100					Silty Sand	No Odors
15	Refusal							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks: No water present

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-2

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.626839° | Long: -117.542037° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2.			
3.			
4.			
Total Cover:	15 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
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Column Totals:	45 (A)		165 (B)

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Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: SP-2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 16	7.5YR 3/3	100					Silty Sand	No Odors
16	Refusal							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks: No water present

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-3

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.625914° | Long: -117.541361° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2.			
3.			
4.			
Total Cover:	15 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	15	x 3 =	45
FACU species	30	x 4 =	120
UPL species		x 5 =	0
Column Totals:	45 (A)		165 (B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: SP-3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 17	10YR 3/3	100					Sand w/ Silt	No Odors

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks: No water present

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-4

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.626025° | Long: -117.541267° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2.			
3.			
4.			
Total Cover:	15 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	15	x 3 =	45
FACU species	30	x 4 =	120
UPL species		x 5 =	0
Column Totals:	45 (A)		165 (B)

Prevalence Index = B/A = 3.67

Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Delineation was completed outside the typical growing season. Therefore, GeoEngineers assumes that hydrophytic vegetation would be present since hydrology and hydric soils are present at this time. Further vegetation assessment during the growing season may be required if requested by the USACE or Ecology.

SOIL

Sampling Point: SP-4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 2	Woody Duff						Organic Layer	No Odors
2 - 6	10YR 2/2						Silt	No Odors
6 - 13	7.5YR 4/2						Sand	Wet/Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 6

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-5

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.626291° | Long: -117.540981° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2. *Salix (sp?)*	15	Yes	FACW
3.			
4.			
Total Cover:	30 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	15	x 2 =	30
FAC species	15	x 3 =	45
FACU species	30	x 4 =	120
UPL species		x 5 =	0
Column Totals:	60 (A)		195 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: SP-5

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 17	10YR 3/3	100					Sand w/ Silt	No Odors

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 17
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 15

Wetland Hydrology Present? Yes ○ No ◉

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

Remarks: Water depth and saturation greater than 12 inches below ground surface.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Spokane International Airport 4-Acre Parcel | City/County: Spokane County | Sampling Date: 12/13/18

Applicant/Owner: Spokane International Airport | State: WA | Sampling Point: SP-6

Investigator(s): Jason E. Poulsen | Section, Township, Range: S31 R42E T25N

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): None

Subregion (LRR): B - Columbia/Snake River Plateau | Lat: 47.626391° | Long: -117.541212° | Datum: WGS84

Soil Map Unit Name: 3044 - Cheney Ashy Silt Loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2. *Salix (sp?)*	15	Yes	FACW
3.			
4.			
Total Cover:	30 %		
Sapling/Shrub Stratum			
1. *Mahonia aquifolium*	15	Yes	FACU
2.			
3.			
4.			
5.			
Total Cover:	15 %		
Herb Stratum			
1. *Verbascum thapsus*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	15	x 2 =	30
FAC species	15	x 3 =	45
FACU species	30	x 4 =	120
UPL species		x 5 =	0
Column Totals:	60 (A)		195 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

- (●) Dominance Test is >50%
- (●) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Delineation was completed outside the typical growing season. Therefore, GeoEngineers assumes that hydrophytic vegetation would be present since hydrology and hydric soils are present at this time. Further vegetation assessment during the growing season may be required if requested by the USACE or Ecology.

SOIL

Sampling Point: SP-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0 - 2	Woody Duff						Organic Layer	No Odors
2 - 6	10YR 2/2						Silt	No Odors
6 - 13	7.5YR 4/2						Sand	Wet/Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 6

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

APPENDIX C
Eastern Washington Wetland Rating Summary

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland A Date of site visit: 12/13/2017

Rated by Jason E. Poulsen Trained by Ecology? ☐ Yes ☐ No Date of training 6/17/2015

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map SEE ATTACHED REPORT DOCUMENTATION

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 22 - 27
_____ **Category II** - Total score = 19 - 21
_____ **Category III** - Total score = 16 - 18
X **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	M	M	L	
Landscape Potential	M	M	L	
Value	L	L	L	**Total**
Score Based on Ratings	5	5	3	**13**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Vernal Pools	
Alkali	
Wetland of High Conservation Value	
Bog and Calcareous Fens	
Old Growth or Mature Forest - slow growing	
Aspen Forest	
Old Growth or Mature Forest - fast growing	
Floodplain forest	
None of the above	X

Maps and Figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	—
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	—
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	—
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	Fig C-1
Map of the contributing basin	D 5.3	*
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	Fig C-2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	Fig C-3
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	Fig C-4

* THE AREA OF THE CONTRIBUTING BASIN FOR THIS WETLAND IS TOO SMALL TO MAP.

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream (*can be added to another figure*)	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1 - 4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
   - ☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   - ☐ At least 30% of the open water area is deeper than 10 ft (3 m)

   ☑ NO - go to 2 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit meet all of the following criteria?
   - ☐ The wetland is on a slope (*slope can be very gradual*),
   - ☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;
   - ☐ The water leaves the wetland **without being impounded.**

   ☑ NO - go to 3 ☐ **YES** - The wetland class is **Slope**

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

3. Does the entire wetland unit **meet all** of the following criteria?
   - ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   - ☐ The overbank flooding occurs at least once every 10 years.

   ☑ NO - go to 4 ☐ **YES** - The wetland class is **Riverine**

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

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

   ☐ NO - go to 5 ☑ **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1 - 4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

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

NOTES and FIELD OBSERVATIONS:

Wetland name or number

DEPRESSIONAL WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality		Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland has no surface water outlet	points = 5	
☐ Wetland has an intermittently flowing outlet	points = 3	5
☐ Wetland has a highly constricted permanently flowing outlet	points = 3	
Wetland has a permanently flowing, unconstricted, surface outlet	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions of soils*)	Yes = 3 No = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes		
Wetland has persistent, ungrazed, vegetation for > $^2/_3$ of area	points = 5	
Wetland has persistent, ungrazed, vegetation from $^1/_3$ to $^2/_3$ of area	points = 3	0
Wetland has persistent, ungrazed vegetation from $^1/_{10}$ to < $^1/_3$ of area	points = 1	
Wetland has persistent, ungrazed vegetation < $^1/_{10}$ of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:		
This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.		
Area seasonally ponded is > ½ total area of wetland	points = 3	0
Area seasonally ponded is ¼ - ½ total area of wetland	points = 1	
Area seasonally ponded is < ¼ total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	**5**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3?		0
Source	Yes = 1 No = 0	
Total for D 2	Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2.Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]?	Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)?	Yes = 2 No = 0	0
Total for D 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

DEPRESSIONAL WETLANDS **Hydrologic Functions** - Indicators that the site functions to reduce flooding and erosion	Points (only 1 score per box)
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has no surface water outlet — points = 8 ☐ Wetland has an intermittently flowing outlet — points = 4 ☐ Wetland has a highly constricted permanently flowing outlet — points = 4 Wetland has a permanently flowing unconstricted surface outlet — points = 0 *(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")*	8
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).* Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 8 Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 6 ☐ The wetland is a headwater wetland — points = 4 ☐ Seasonal ponding: 1 ft - < 2 ft — points = 4 Seasonal ponding: 6 in - < 1 ft — points = 2 Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0	0
Total for D 4 — Add the points in the boxes above	**8**

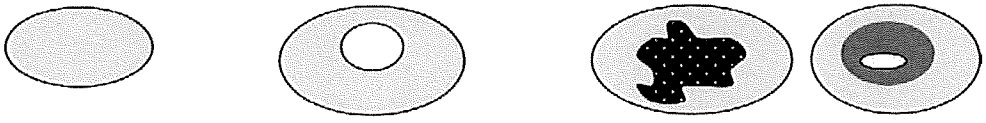
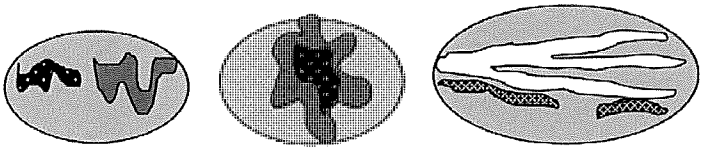
Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generates runoff? Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses ? Yes = 1 No = 0	1
Total for D 5 — Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The wetland is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. — points = 0 *Explain why* ☑ There are no problems with flooding downstream of the wetland — points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 — Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is > = ¼ ac or > = 10% of the wetland if wetland is < 2.5 ac.* ☐ Aquatic bed ☑ Emergent plants 0 - 12 in (0-30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants > 12 - 40 in (> 30-100 cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ☑ Scrub-shrub (areas where shrubs have > 30% cover) ☑ Forested (areas where trees have > 30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points - 1 1 check: points = 0	2
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? *Answer YES for Lake Fringe wetlands.* ☐ Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No.* ☐ Yes = 3 No = 0	0
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold. You do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species 3 Scoring: > 9 species: points = 2 4 - 9 species: points = 1 < 4 species: points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points  Riparian braided channels with 2 classes	0

H 1.6. Special habitat features:	
Check the habitat features that are present in the wetland. The number of checks is the number of points. ☐ Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the wetland. ☐ Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)	0
Total for H 1 — Add the points in the boxes above	**2**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1 Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* 0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0% > 1/3 (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* 5 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 5% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1 - 3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	0
H 2.3 Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (-2) Does not meet criterion above — points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 — Add the points in the boxes above	**-2**

Rating of Landscape Potential If Score is: ☐ **4 - 9 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	
SC 1.0. Vernal Pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.* ☐ The soil in the wetland is shallow [< 1 ft (30 cm) deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. ☐ Yes - Go to **SC 1.1** ☑ No = **Not vernal pool**	
SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes – Go to **SC 1.2** ☐ No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? ☐ Yes = **Category II** ☐ No = **Category III**	
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ¾ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. ☐ Yes = **Category I** ☑ No = **Not an alkali wetland**	
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐ Yes - Go to **SC 3.2** ☑ No - Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 3.4** ☑ No = **Not WHCV** SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	

SC 4.0. Bogs and Calcareous Fens

Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? Use the key below to identify if the wetland is a bog or calcareous fen. ***If you answer yes you will still need to rate the wetland based on its functions.***

SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils.*

☐ Yes - Go to **SC 4.3** ☑ No - Go to **SC 4.2**

SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 4.3** ☑ No = **Is not a bog for rating**

SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5?

☐ Yes = **Category I bog** ☑ No - Go to **SC 4.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog.

SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy?

☐ Yes = **Category I bog** ☑ No - Go to **SC 4.5**

SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks?

☐ Yes = **Is a Calcareous Fen for purpose of rating** ☑ No - Go to **SC 4.6**

SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met:

☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems

☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland

☐ Yes = **Is a Category I calcareous fen** ☑ No = **Is not a calcareous fen**

SC 5.0. Forested Wetlands

Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H*

☐ The wetland is within the 100 year floodplain of a river or stream

☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species

☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW (*see definitions in question H3.1*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a forested wetland with special characteristics**

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)?

☐ Yes = **Category I** ☑ No - Go to **SC 5.2**

SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species?

☐ Yes = **Category I** ☑ No - Go to **SC 5.3**

SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)?

☐ Yes = **Category II** ☑ No - Go to **SC 5.4**

SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream?

☐ Yes = **Category II** ☑ No = **Not a forested wetland with special characteristics**

Category of wetland based on Special Characteristics

Choose the highest rating if wetland falls into several categories

If you answered No for all types, enter "Not Applicable" on Summary Form

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Old-growth/Mature forests**: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.
- ☐ **Shrub-steppe**: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- ☐ **Eastside Steppe**: Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).
- ☐ **Juniper Savannah**: All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland B Date of site visit: 12/13/2017

Rated by Jason E. Poulsen Trained by Ecology? ☐ Yes ☐ No Date of training 6/17/2015

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map SEE ATTACHED REPORT DOCUMENTATION

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 22 - 27
_____ **Category II** - Total score = 19 - 21
_____ **Category III** - Total score = 16 - 18
X **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	M	M	L	
Landscape Potential	M	M	L	
Value	L	L	L	**Total**
Score Based on Ratings	5	5	3	**13**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Vernal Pools	
Alkali	
Wetland of High Conservation Value	
Bog and Calcareous Fens	
Old Growth or Mature Forest - slow growing	
Aspen Forest	
Old Growth or Mature Forest - fast growing	
Floodplain forest	
None of the above	**X**

Maps and Figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	—
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	—
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	—
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	Fig C-1
Map of the contributing basin	D 5.3	*
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	Fig C-2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	Fig C-3
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	Fig C-4

*THE AREA OF THE CONTRIBUTING BASIN FOR THIS WETLAND IS TOO SMALL TO MAP.

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream (*can be added to another figure*)	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1 - 4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
   - ☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   - ☐ At least 30% of the open water area is deeper than 10 ft (3 m)

   ☑ NO - go to 2 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit meet all of the following criteria?
   - ☐ The wetland is on a slope (*slope can be very gradual*),
   - ☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;
   - ☐ The water leaves the wetland **without being impounded.**

   ☑ NO - go to 3 ☐ **YES** - The wetland class is **Slope**

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

3. Does the entire wetland unit **meet all** of the following criteria?
   - ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   - ☐ The overbank flooding occurs at least once every 10 years.

   ☑ NO - go to 4 ☐ **YES** - The wetland class is **Riverine**

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

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

   ☐ NO - go to 5 ☑ **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1 - 4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

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

NOTES and FIELD OBSERVATIONS:

DEPRESSIONAL WETLANDS Water Quality Functions - Indicators that the site functions to improve water quality	Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland:	
Wetland has no surface water outlet — points = 5	5
☐ Wetland has an intermittently flowing outlet — points = 3	
☐ Wetland has a highly constricted permanently flowing outlet — points = 3	
Wetland has a permanently flowing, unconstricted, surface outlet — points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions of soils*) Yes = 3 No = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes	
Wetland has persistent, ungrazed, vegetation for > $^2/_3$ of area — points = 5	0
Wetland has persistent, ungrazed, vegetation from $^1/_3$ to $^2/_3$ of area — points = 3	
Wetland has persistent, ungrazed vegetation from $^1/_{10}$ to < $^1/_3$ of area — points = 1	
Wetland has persistent, ungrazed vegetation < $^1/_{10}$ of area — points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:	
This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.	
Area seasonally ponded is > ½ total area of wetland — points = 3	0
Area seasonally ponded is ¼ - ½ total area of wetland — points = 1	
Area seasonally ponded is < ¼ total area of wetland — points = 0	
Total for D 1 — Add the points in the boxes above	**5**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **6 - 11 = M** ☑ **0 - 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3?		0
Source	Yes = 1 No = 0	
Total for D 2	Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2.Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]?	Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)?	Yes = 2 No = 0	0
Total for D 3	Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

DEPRESSIONAL WETLANDS **Hydrologic Functions** - Indicators that the site functions to reduce flooding and erosion	Points (only 1 score per box)
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland has no surface water outlet — points = 8 ☐ Wetland has an intermittently flowing outlet — points = 4 ☐ Wetland has a highly constricted permanently flowing outlet — points = 4 Wetland has a permanently flowing unconstricted surface outlet — points = 0 (*If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing"*)	8
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).* Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 8 Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 6 ☐ The wetland is a headwater wetland — points = 4 ☐ Seasonal ponding: 1 ft - < 2 ft — points = 4 Seasonal ponding: 6 in - < 1 ft — points = 2 Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0	0
Total for D 4 — Add the points in the boxes above	8

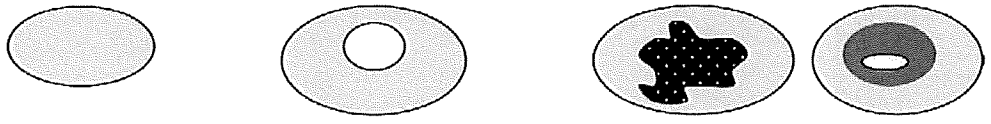
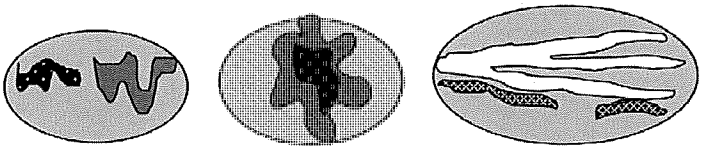
Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **6 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generates runoff? Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses ? Yes = 1 No = 0	1
Total for D 5 — Add the points in the boxes above	1

Rating of Landscape Potential If score is: ☐ **3 = H** ☑ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The wetland is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. — points = 0 *Explain why* ☑ There are no problems with flooding downstream of the wetland — points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 — Add the points in the boxes above	0

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is > = ¼ ac or > = 10% of the wetland if wetland is < 2.5 ac.* ☐ Aquatic bed ☑ Emergent plants 0 - 12 in (0-30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants > 12 - 40 in (> 30-100 cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ☑ Scrub-shrub (areas where shrubs have > 30% cover) ☑ Forested (areas where trees have > 30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points - 1 1 check: points = 0	2
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? *Answer YES for Lake Fringe wetlands.* ☐Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No.* ☐ Yes = 3 No = 0	0
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold. You do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species 3 Scoring: > 9 species: points = 2 4 - 9 species: points = 1 < 4 species: points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points  Riparian braided channels with 2 classes	0

H 1.6. Special habitat features:	
Check the habitat features that are present in the wetland. The number of checks is the number of points. ☐ Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the wetland. ☐ Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)	0
Total for H 1 — Add the points in the boxes above	**2**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1 Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* 0 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 0% > 1/3 (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* 5 % undisturbed habitat + (0 % moderate & low intensity land uses / 2) = 5% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1 - 3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	0
H 2.3 Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (-2) Does not meet criterion above — points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 — Add the points in the boxes above	**-2**

Rating of Landscape Potential If Score is: ☐ **4 - 9 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	
SC 1.0. Vernal Pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.* ☐ The soil in the wetland is shallow [< 1 ft (30 cm) deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. ☐ Yes - Go to **SC 1.1** ☑ No = **Not vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes – Go to **SC 1.2** ☐ No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? ☐ Yes = **Category II** ☐ No = **Category III**	
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ⅓ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. ☐ Yes = **Category I** ☑ No = **Not an alkali wetland**	
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐ Yes - Go to **SC 3.2** ☑ No - Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☐ No = **Not WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 3.4** ☑ No = **Not WHCV** SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	

SC 4.0. Bogs and Calcareous Fens

Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? Use the key below to identify if the wetland is a bog or calcareous fen. ***If you answer yes you will still need to rate the wetland based on its functions.***

SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils.*

☐ Yes - Go to **SC 4.3** ☑ No - Go to **SC 4.2**

SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 4.3** ☑ No = **Is not a bog for rating**

SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5?

☐ Yes = **Category I bog** ☑ No - Go to **SC 4.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog.

SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy?

☐ Yes = **Category I bog** ☑ No - Go to **SC 4.5**

SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks?

☐ Yes = **Is a Calcareous Fen for purpose of rating** ☑ No - Go to **SC 4.6**

SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met:

☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems

☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland

☐ Yes = **Is a Category I calcareous fen** ☑ No = **Is not a calcareous fen**

SC 5.0. Forested Wetlands

Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H*

☐ The wetland is within the 100 year floodplain of a river or stream

☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species

☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW (*see definitions in question H3.1*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a forested wetland with special characteristics**

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)?

☐ Yes = **Category I** ☑ No - Go to **SC 5.2**

SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species?

☐ Yes = **Category I** ☑ No - Go to **SC 5.3**

SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)?

☐ Yes = **Category II** ☑ No - Go to **SC 5.4**

SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream?

☐ Yes = **Category II** ☑ No = **Not a forested wetland with special characteristics**

Category of wetland based on Special Characteristics

Choose the highest rating if wetland falls into several categories

If you answered No for all types, enter "Not Applicable" on Summary Form

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Old-growth/Mature forests**: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.
- ☐ **Shrub-steppe**: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- ☐ **Eastside Steppe**: Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).
- ☐ **Juniper Savannah**: All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

● Approximate Location of the center of Wetland A

● Approximate Location of the center of Wetland B

N
W E
S

Not to Scale

Wetland A and B
150-Foot Radius

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure C-1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source:

3485-063-00 Date Exported: 02/12/18

- Approximate Location of Wetland A
- Approximate Location of Wetland B

N
W E
S

Not to Scale

Wetland A and B
1-Kilometer Radius

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

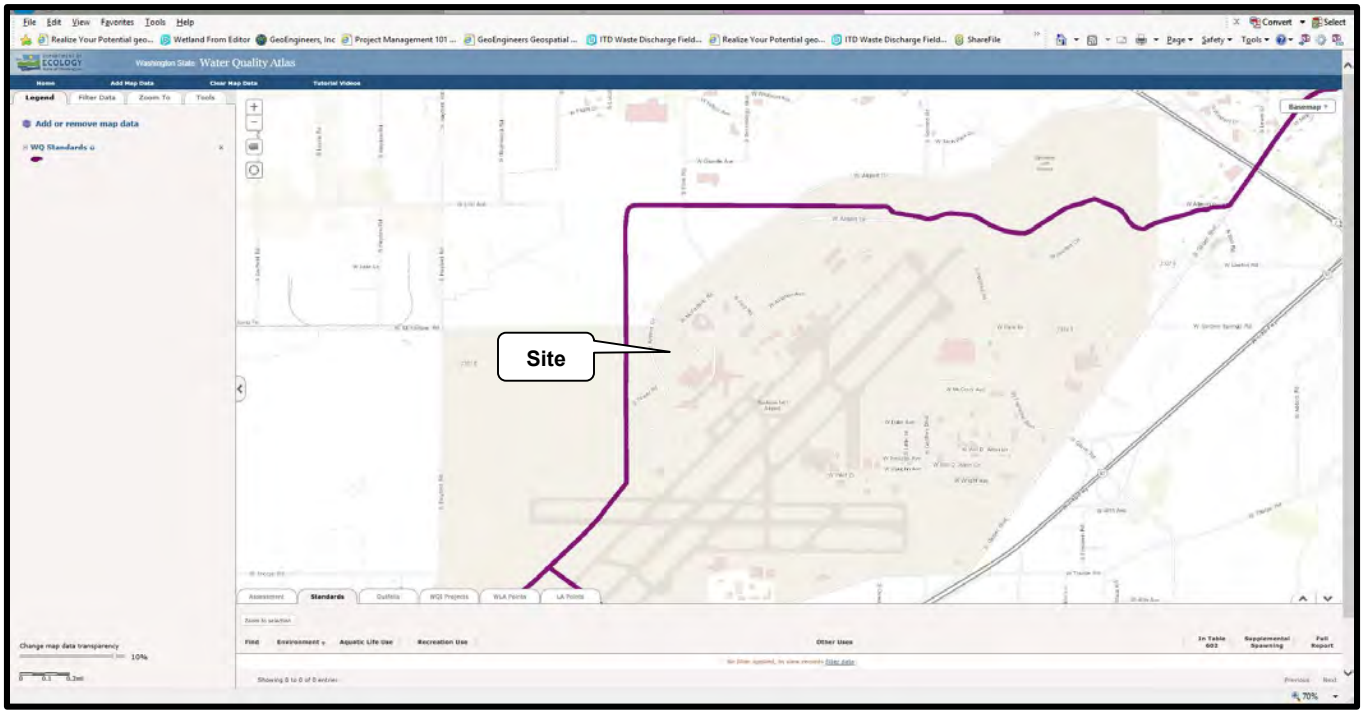
Figure C-2

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source:

3485-063-00 Date Exported: 02/12/18



N
W E
S
Not to Scale

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Screenshot received from Washington Department of Ecology

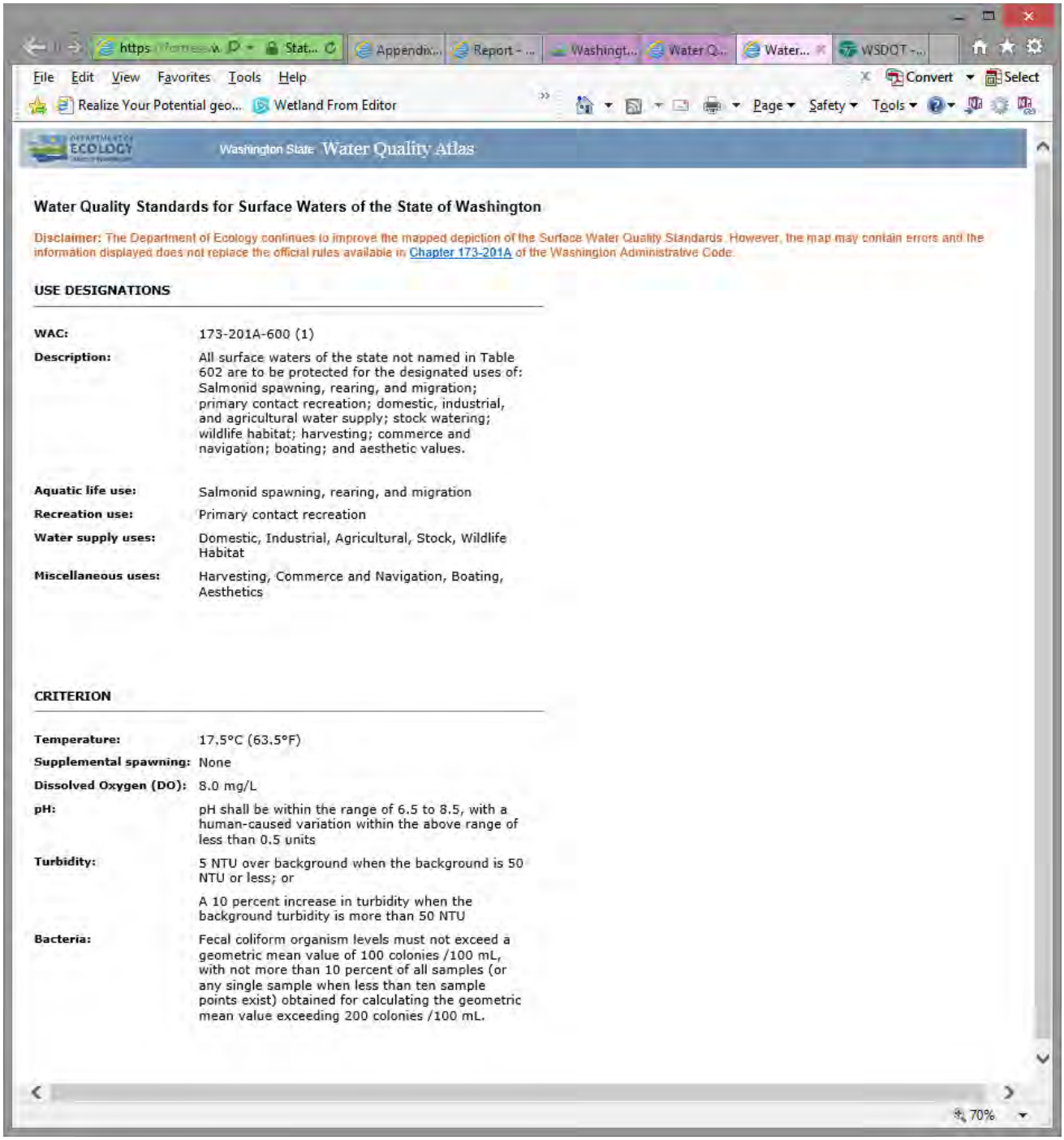
303 D Stream Ecology Screenshot

Spokane International Airport 4-Acre Parcel
Spokane, Washington

GeoEngineers

Figure C-3

3485-063-00 Date Exported: 02/12/18



Washington State Water Quality Atlas

Water Quality Standards for Surface Waters of the State of Washington

Disclaimer: The Department of Ecology continues to improve the mapped depiction of the Surface Water Quality Standards. However, the map may contain errors and the information displayed does not replace the official rules available in Chapter 173-201A of the Washington Administrative Code.

USE DESIGNATIONS

WAC:	173-201A-600 (1)
Description:	All surface waters of the state not named in Table 602 are to be protected for the designated uses of: Salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.
Aquatic life use:	Salmonid spawning, rearing, and migration
Recreation use:	Primary contact recreation
Water supply uses:	Domestic, Industrial, Agricultural, Stock, Wildlife Habitat
Miscellaneous uses:	Harvesting, Commerce and Navigation, Boating, Aesthetics

CRITERION

Temperature:	17.5°C (63.5°F)
Supplemental spawning:	None
Dissolved Oxygen (DO):	8.0 mg/L
pH:	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units
Turbidity:	5 NTU over background when the background is 50 NTU or less; or A 10 percent increase in turbidity when the background turbidity is more than 50 NTU
Bacteria:	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

N
W E
S
Not to Scale

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Washington State Department of Ecology

TMDL's for WRIA Located Wetlands

Spokane International Airport 4-Acre Parcel
Spokane, Washington

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Figure C-4

3485-063-00 Date Exported: 02/12/18

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