Wetland Delineation

Quail Run Property
Spokane, Washington

for
Sonneland Commercial Properties, LLC
c/o Schueler Consulting Services, LLC

October 24, 2014

GeoEngineers
Earth Science + Technology

Wetland Delineation

Quail Run Property
Spokane, Washington

for
Sonneland Commercial Properties, LLC
c/o Schueler Consulting Services, LLC

October 24, 2014

GeoEngineers

1525 South David Lane
Boise, Idaho 83705
208.433.8098

Wetland Delineation

Quail Run Property
Spokane, Washington

File No. 21508-001-01

October 24, 2014

Prepared for:

Sonneland Commercial Properties, LLC
c/o Schueler Consulting Services, LLC
144 Northwest Vicksburg Avenue
Bend, Oregon 97701

Attention: Kirk Schueler

Prepared by:

GeoEngineers, Inc.
1525 South David Lane
Boise, Idaho 83705
208.433.8098

Jason E. Poulsen, PWS
Senior Natural Resource Scientist

Jason R. Scott, CFP
Associate

JEP:JRS:mlh

GeoEngineers

Table of Contents

INTRODUCTION **1**

SCOPE OF SERVICES **1**

METHODS **1**

Literature Review 1
Wetland Delineation Methodology 1
Ordinary High Water Mark Delineation Methodology 2
Field Evaluation 3
Wetland Classification and Rating 3

RESULTS **3**

Literature Review 3
Soils 3
NWI Map 4
Topographic Maps 4
Historical Aerial Photographs 4
Wetland Delineation/Assessment 4
Soil and Hydrology Field Data 5
Wetland Conditions 6

CONCLUSIONS **6**

LIMITATIONS **7**

REFERENCES **7**

LIST OF FIGURES

Figure 1. Vicinity Map
Figure 2. Soils Map
Figure 3. NWI Map
Figure 4. Topographic Map
Figure 5. Wetland Delineation Map

APPENDICES

Appendix A. Site Photographs
Appendix B. Eastern Washington Wetland Rating Forms
Appendix C. Wetland Determination Data Forms

INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) was retained by Sonneland Commercial Properties, LLC (Sonneland) to provide a wetland delineation and functions assessment on the approximately 34-acre Quail Run Property located southwest of the intersection of South Southeast Boulevard and East 29th Avenue in Spokane, Washington (Figure 1, Vicinity Map). GeoEngineers understands that Sonneland Commercial Properties, LLC (Sonneland) will use this wetland delineation report as documentation to support a site development plan and assist with future permitting requirements.

SCOPE OF SERVICES

GeoEngineers' delineation and functions assessment scope of services included: (1) a literature review; (2) a field assessment; and (3) the preparation of this report for future permitting and documentation purposes.

METHODS

Literature Review

GeoEngineers researched existing information on wetlands, streams, ditches, man-made features and or other aquatic habitat documented on or near the project area prior to conducting the site visit. The search for pertinent and applicable data and maps consisted of a review of the following.

- United States Geological Survey (USGS) topographic map;
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps;
- United States Department of Agriculture (USDA) – National Resource Conservation Service (NRCS) Web Soil Survey for Spokane County, Washington; and
- Readily available historical aerial photographs.

The purpose of this pre-field review was to prepare for the site survey and to assist the field wetland biologist in determining the potential for wetlands and, if present, their location.

Wetland Delineation Methodology

Wetland delineation efforts followed the guidance set forth in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory, 1987), the USACE Regional Supplement to the USACE Wetland Delineation Manual, Western Mountains, Valleys and Coastal Region (USACE 2010 Version 2.0) and the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). These manuals follow the three-parameter approach for conducting wetland determinations which include analysis for the presence of: (1) hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. The presence of all three criteria is required for a given area to be classified as a wetland.

Soil pits were dug as needed to confirm the presence/absence of hydric soils and hydrology. Soils were inspected from the hand-dug soil pits that extended approximately 13 to 14 inches below ground surface (bgs), depending on soil conditions, to be analyzed visually and physically. Within each soil pit, soil texture,

soil matrix color, presence or absence of redoximorphic features or gleying and depth of soil saturation, if present, were recorded. Soil matrix and redoximorphic feature colors were determined using Munsell Soil Color Charts (GretagMacbeth 2000). Additionally, wetland hydrology indicators, including drainage patterns, presence of surface water, depth to groundwater within soil pits and evidence of inundation were also noted at each sample plot, if applicable.

Soil test pit coordinates were collected using an iPad and associated global positioning system (GPS) and GISPro application package. This data was then used in conjunction with desktop GIS mapping software to produce site maps.

Ordinary High Water Mark Delineation Methodology

Open water features, located within the study area, were determined based on their ordinary high water mark (OHWM) in accordance with the guidance set forth by the USACE in their Regulatory Guidance Letter titled *Ordinary High Water Mark Identification* (USACE, 2005) and various indicators outlined with the USACE *A Guide to OHWM for Non-Perennial Streams in the Western Mountains, Valleys and Cast Region of the Unites States* (USACE 2014) and the *Field Guide to Identification of the OHWM in the Arid West Region of the Western United States* (USACE 2008). Please note, the Arid West OHWM document was also used because many of the characteristics and attributes of the waters/waterways in the region of the study area are similar to those found in the Arid West region. The OHWM is defined by the USACE as:

> *The term "ordinary high water mark" 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).*

Physical characteristics that are present on the shoreline of a watercourse 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
- Leaf litter disturbed, matted or washed away
- Water staining
- Change in plant community

Combinations of physical characteristics and other methods are typically used when available for determining the OHWM. Because many types of water bodies occur with varying conditions including topography, morphology and flow/elevation dynamics, other physical characteristics indicative of the OHWM may also be used that are not identified in the USACE guidance.

OHWM points were collected using an iPad and associated GPS and GISPro application package. This data was then used in conjunction with desktop GIS mapping software to produce site maps.

Field Evaluation

A GeoEngineers' biologist conducted field delineation and functions assessment services for the site on September 4, 2014. A photographic record of existing site conditions is provided in Appendix A, Site Photographs. Potential wetland areas, within the subject site, were evaluated based upon three criteria: (1) the presence of hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. Based upon positive confirmation of all three parameters, the GeoEngineers' biologist would established soil pits in the field to determine the wetland boundary and document the conditions of the wetlands and adjacent upland habitat.

Wetland Classification and Rating

Wetlands 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 hydrogeomorphic 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 USDA NRCS Web Soil Survey (USDA NRCS Soil Survey http://websoilsurvey.nrcs.usda.gov/app/) for Spokane County, Washington identified two soil types within the area of the project site, as shown in Figure 2, Soils Map. A general description of each soil type as defined by the NRCS Web Soil Survey is provided below.

- **3117 — Northstar–Rock outcrop–Rockly complex, 0% to 15 % Slopes**: Landform: Plateaus / Available water storage in profile: Very Low / Parent material: Loess with an influence of volcanic ash over residuum and/or colluvium derived from basalt / Drainage class: Well drained.
- **7131 — Urban land Northstar, disturbed complex, 3% to 8 % Slopes**: Landform: Plateaus / Available water storage in profile: Very low / Parent material: Loess with an influence of volcanic ash over residuum and/or colluvium derived from basalt / Drainage class: Well drained.

Only the Northstar-Rock outcrop (3117) soil type was classified by the National Hydric Soils List as a potential hydric soil in depressions.

NWI Map

The USFWS NWI maps depicted two wetland classifications on the site; one Palustrine Emergent Persistent Wetland, Seasonally Flooded (PEM1C) and one Palustrine, Scrub-shrub, Broad-Leaved Deciduous, Seasonally Flooded (PSS1C) (Figure 3, NWI Map). Based on our field observations, only the wetland location depicted by the NWI map as PSS1C was present on the site. However, GeoEngineers' study reclassified the NWI PSS1C classification as a Palustrine, Forested, Broad-Leaved Deciduous, Semi-permanently Flooded (PFO1F) wetland with a shallow, open water component.

Topographic Maps

GeoEngineers reviewed the 1974 photorevised 1986 Spokane Northwest, Washington, the 1973 photorevised 1986 Spokane Southwest, Washington and Spokane Southeast, Washington 7.5 minute series topographic maps for the project site. The topographic maps indicate the presence of seasonal drainage through the central portion of the site and an undefined marsh area along the far west property boundary prior to 1973/1974 (Figure 4, Topographic Map). The drainage and marsh characteristics depicted by the topographic maps were not observed by the field biologist during the assessment.

Historical Aerial Photographs

GeoEngineers reviewed the following historical aerial photographs associated with the site to assist with the evaluation process. *Please note, not all aerial photographs were reproduced in the attached figures due to copy right restrictions.*

- **July 1995**: The 1995 aerial photograph shows the majority of the site as undeveloped land except for four residential structures, one located on the west end of the property and three located on the east end of the property. There also appears to be earth moving activities (grading) on the northeast portion of the site and general dirt road access through the central portion of the property. No clear evidence of wetland or aquatic features were observed in this photograph due to poor scale and clarity.
- **May 2002 / August 2005 / August 2006 / May 2009 / August 2011**: The 2002, 2005, 2006 and 2011 aerial photograph appears similar to the 1995 photograph.
- **July 2013**: The 2013 photograph appears similar to the previous photographs; however, the pond that was identified near the west property boundary (adjacent to the west residential structure) can be identified in this photograph. No other water features were observed in the photograph.

Wetland Delineation/Assessment

GeoEngineers identified one wetland, approximately 0.48 acres (21,244 square feet) in size within the Quail Run Property project boundary. This wetland is identified as Wetland A and, as previously mentioned,

was reclassified by the field biologist as a Palustrine, Forested, Broad-Leaved Deciduous, Semi permanently Flooded (PFO1F) wetland with a shallow, open water component. This wetland was delineated using OHWM methods as described above, therefore a wetland data sheet was not completed for Wetland A. Ordinary High Water Mark (OHWM) points were recorded using an iPad and associated GISPro application package. Please note, the OHWM boundaries associated with Wetland A were not surveyed by a professional land surveyor for mapping purposes and are therefore considered approximate. As the OHWM was determined, appropriate pin flagging was labeled and inserted into the ground along the OHWM boundary determined by the field biologist. A waypoint was established on the hand-held GPS unit for each pin flag location. Following the field study, these data were then used in conjunction with desktop GIS mapping software to depict the OHWM boundary as illustrated on Figure 5, Wetland Delineation Map.

Only two areas were identified that expressed potential vegetative and/or topographically depressed characteristics that led to require the advancement of hand dug soil test pits (SP-1 ns SP-2). In both soil test pits, neither hydrology nor hydric soil indicators were identified and therefore were characterized as upland soil test pits.

Soil and Hydrology Field Data

The GeoEngineers' wetland biologist surveyed the property to estimate presence/absence of wetlands on site. Based on site observations, one wetland (Wetland A) was identified on-site. GeoEngineers established a total of two soil pits (SP-1 and SP-2) within the area of the project site. Sample pits were located based on observations related to topography gradient or low points within the terrain, general vegetative cover type or color change and data obtained from the literature review. Table 1, provides a summary of soil and hydrology data conditions encountered during the delineation/assessment.

TABLE 1. 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" – 7"	10YR 3/2	No	Silt	No	Not present	No
	7" – 14"	10YR 5/2	No	Sandy Silt	No	Not present	No
SP-2	0" – 8"	10YR 3/3	No	Silt	No	Not present	No
	8" – 13"	10YR 5/2	No	Silt	No	Not present	No

The data collected from each soil pit was compared in an effort to identify consistent soil types. Soil data gathered from soil pits (Appendix C, Wetland Determination Data Forms) revealed a consistent non-hydric or upland soil profile of silt texturing with soil colors ranging from 10YR 3/2 to 10YR 5/2. No apparent redoximorphic features (GretagMacbeth, 2000) were observed in either of these two soil pits. Photographs were collected of each soil pit and are presented in Appendix A, Site Photographs. Please note, soil pits were not dug in association with Wetland A. This Wetland A was delineated using topographic relief and OHWM primary indicators described above.

Wetland Conditions

General Vegetation

The Wetland A is surrounded by a deciduous forest and relatively steep basalt outcroppings. The majority of Wetland A consists of an open water component with only a narrow forested wetland fringe vegetated mainly with Cascara buckthorn (*Frangula pushiana*) and Pacific willow (*Salix lucida*). A significant algal mat was also observed across the open water component. These general vegetation types are common and are typically found in or adjacent to freshwater habitats.

Wetland Rating/Buffers

GeoEngineers completed a functional attributes assessment on Wetland A using the Washington State Department of Ecology (Ecology), Washington State Wetland Rating System for Eastern Washington (Ecology Publication #04-06-15 dated 2007) Eastern Washington Rating Form (Appendix B). Based on the functional attributes associated with this wetland, the rating form characterized the on-site wetland as a Category III system; scoring a total of 33 points. The wetland meets criteria consistent with a Category III rating as defined by Ecology and the City of Spokane (City of Spokane's Municipal Code Section 17E.070.100 - Wetland Rating System) because of its score for water quality functions (10 points), hydrologic functions (12 points) and habitat functions (11 points).

Based on the current habitat function score identified above (11 points) and the current land use type (Moderate – Residential: one unit per acre or less), as defined by Spokane Municipal Code Alternative 2 (Section 17E.070.110 Wetland Buffers), Wetland A currently has an established buffer of 60 feet from the edge of the wetland. However, if future development occurs that increases the land use type to a density greater than one residential unit per acre, it would result in a "High" land use classification type. This increase to "High" land use type would require the buffer to be increased to a total of 80 feet (Section 17E.070.110 Wetland Buffers B. 2.) from the edge of the wetland. Spokane Municipal Code (17E.070.110 Wetland Buffers H. Structural Setbacks from Buffers) also requires a 10 foot structural setback beyond the wetland buffer. Figure 5, Wetland Delineation Map, illustrates the approximate location of each buffer width related to the edge of Wetland A but does not include the additional 10 foot structural setback line.

CONCLUSIONS

GeoEngineers identified, delineated and assessed one Palustrine, Forested, Broad-Leaved Deciduous, Semi-permanently Flooded (PFO1F) wetland (Wetland A) with a shallow, open water component approximately 0.48 acres (21,244 square feet) in size. This wetland was classified as a Category III wetland with a current regulatory (City of Spokane) buffer of 60 feet. If future development increased the current land use type classification from "Moderate" to "High" by increasing the number of residential units, then a new regulatory buffer of 80 feet will be required along with a 10-foot structural setback.

This report contains opinions from GeoEngineers based on specific site data and previous professional experience; however, all jurisdictional determinations and regulatory requirements are beyond GeoEngineers' control and at the sole discretion of the City of Spokane, Ecology and the USACE.

LIMITATIONS

GeoEngineers has developed 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 of Sonneland Commercial Properties, LLC 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

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetland and Deep Water Habitats of the United States. Performed for Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

Environmental Laboratory. 1987. "U.S. Army Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

GretagMacbeth. 2000. Munsell® Soil Color Charts. New Windsor, New York.

Hruby, T. 2004. Washington State Wetland Rating System for Eastern Washington – Revised. Washington State Department of Ecology Publication #04-06-015.

McMillan, Andy. 1997. Washington State Wetlands Identification and Delineation Manual. Washington State Department of Ecology Publication #96-94.

United States Army Corps of Engineers (USACE). 2008. "Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region, ed. J.S. Wakeley, R. W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

United States Army Corps of Engineers. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

United States Army Corps of Engineers. 2005. "Regulatory Guidance Letter – Subject: Ordinary High Water Mark."

United States Army Corps of Engineers. 2014. "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0)"

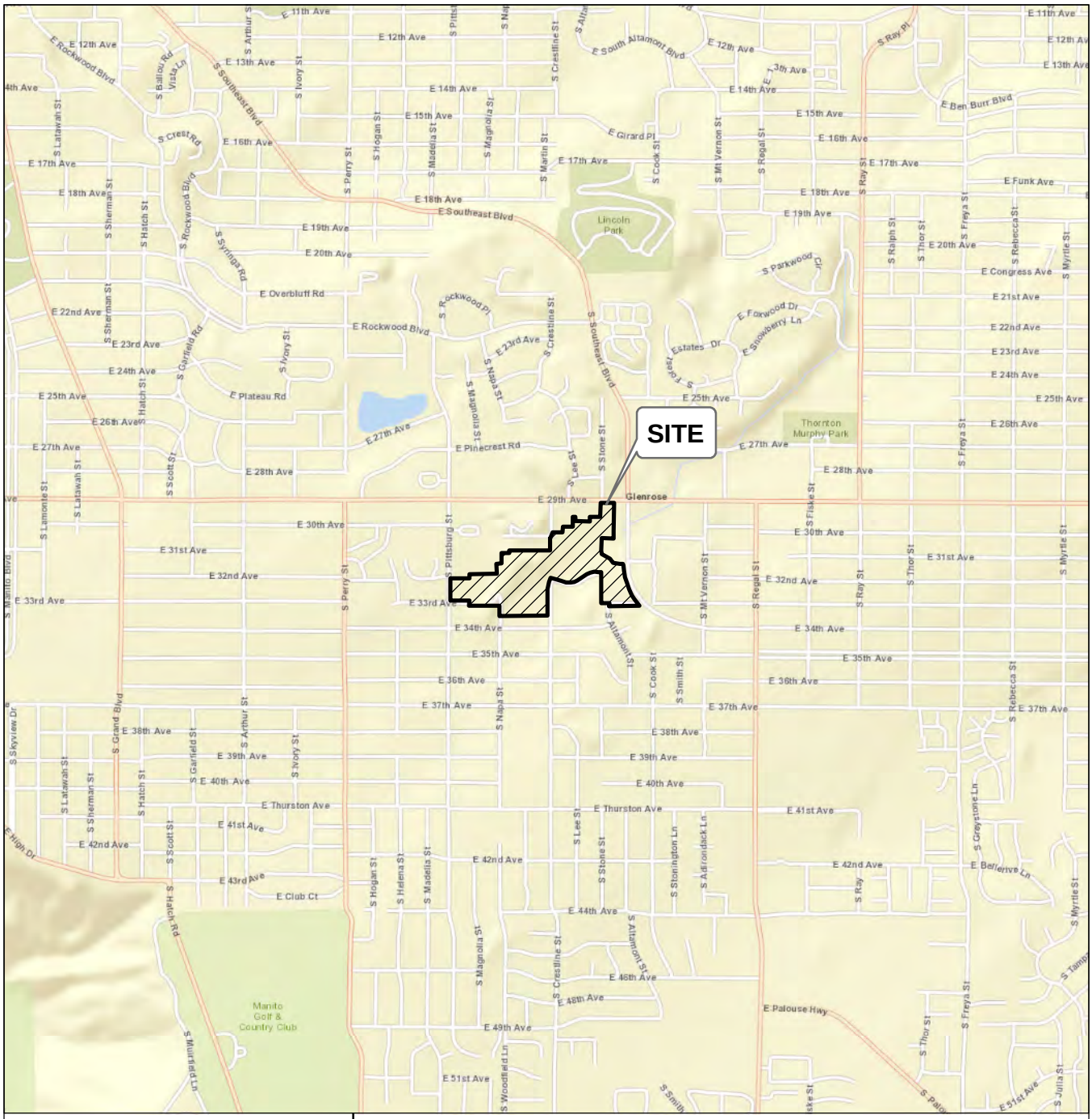
United States Department of Agriculture – National Resource Conservation Service (USDA-NRCS). 2009a. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/ (Accessed Oct.1, 2014).

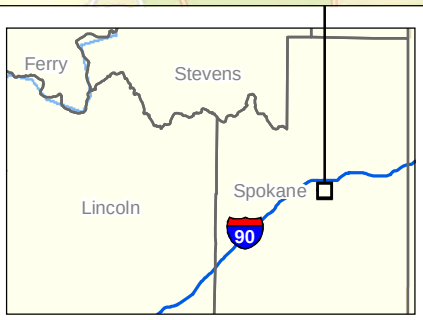
United States Department of Agriculture – National Resource Conservation Service (USDA-NRCS). 2009b. National Hydric Soils List by State. http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/ (Accessed Oct.1, 2014).

United States Fish and Wildlife Service (USFWS). 2009. Wetlands Mapper. http://www.fws.gov/wetlands/Data/mapper.html (Accessed Aug. 29, 2014).

FIGURES

GeoEngineers





N
W E
S

2,000 0 2,000
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 Sources: ESRI Data & Maps, Street Maps 2008.
Base map from ESRI Data Online.
Projection: NAD 1983, UTM Zone 11 North.

Vicinity Map

Quail Run Property
Spokane, Washington

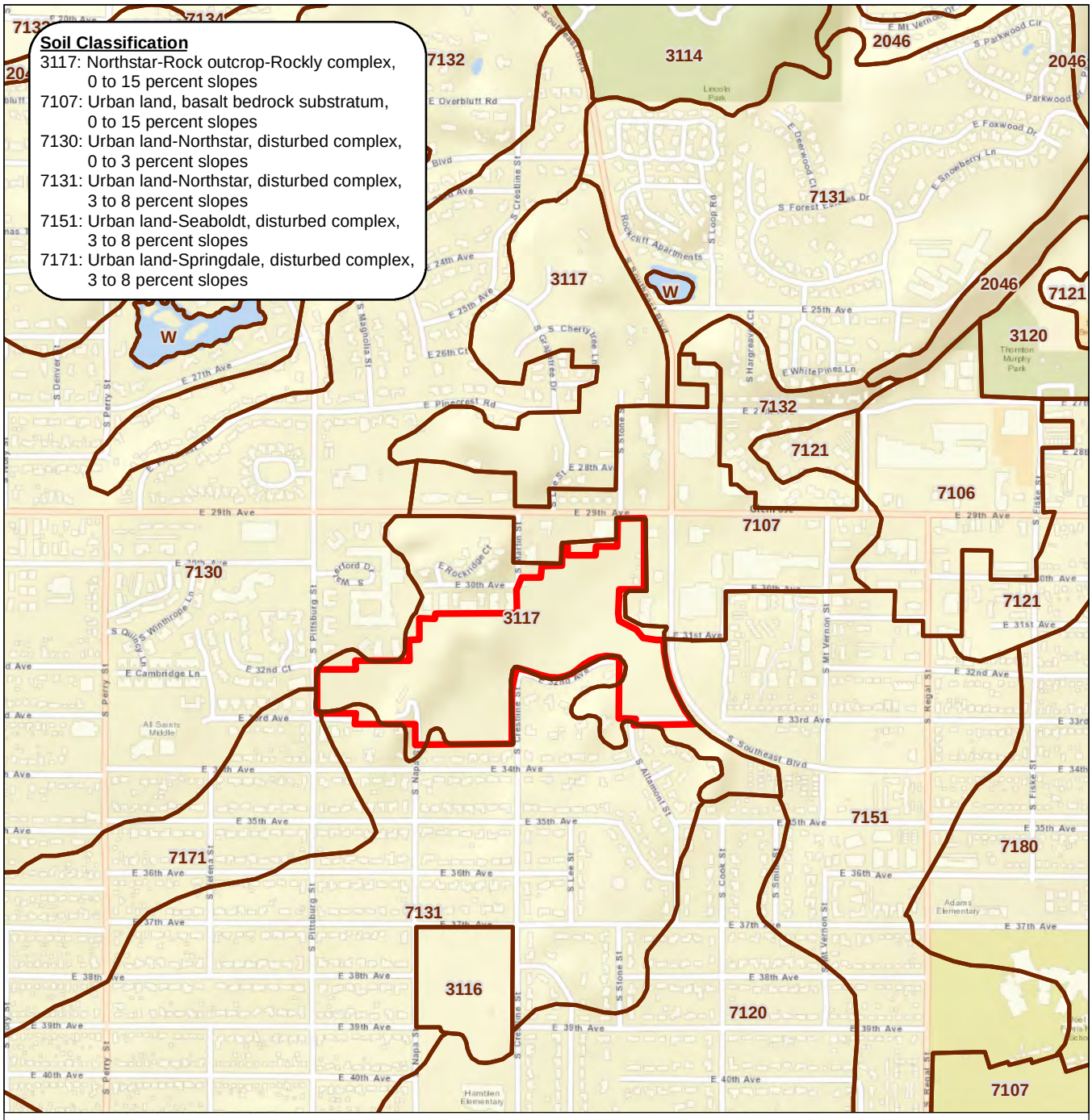
GeoEngineers

Figure 1

Map Revised: 26 September 2014 ccabrera

Path: P:\21\21508001_GIS\01\GIS\MXD\2150800100_F1_VM.mxd

Office: PORT



Approximate Site Boundary

NRCS Soils Boundary

N
W E
S

1,000 0 1,000

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 Sources: ESRI Data & Maps, Street Maps 2008.
Base map from ESRI Data Online.
Projection: NAD 1983, UTM Zone 11 North.

Soils Map

Quail Run Property
Spokane, Washington

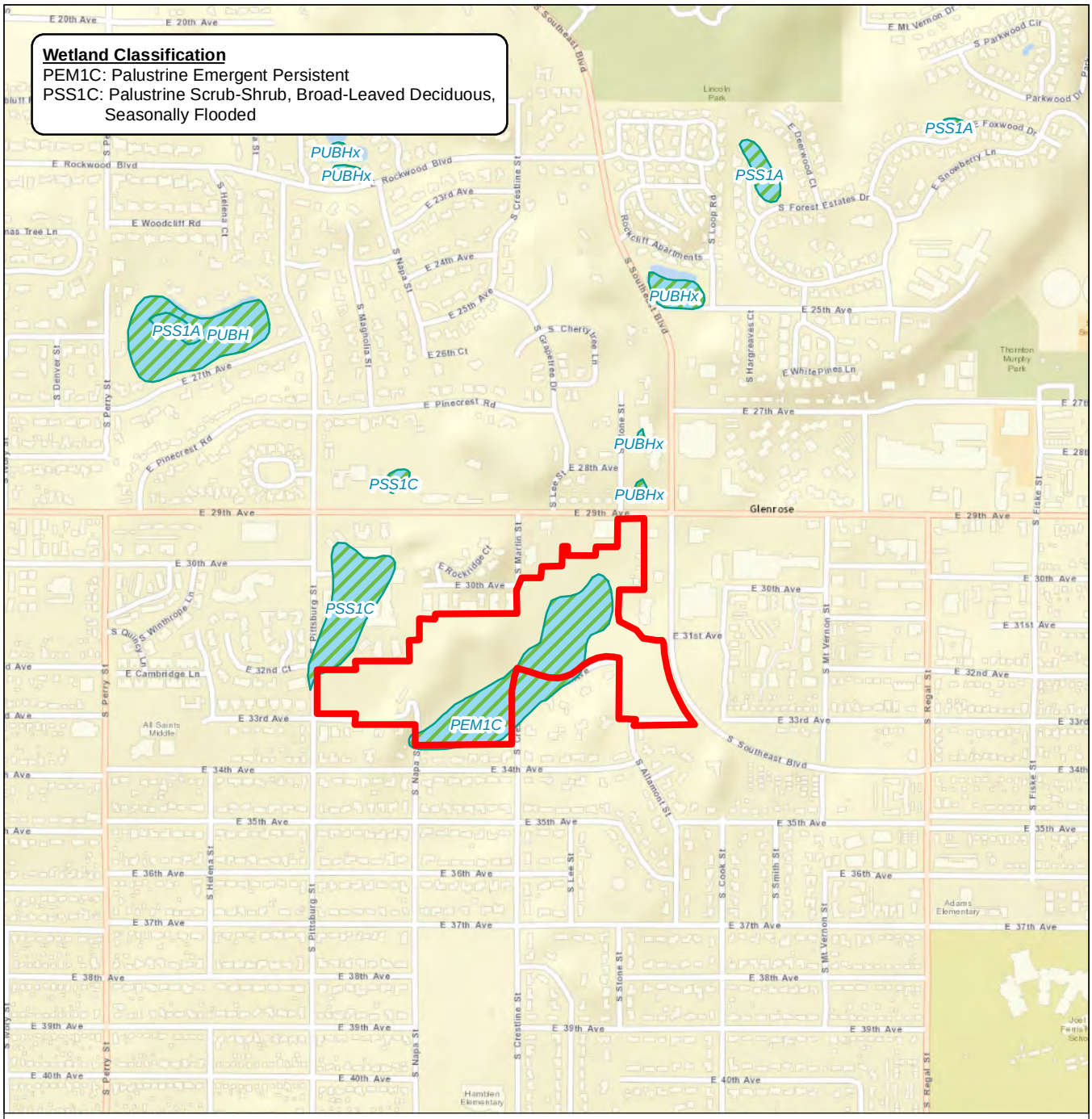
GeoEngineers

Figure 2

Map Revised: 26 September 2014 ccabrera

Path: P:\21\21508001_GIS\01\GIS\MXD\21508001_Soils.mxd

Office: PORT



Approximate Site Boundary

NWI Wetland Boundary

N
W E
S

1,000 0 1,000
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 Sources: NWI Data from US Fish and Wildlife.
Base map from ESRI Data Online.
Projection: NAD 1983, UTM Zone 11 North.

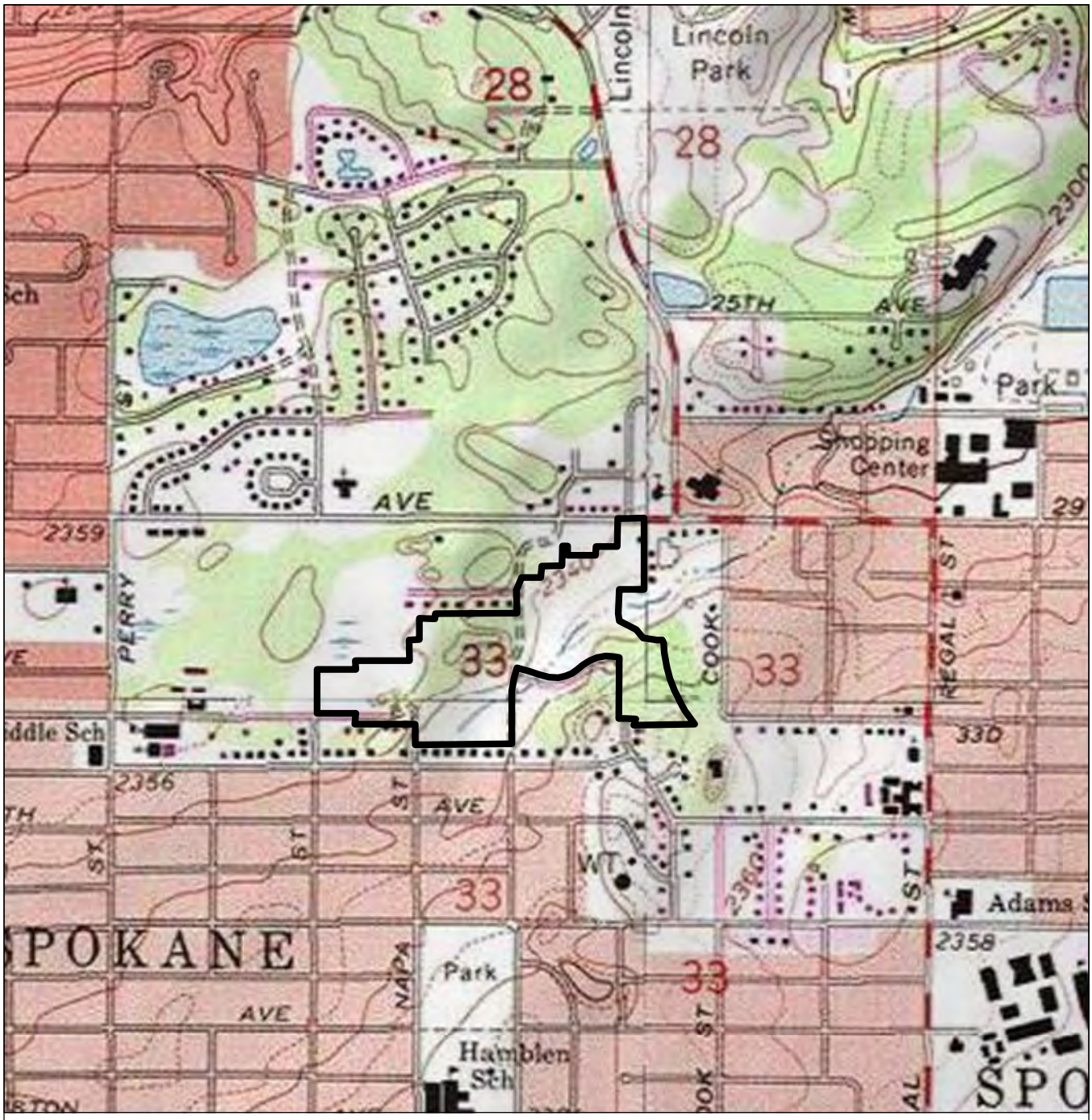
Wetland Map

Quail Run Property
Spokane, Washington

GeoEngineers

Figure 3

Office: PORT Path: P:\21\21508001_GIS\01\GIS\MXD\21508001_NWI.mxd Map Revised: 26 September 2014 ccabrera



Approximate Site Boundary

N
W E
S

1,000 0 1,000
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 Sources:
Base map from ESRI Data Online.
Projection: NAD 1983, UTM Zone 11 North.

Topographic Map

Quail Run Property
Spokane, Washington

GeoEngineers

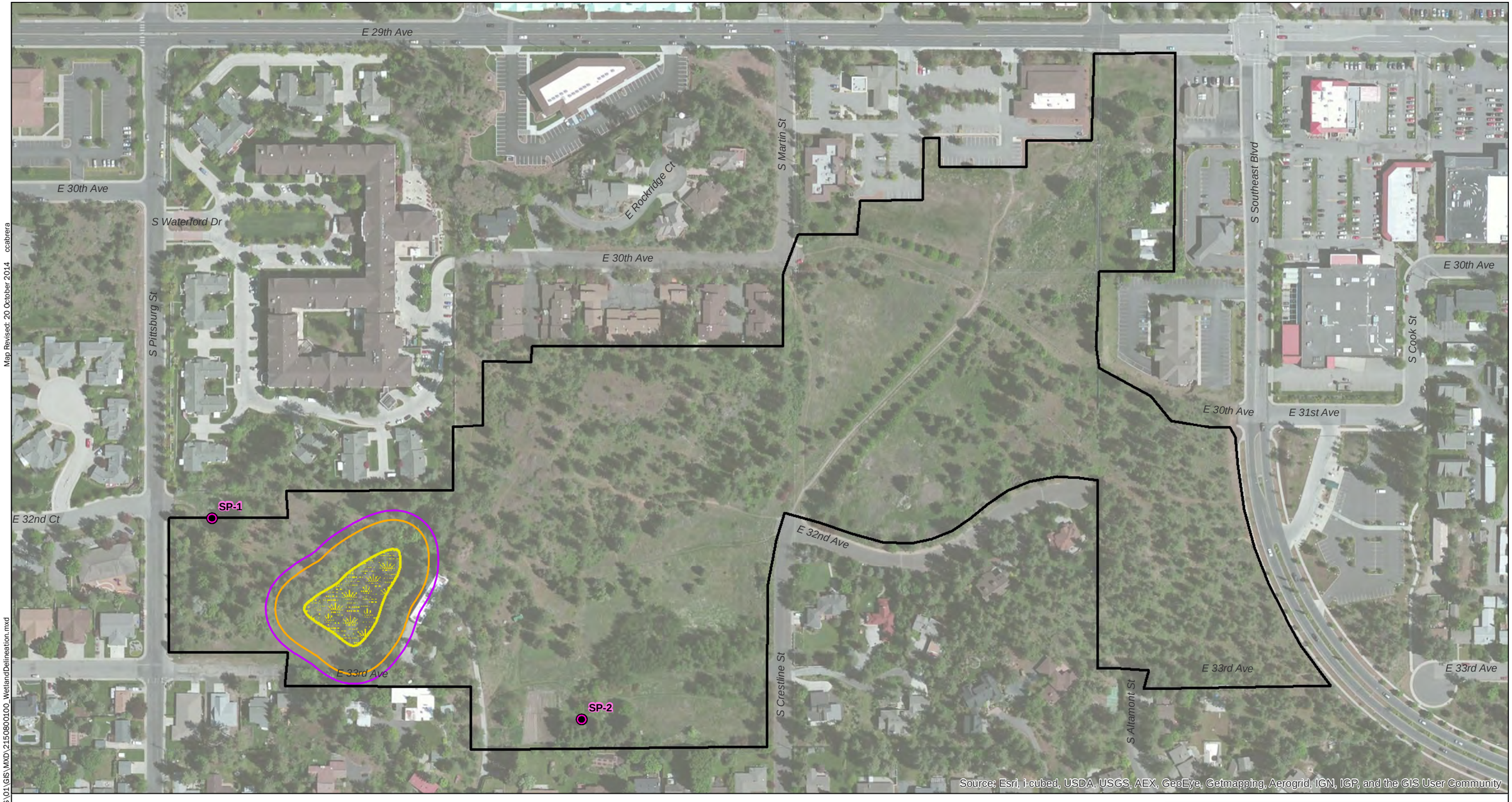
Figure 4

Office: PORT Path: P:\21\21508001_GIS\01\GIS\MXD\21508001_Topo.mxd Map Revised: 26 September 2014 ccabrera

Map Revised: 20 October 2014 ccabrera

Path: P:\21\21508001_GIS\01GIS\MXD\21508001QQ_WetlandDelineation.mxd

Office: PDX



Data Source: Aerial image from ESRI GIS Data Online.
Roads from City of Spokane GIS.

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.

Projection: NAD 1983 UTM Zone 11N

Legend

- Sample Plot
- Delineated Wetland Boundary
- Approximate Project Boundary
- Alternative 2, 60-ft Buffer
- Alternative 2, 80-ft Buffer

N W E S

200 0 200
Feet

Wetland Delineation Map

Quail Run Property
Spokane, Washington

GeoEngineers

Figure 5

APPENDICES

GeoEngineers

APPENDIX A
Site Photographs

General view of Wetland A from the southwest (facing northeast).

General view of Wetland A from the northeast (facing southwest).

Site Photographs	
Quail Run Property Spokane, Washington	
GeoEngineers	Appendix A-1

General view of SP-1.

General view of SP-1 soils.

Site Photographs	
Quail Run Property Spokane, Washington	
GeoEngineers	Appendix A-2

General view of SP-2.

General view of SP-2 soils.

Site Photographs	
Quail Run Property Spokane, Washington	
GeoEngineers	Appendix A-3

General view of the central portion of the site (facing south).

General view of the central portion of the site (facing southeast).

Site Photographs	
Quail Run Property Spokane, Washington	
GeoEngineers	Appendix A-4

General view of the southeast portion of the site (facing north).

General view of the southeast portion of the site (facing southeast).

Site Photographs	
Quail Run Property Spokane, Washington	
GeoEngineers	Appendix A-5

APPENDIX B
Eastern Washington Wetland Rating Forms

Wetland name or number: _____

WETLAND RATING FORM –EASTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users –
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): N/A Date of site visit: 9/4/14

Rated by: JEP Trained by Ecology? ☐ Yes ☒ No Date of training: _____

SEC: 33 TWNSHP: 25N RNGE: 43E Is S/T/R in Appendix D? ☐ Yes ☒ No

Map of wetland unit: Figure _____ **Estimated size** _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ **I** ☐ **II** ☒ **III** ☐ **IV**

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 - 50
Category IV =	Score < 30

Score for "Water Quality" Functions	**10**
Score for Hydrologic Functions	**12**
Score for Habitat Functions	**11**
TOTAL score for Functions	**33**

Category based on SPECIAL CHARACTERISTCS of Wetland: ☐ **I** ☐ **II** ☐ **III** ☒ **Does not Apply**

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

Summary of basic information about the wetland unit.

Wetland Type	
Vernal Pool	☐
Alkali	☐
Natural Heritage Wetland	☐
Bog	☐
Forest	☒
None of the above	☐

Wetland Class	
Depressional	☒
Riverine	☐
Lake-fringe	☐
Slope	☐
Check if unit has multiple HGM classes present	☐

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Special and that are Not Included in the Rating	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

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

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Wetland name or number: _____

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

   ☐ The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) in size;

   ☐ At least 30% of the open water area is deeper than 3 m (10 ft)?

   ☒ NO – go to Step 2 ☐ **YES** – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the wetland unit **meet all** of the following criteria?

   ☐ The wetland is on a slope *(slope can be very gradual)*.

   ☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

   ☐ The water leaves the wetland **without being impounded**?
   NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than a foot deep).*

   ☒ NO – go to Step 3 ☐ **YES** – The wetland class is **Slope**

3. Is the wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes". *The wetland can contain depressions that are filled with water when the river is not flooding.*

   ☒ NO – go to Step 4 ☐ **YES** – The wetland class is **Riverine**

4. Is the wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present is higher than the interior of the wetland.*

   ☐ NO – go to Step 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 1-7 APPLY TO DIFFERENT AREAS IN THE 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 your wetland. 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 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 One Delineated Wetland Boundary	***Class to Use for Rating***
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

Wetland name or number: _____

D	Depressional and Flat Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
D 1	**Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.38)*
	D 1.1 Characteristics of surface water flows out of the wetland unit: • Wetland has no surface water outlet ..... points = 5 ☒ • Wetland has an intermittently flowing outlet ..... points = 3 ☐ • Wetland has a highly constricted permanently flowing outlet ..... points = 3 ☐ • Wetland has a permanently flowing surface outlet ..... points = 1 ☐	**5**
	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definition of soil types).* ☐ **YES** points = 3 ☒ **NO** points = 0	0
	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): • 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 ☐ • 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 ☒ **Map of Cowardin vegetation classes**	**Figure** ☐ 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 > 1/2 total area of wetland ..... points = 3 ☐ • Area seasonally ponded is 1/4 to 1/2 total area of wetland ..... points = 1 ☐ • Area seasonally ponded is < 1/4 total area of wetland ..... points = 0 ☒ NOTE: *See text for indicators of seasonal and permanent inundation/flooding* ..... **Map of Hydroperiods**	**Figure** ☐ 0
	Total for D 1 *Add the points in the boxes above*	**5**
D 2	**Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other _____ ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier 2
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from D1 by D2. ***Record score on p. 1 of field form***	**<u>10</u>**
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
D 3	**Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?**	*(see p.39)*
	D 3.1 Characteristics of surface water flows out of the wetland unit: • 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 surface outlet ..... points = 0 ☐	8
	D 3.2 Depth of storage during wet periods. *Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water).* • Marks of ponding are at least 3 ft. above the surface ..... points = 8 ☐ • The wetland is a "headwater" wetland *(see p. 39)* ..... points = 6 ☐ • Marks are 2 ft. to < 3 ft. from surface ..... points = 6 ☐ • Marks are 1 ft. to < 2 ft. from surface ..... points = 4 ☒ • Marks are 6 in. to < 1 ft. from surface ..... points = 2 ☐ • No marks above 6 in. or wetland has only saturated soils ..... points = 0 ☐	4
	Total for D 3 *Add the points in the boxes above*	12
D 4	**Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** *(see p. 42)* *Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.* Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems. ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	Multiplier 1
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from D3 by D4; then ***record score on p.1 of field form.***	**<u>12</u>**

Wetland name or number: _____

R	Riverine Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
R 1	**Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.45)*
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: • Depressions cover > 1/3 area of wetland ..... points = 6 ☐ • Depressions cover > 1/10 area of wetland ..... points = 3 ☐ **If depressions > 1/10th of area of unit draw polygons on aerial photo or map.** • Depressions present but cover < 1/10 area of wetland ..... points = 1 ☐ • No depressions present ..... points = 0 ☐	**Figure** ☐
	R 1.2 Characteristics (cover) of the vegetation in the unit *(area of polygons with > 90% cover at person height. This is **not** Cowardin vegetation classes)*: • Forest or shrub > 2/3 the area of the wetland ..... points =10 ☐ • Forest or shrub 1/3 – 2/3 area of the wetland ..... points = 5 ☐ • Ungrazed, herbaceous plants > 2/3 area of wetland ..... points = 5 ☐ • Ungrazed herbaceous plants 1/3 – 2/3 area of wetland ..... points = 2 ☐ • Forest, shrub, and ungrazed herbaceous < 1/3 area of wetland ..... points = 0 ☐ **Arial photo or map showing polygons of different vegetation cover**	**Figure** ☐
	Total for R1 Add the points in the boxes above	
R 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Wetland intercepts groundwater within the Reclamation Area ☐ Untreated stormwater flows into wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ Water flows into wetland from a stream or culvert that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential or urban areas are within 150 ft. of wetland ☐ The river or stream that floods the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above water quality standards. ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 46)* Multiplier
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from R1 by the multiplier in R2; then ***record score on p.1 of field form.***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream degradation.	
R 3	**Does the wetland have the <u>potential</u> to reduce flooding and erosion?**	*(see p.47)*
	R 3.1 Amount overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow of water and the width of the stream or river channel (distance between banks). Calculate the ratio: width of wetland / width of stream.* • If the ratio is 2 or more ..... points =10 ☐ • If the ratio is between 1 and < 2 ..... points = 8 ☐ • If the ratio is 1/2 to < 1 ..... points = 4 ☐ • If the ratio is 1/4 to < 1/2 ..... points = 2 ☐ • If the ratio is < 1/4 ..... points = 1 ☐ **Aerial photo or map showing average widths**	**Figure** ☐
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub" (areas of polygons with > 90% cover at person height. This is **not** Cowardin vegetation classes):* • Forest or shrub for more than 2/3 the area of the wetland ..... points = 6 ☐ • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area ..... points = 4 ☐ • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area ..... points = 2 ☐ • Vegetation does not meet above criteria ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Total for R3 *Add the points in the boxes above*	
R 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** *Answer NO if the major source of water is irrigation return flow or water levels are controlled by a reservoir.* Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p.50)* Multiplier
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from R3 by the multiplier in R4. ***Record score on p.1 of field form.***	_____

Wetland name or number: _____

L	Lake-fringe Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
L 1	**Does the wetland have the <u>potential</u> to improve water quality?**	*(see p.52)*
	L 1.1 Average width of vegetation along the lakeshore: • Vegetation is more than 33 ft. (10m) wide ..... points = 6 ☐ • Vegetation is more than 16 ft.(5m) wide and < 33 ft wide ..... points = 3 ☐ • Vegetation is 6 ft. (2m) wide to < 16 ft wide ..... points = 1 ☐ **Map of Cowardin classes with widths marked**	**Figure** ☐
	L 1.2 Characteristics of the vegetation in the wetland: C*hoose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* • Herbaceous plants cover > 90% of the vegetated area ..... points = 6 ☐ • Herbaceous plants cover > 2/3 of the vegetated area ..... points = 4 ☐ • Herbaceous plants cover > 1/3 of the vegetated area ..... points = 3 ☐ • Other vegetation that is not aquatic bed in > 2/3 vegetated area ..... points = 3 ☐ • Other vegetation that is not aquatic bed in > 1/3 vegetated area ..... points = 1 ☐ • Aquatic bed cover > 2/3 of the vegetated area ..... points = 0 ☐ **Map with polygons of different vegetation types**	**Figure** ☐
	Total for L1 *Add the points in the boxes above*	
L 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or surface water flowing through the wetland to the lake is polluted. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater flows into the wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ Residential or urban areas are within 150 ft. of wetland ☐ Powerboats with gasoline or diesel engines use the lake ☐ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of shore of lake) ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p.53)* Multiplier
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from L1 by the multiplier in L2. ***Record score on p.1 of field form.***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.	
L 3	**Does the wetland have the <u>potential</u> to reduce shoreline erosion?**	*(see p.54)*
	L 3.1 Average width and characteristics of vegetation along the lakeshore ***(do not** include aquatic bed):* *(choose the highest scoring description that matches conditions in the wetland)* • > 3/4 of vegetation is shrubs or trees at least 33 ft. (10m) wide ..... points = 6 ☐ • > 3/4 of vegetation is shrubs or trees at least 6 ft. (2m) wide. ..... points = 4 ☐ • > 1/4 of vegetation is shrubs or trees at least 33 ft. (10m) wide. ..... points = 4 ☐ • Vegetation is at least 6 ft. (2m) wide ..... points = 2 ☐ • Vegetation is less than 6 ft. (2m) wide. ..... points = 0 ☐ **Aerial photo or map with Cowardin vegetation classes**	**Figure** ☐
L 4	**Does the wetland have the <u>opportunity</u> to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* ☐ There are human structures and activities along the shore behind the wetland (buildings, fields) that can be damaged by erosion. ☐ There are undisturbed natural resources along the shore (e.g. mature forests, other classes of wetland) behind the wetland that can be damaged by shoreline erosion. ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 55)* Multiplier
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from L3 by the multiplier L4. ***Record score on p.1 of field form.***	_____

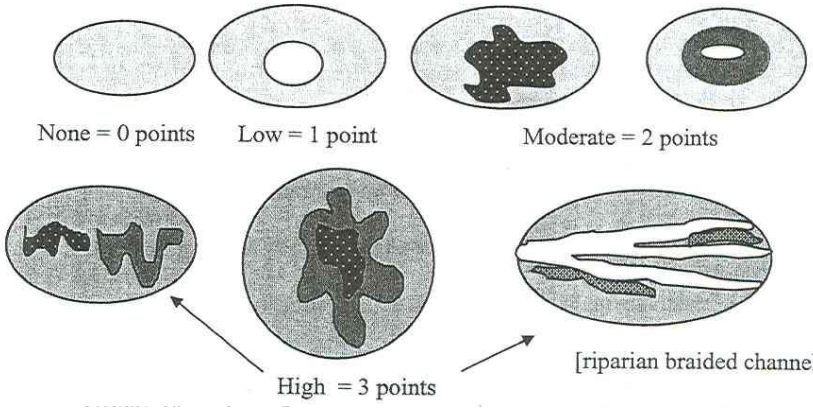
Comments:

Wetland name or number: _____

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
S 1	**Does the wetland have the <u>potential</u> to improve water quality?**	*(see p.56)*
	S 1.1 Characteristics of average slope of wetland: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance*) ..... points = 3 • Slope is between 1% and 2% ..... points = 2 • Slope is more than 2% but less than 5% ..... points = 1 • Slope is 5% or greater ..... points = 0	
	S 1.2 The soil 2 inches below the surface is clay or organic, or smells anoxic *(use NRCS definitions of soil types).* **YES** = 3 points **NO** = 0 points	
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. **Dense** vegetation means you have trouble seeing the soil surface (> 75% cover), and **uncut** means not grazed or mowed and plants are higher than 6 inches.* • Dense, ungrazed, herbaceous vegetation > 90% of the wetland unit ..... points = 6 • Dense, ungrazed, herbaceous vegetation > 1/2 of unit ..... points = 3 • Dense, woody, vegetation > 1/2 of unit. ..... points = 2 • Dense, ungrazed, herbaceous vegetation > 1/4 of unit ..... points = 1 • Does not meet any of the criteria above for herbaceous vegetation ..... points = 0 **Aerial photo or map with vegetation polygons**	**Figure** ☐
	Total for S 1 *Add the points in the boxes above*	
S 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Wetland is a groundwater seep within the Reclamation Area ☐ Untreated stormwater flows through the wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☐ Residential, urban areas, golf courses are within 150 ft. upslope of wetland ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 58)* Multiplier
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from S1 by the multiplier in S2. ***Record score on p.1 of field form.***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?**	*(see p.59)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland. See questions S 1.3 for definition of dense and uncut. **Rigid** means that the stems of plants should be thick enough (usually > 1/8 in), or dense enough to remain erect during surface flows.* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the unit ..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 – 90% area of unit ..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 – 1/2 of unit ..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☐	
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☐ **YES** = 2 points ☐ **NO** = 0 points	
	Total for S3 Add the points in the boxes above	
S 4	**Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** *(see p. 61)* Answer NO if the major source of water is irrigation return flow (e.g. a seep that is on the downstream side of a dam or at the base of an irrigated field. Answer YES if the wetland is in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources fro flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ Wetland has surface runoff that can cause flooding problems downgradient ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from S3 by S4. ***Record score on p.1 of field form.***	_____

Comments: _____

Wetland name or number: _____

These questions apply to wetlands of all HGM classes.		**Points**
	HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.	(only 1 score per box)
H 1	**Does the wetland have the <u>potential</u> to provide habitat for many species?** *(see P. 62)*	
	H 1.1 <u>Categories of Vegetation structure</u>: *Check the vegetarian classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.* ☐ Aquatic bed ☐ Emergent plants 0-12 inches (0-30cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 inches (30 – 100cm) high are the highest layer with > 30% cover ☐ Emergent plants > 40 inches (>100cm) high are the highest layer with > 30% cover ☐ Scrub/shrub (areas where shrubs have > 30% cover) ☒ Forested (areas where trees have > 30% cover) *Add the number of vegetation types that qualify. If you have:* 4 –6 types.....points = 3 ☐ 2 types.....points = 1 ☒ 3 types.....points = 2 ☐ 1 type .....points = 0 ☐ **Map of Cowardin vegetation classes and areas with different heights of emergents**	**Figure** ☐ 1
	H 1.2 Is one of the vegetation types "aquatic bed?" *(see p.64)* ☐ **YES** = 1 point ☒ **NO** = 0 points	0
	H 1.3 <u>Surface Water</u> *(see p. 65)* H1.3.1 Does the unit have areas of "open" water (without emergent or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? *Note: 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 unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? ☐ YES = 3 points ☐ NO = 0 points **Map showing areas of open water**	**Figure** ☐ 3
	H 1.4 <u>Richness of Plant Species</u> *(see p. 66)* 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 Salt Cedar (Tamarisk)* If you counted: > 9 species points = 2 ☐ 4 – 9 species points = 1 ☐ < 4 species points = 0 ☒ # of species <u>3</u> *List species below if you wish:* _____	0
	H 1.5 Interspersion of Habitats *(see p. 67)* Decided from the diagrams below whether interspersion between types of vegetation (described in H1.1), or categories and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more vegetation categories or 3 vegetation categories and open water, the rating is always "high". **Use maps from H 1.1 and H 1.3**	**Figure** ☐ 2

Comments: _____

Wetland name or number: _____

	H 1.6 Special Habitat Features *(see p. 68)* *Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.* ☐ Loose rocks larger than 4" **or** large, downed, woody debris (> 4 in. diameter) within the area of surface ponding or in stream ☐ Cattails or bulrushes are present within the unit ☒ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30m (100 ft) of the edge ☒ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently 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)* *Maximum score possible = 6*	2
	H 1 TOTAL Score – potential to provide habitat *Add the scores in the column above*	**8**
H 2	**Does the wetland have the opportunity to provide habitat for many species?**	(only 1 score per box)
	H 2.1 Buffers *(see P. 71)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed". Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.* ☐ 330 ft (100m) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. ..... **points = 5** ☐ 330 ft (100m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference ..... **points = 4** ☐ 170 ft (50m) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference ..... **points = 4** ☐ 330 ft (100m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference ..... **points = 3** ☒ 170 ft (50m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference ..... **points = 3** **If buffer does not meet any of the three criteria above:** ☐ No paved areas (except paved trails) or buildings within 80 ft (25m) of wetland > 95% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ No paved areas of buildings within 170 ft (50m) of wetland for > 50% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ Heavy grazing in buffer ..... **points = 1** ☐ Vegetated buffers are < 6.6 ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) ..... **points = 0** ☐ Buffer does not meet any of the criteria above ..... **points = 1**	**Figure** ☐ 3
	H 2.2 Wet Corridors *(see p. 72)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken, > 30 ft. wide, vegetated corridor at least 1/4 mile long with surface water or water flowing water throughout most of the year (> 9 months/yr?) (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). ☐ **YES** = **4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft. wide, vegetated corridor, at least 1/4 mile long with water flowing seasonally, **OR** a lake-fringe wetland without a "wet" corridor, **OR** a riverine wetland without a surface channel connecting to the stream? ☐ **YES** = **2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland within 1/2 mile of any permanent stream, seasonal stream, or lake (*do not include man-made ditches*)? ☐ **YES** = 1 point ☒ **NO** = 0 points	0

Comments: _____

Wetland name or number: _____

	H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*. Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (may include urban or urban growth areas) (*full descriptions in WDFW PHS report p. 152*). ☐ **Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora(i.e., forbs), perennial bunchgrasses, or a combination of both (*full description of species found here in WDFW PHS report p. 153*). ☐ **Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). Old-growth: Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. Mature: Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ☐ **Juniper Savannah**: All juniper woodlands (*SE part of state only; check map*) ☐ **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). ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. *(check WDFW web site)* ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **2 or more** Priority Habitats **= 4 points** If wetland has **1** Priority Habitat **= 2 points** No Priority habitats = **0 points** *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in H 2.4)*	0
	H 2.4 Landscape: *Choose the **one** description of the landscape around the wetland that best fits. (see p. 76)* • The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (*Generally, this means outside boundaries of reclamation areas, irritation district, or reservoirs*.)..... points = 5 ☐ • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development. ..... points = 5 ☐ • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 2 ☐ • There is at least 1 wetland within 1/2 mile ..... points = 1 ☐ • Does not meet any of the four criteria above ..... points = 0 ☒	0
	H 2 TOTAL Score – opportunity for providing habitat *Add the scores in the columns above*	**3**
H 3	**Does the wetland unit have indicators that its ability to provide habitat is reduced?**	
	H 3.1 Indicator of reduced habitat functions *(see p. 75)* Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? Note: *This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers.* ☐ **YES** = **5 points** ☒ **NO** = 0 points	*Points will be subtracted* 0
◆	**Total Score for Habitat Functions** Add the points for H 1, H 2 and H 3; and ***record the result on p. 1***	**11**

Comments: _____

Wetland name or number: _____

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 units should also be characterized based on their functions.

Wetland Type – *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*		
SC1	**Vernal pools** *(see p.79)* Is the wetland unit **less than 4,000 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. *NOTE: If you find perennial, "obligate", wetland plants the wetland is probably NOT a vernal pool.* ☐ The soil in the wetland are shallow (<1 ft. deep (30cm) 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 a 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 miles (other wetlands, rivers, lakes etc.)? ☐ **YES** = Category II ☐ **NO** = Category III	☐ **Cat. II** ☐ **Cat. III**
SC2	**Alkali wetlands** *(see p.81)* Does the wetland unit meet **one** of the following two criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 – 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 2 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 meet **two** of the following three sub-criteria? ☐ Salt encrustations around more than 80% of the edge of the wetland. ☐ More than 3/4 of the plant cover consists of species listed on Table 2. ☐ 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	**Cat. I** ☐
SC3	**Natural Heritage Wetlands** *(see p. 82)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a natural heritage wetland? *(This question is used to screen out most sites before you need to contact WNHP/DNR.)* S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ **YES** ☐ Contact WNHP/DNR (see p. 79) and go to SC 3.2 **NO** ☒ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? ☐ **YES** = Category 1 ☒ **NO** – not a natural heritage wetland	**Cat. I** ☐

Wetland name or number: _____

SC4	**Bogs** *(see p. 82)* Does the wetland unit **(or any part of the wetland unit)** meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. *If you answer yes you will still need to rate the wetland based on its functions.* SC 4.1 Does the wetland have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) ☐ **YES** = go to SC 4.3 ☒ **NO** = go to SC 4.2 SC 4.2 Does the wetland have organic soils, either peats or mucks that are less than 16 inches 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 4.3 ☒ **NO** = Is not a bog for rating SC 4.3 Does the wetland have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ **YES** = Category I bog ☒ **NO** = go to question 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.* SC 4.4 Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (*> 30% coverage of the total shrub/herbaceous cover*)? ☐ **YES** = Category 1 bog ☒ **NO**	**Cat. I** ☐
SC5	**Forested Wetlands** *(see p. 85)* Does the wetland unit have an area of forest *(you should have identified a forested class, if present, in question H 1.1)* rooted within its boundary that meet **at least one** of the following three criteria? ☐ The wetland is within the "100 year" floodplain of a river or stream. ☐ Aspen (*Populus tremuloides*) are a dominant or co-dominant of the "woody" vegetation. (*Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species.*) ☐ There is at least 1/4 acre of trees (even in wetlands smaller than 2.5 acres) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see p. 83)*. ☐ **YES** = got o SC 5.1 ☒ **NO** – *not a forested wetland with special characteristics*	
	SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees? Slow growing trees are: western red cedar (*Thuja plicata*), Alaska yellow cedar (*Chamaecyparis nootkatensis*), pine spp. mostly "white" pine (Pinus monticola), western hemlock (*Tsuga heterophylla*), Englemann spruce (*Picea engelmannii*)? ☐ **YES** = Category I ☐ **NO** = go to SC 5.2	**Cat. I** ☐
	SC 5.2 Does the unit have areas where aspen (*Populus tremuloides*) as a dominant or co-dominant species? ☐ **YES** = Category I ☐ **NO** = go to SC 5.3	**Cat. I** ☐
	SC 5.3 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are fast growing species? Fast growing species are: Alders – red (*alnus rubra*), thin-leaf (A. *tenuifolia*); Cottonwoods – narrow-leaf (*Populus angustifolia*), black (*P. balsamifera*); Willows – peach-leaf (Salix *amygdaloides*), Sitka (S. *sitchensis*), Pacific (*S. lasiandra*), Aspen – *Populus tremuloides*), Water Birch (*Betula occidentalis*) ☐ **YES** = Category II ☐ **NO** = go to SC 5.5	**Cat. II** ☐
	SC 5.5 Is the forested component of the wetland within the "100 year floodplain" of a river or stream? ☐ **YES** = Category II	**Cat. II** ☐
◆	**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 p. 1	**N/A**

APPENDIX C
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Quail Run Property City/County: Spokane/Spokane County Sampling Date: Sept. 4, 2014

Applicant/Owner: Sonneland State: WA Sampling Point: SP-1

Investigator(s): JEP Section, Township, Range: Sec 33, T25N, R43E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): N/A

Subregion (LRR): LRR E Lat: 47.625414 Long: -117.384181 Datum: NAD 83

Soil Map Unit Name: 3117 Northstar-Rock outcrop NWI classification: N/A

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

Are Vegetation ☐, Soil ☐, 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 ☐	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: NWI Maps indicated the potetnial presence of a PSS1C wetland in this area. This wetland type was not identified.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix lasiandra (Pacific willow)*	15%	no	FACW
2. *Betula pendula (Eur. Whitebirch)*	15%	no	FACU
3. _____			
4. _____			
50% = _____, 20% = _____	30%	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. *Cornus sericea (Redosier dogwood)*	15%	no	FACW
2. _____			
3. _____			
4. _____			
5. _____			
50% = _____, 20% = _____	15%	= Total Cover	
Herb Stratum (Plot size: _____)			
1. *Tanacetum volgare (Common tansey)*	20%	yes	NI
2. *Cirsium arvense (Canada thistle)*	20%	no	FAC
3. *other various grasses*	15%	no	NI
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
50% = _____, 20% = _____	55%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
50% = _____, 20% = _____	0%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: .50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x1 =	0
FACW species	30%	x2 =	60
FAC species	20%	x3 =	60
FACU species	15%	x4 =	60
UPL species	0%	x5 =	0
Column Totals:	65% (A)		180 (B)

Prevalence Index = B/A = 2.77

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

Project Site: Quail Run

SOIL

Sampling Point: SP-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/2		N/A				Silt	No sulfur odor
7 - 14	10YR 5/2		N/A				Silt	No sulfur odor

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ 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) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Quail Run Property City/County: Spokane/Spokane County Sampling Date: Sept. 4, 2014

Applicant/Owner: Sonneland State: WA Sampling Point: SP-2

Investigator(s): JEP Section, Township, Range: Sec 33, T25N, R43E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): N/A

Subregion (LRR): LRR E Lat: 47.624265 Long: -117.381026 Datum: NAD 83

Soil Map Unit Name: 3117 Northstar-Rock outcrop NWI classification: N/A

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

Are Vegetation ☐, Soil ☐, 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 ☐	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: NWI Maps indicated the potetnial presence of a PEM1C wetland in this area. This wetland type was not identified.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
50% = _____, 20% = _____	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
50% = _____, 20% = _____	0%	= Total Cover	
Herb Stratum (Plot size: _____)			
1. *Phalaris arundinacea (Reed canarygrass)*	100%	yes	FACW
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
50% = _____, 20% = _____		= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
50% = _____, 20% = _____	0%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	1	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x1 =	0
FACW species	100%	x2 =	200
FAC species	0%	x3 =	0
FACU species	0%	x4 =	0
UPL species	0%	x5 =	0
Column Totals:	100% (A)		200 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☒ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

Project Site: Quail Run

SOIL Sampling Point: SP-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/3		N/A				Silt	No sulfur odor
8 - 13	10YR 5/2		N/A				Silt	No sulfur odor

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ 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) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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:

Have we delivered World Class Client Service?

Please let us know by visiting **www.geoengineers.com/feedback**.

GeoEngineers