Wetland Delineation and Critical Areas Report

Greenwater Battery Energy Storage System

City of Sumner and Pierce County, Washington

GREE bn, LLC, a subsidiary of BrightNight, LLC

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1.0 INTRODUCTION

1.1 Project Description

BrightNight is proposing to construct the Greenwater Battery Energy Storage System (GREE bn, LLC), a 200 Megawatt / 800 Megawatt Hour Battery Energy Storage System (BESS) on four contiguous tax parcels on the west side of East Valley Highway East in the City of Sumner (**Figure 1**). A generation-intertie overhead electrical transmission line (gen-tie) will connect the BESS to the Puget Sound Energy (PSE) White River Substation east of East Valley Highway East in unincorporated Pierce County.

The 8-acre BESS will consist of a minimum of 150 modular energy units in rows. The modular energy units will be placed next to one another and will accommodate access for operations and maintenance and emergency services. Each modular energy unit will be 20 to 40 feet long and 8.5 to 9.5 feet tall. The modular energy units will be connected via underground electrical cables to a small substation in the southeast corner of the site. The substation will increase voltage from 34.5 kilovolt (kV) to 230 kV, to match PSE's White River Substation voltage. The BESS substation will include a voltage transformer, six to nine circuit breakers (depending on the BESS technology selected) and metering equipment. A 6-foot-tall chain link perimeter security fence will be installed around the entire BESS facility. Primary access to the BESS facility will be via an existing access road in the northeast corner of the site.

The proposed gen-tie for the project will extend approximately 1 mile from the White River substation to the BESS substation. On the east side of East Valley Highway East, the gen-tie alignment will be located between existing PSE transmission lines, south of and parallel to an existing access road (Cottage Road East). A total of 17 90-foot tall, steel, single-pole vertical aligned transmission towers will be installed to support the gen-tie, including seven poles in unincorporated Pierce County and 10 poles in Sumner. Towers will be equipped with insulators and wire conductors designed to carry 230 kV.

Construction of the BESS and substation will require demolition/removal of existing structures, site preparation, surfacing and concrete work, and installation of the modular energy units, access platforms, and substation. Construction of the gen-tie will require earthwork and site preparation (including vegetation clearing, excavation, fill, and grading), foundation construction, transmission line structure construction and wire stringing operations. Project construction is planned to start in the third quarter of 2024 and last until the third or fourth quarter of 2025.

Utility transmission lines, corridors, and facilities are permitted uses subject to City of Sumner and Pierce County critical areas review. AECOM was contracted by BrightNight to delineate wetlands and streams within the project study area (**Figure 2**)

in order to avoid and minimize impacts to wetlands, streams, and their buffers to the extent feasible. The study area varies from 600 to 1,000 feet wide east of East Valley Highway in order to account for three gen-tie options under consideration at the time the field work was conducted. The entire study area is approximately 85 acres.

AECOM wetland scientists conducted an initial wetland reconnaissance of the study area on September 6 and 7, 2023. During this time, AECOM confirmed the presence and boundaries of a small wetland mapped by Terracon in July 2022 (referred to as Wetland B in this report). AECOM wetland scientists conducted a subsequent wetland and stream delineation of the study area on November 30, 2023. This report describes the wetland/stream delineation study area, documents office and field methods, and identifies wetlands, streams, and other critical areas and their buffers in the project vicinity. Avoidance and minimization measures are discussed, as well as potential permanent or temporary impacts from the project. This wetland delineation and critical areas report is subject to agency verification and approval.

1.2 Project Location

The proposed BESS will be located on four contiguous tax parcels (9520000174, 9520000173, 9520000168, and 9520000152) in the City of Sumner, Washington (**Figure 2**). The primary site address for the BESS is 1808 East Valley Highway East, Sumner, Washington. The proposed gen-tie will extend from the BESS substation south across tax parcels 9520000152, 9520000143, and 9520000121, then east across East Valley Highway East, then east across tax parcels 0520072002, 9520000110, 0520072004, 0520071007, and 0520071008 to the PSE White River Substation in unincorporated Pierce County, Washington. The proposed project is in Quarter Sections 1 and 2 of Section 07, Township 20 North, Range 05 East.

2.0 METHODS

2.1 Office Assessment

The following maps and documents were reviewed to aid in identification and delineation of wetlands, streams, and habitats in the study area vicinity:

- Aerial photographs publicly available via the internet (Google Earth 2023, Pierce County 2023a)
- Pierce County PublicGIS website (Pierce County 2023b)
- City of Sumner GIS Open Data Portal (City of Sumner 2023)
- Natural Resources Conservation Service Web Soil Survey (**Figure 3)** (NRCS 2023a)
- Northwest Indian Fisheries Commission Statewide Integrated Fish Distribution Mapper (SWIFD) (NWIFC 2023)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Map (Online Mapper) (**Figure 4**) (USFWS 2023)
- U.S. Geological Survey 7.5-minute Quadrangles (USGS 2023a)
- Washington State Department of Ecology (Ecology) Water Quality Atlas (Ecology 2023a)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) on the Web (WDFW 2023a)
- WDFW SalmonScape (WDFW 2023b)
- Washington State Department of Natural Resources (WDNR), Natural Heritage Program Data Explorer (WDNR 2023a)
- WDNR Forest Practices Application Mapping Tool (WDNR 2023b)
- WDNR Washington Geologic Information Portal (WDNR 2023c)
- U.S. Army Corps of Engineers (USACE) Antecedent Precipitation Tool (USACE 2021)
- 2020 National Wetland Plant List (USACE 2020)

2.2 Wetland Delineation

This wetland delineation was conducted by wetland professionals following the standard protocols outlined in the following manuals:

- USACE Wetlands Delineation Manual (USACE 1987)
- USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast, Version 2.0 (USACE 2010); (hereafter referred to as the “2010 Regional Supplement”)

The 2010 Regional Supplement provides technical guidance and procedures specific to the non-arid west. To maintain consistency between the state and federal delineations of wetlands,

Ecology has repealed Washington Administrative Code (WAC) 173-22-080 (the state delineation manual) and replaced it with a revision of WAC 173-22-035 that states delineations should be completed according to the currently approved federal manual and supplements (the 2010 Regional Supplement). The changes were effective March 14, 2011. Pierce County references the federal delineation manual in its municipal code and critical areas ordinance.

For regulatory purposes, wetlands are distinguished from uplands using hydrology, soil, and vegetative characteristics, or "indicators" as the manuals refer to them. A wetland requires "inundation or soil saturation long enough during the growing season to create an anaerobic condition sufficient to alter chemical and biological activity in the soil, soil microbes, and rooted vegetation" (USACE 1987). This anaerobic condition manifests itself via indicators present at designated depths within the soil profile and through adaptations in the vegetative community.

According to the 2010 Regional Supplement, the growing season is technically defined as the period when soil temperatures 12 inches below ground surface (bgs) are greater than 5 degrees Celsius (41 degrees Fahrenheit [°F]). The 2010 Regional Supplement also states that the determination of growing season should take into account careful observations of evidence that active plant growth is occurring. This evidence can include new or recent growth such as flowers, new shoots, new leaves, or swollen buds on plants.

In the absence of active plant growth observations, the length of the growing season may be approximated by the beginning and ending dates of 28°F temperatures with 50 percent probability, as estimated by the Natural Resources Conservation Service (NRCS). The estimated growing season for the study area occurs from February 4 until December 5 (a total of 304 days), as determined using the prior 30 years of data for the nearest NRCS WETS station at Tacoma #1 (NRCS 2023b). The study area investigation occurred towards the end of the growing season.

Four documented sample plots, and several "check plots," were used to investigate the study area. Sample plot and check plot locations are shown in **Figures 5a and 5b**. Wetland Determination Data Forms were recorded at each sample plot and are provided in **Appendix A**. The presence or absence of hydrophytic vegetation, hydric soil, and wetland hydrology indicators was documented at each sample plot to justify the wetland determination.

2.2.1 Wetland Hydrology

To determine whether a sample plot location met the wetland hydrology criterion, the area was examined for inundation, soil saturation, shallow groundwater tables, or other dry-season hydrology indicators defined in the 2010 Regional Supplement. An area in which soils are inundated or saturated within 12 inches of the soil surface continuously for at least 5 to 12.5 percent of the growing season meets the criterion for wetland hydrology per the 1987 Wetland Delineation Manual. Per the 2010 Regional Supplement, the requirement is 14 days of continuous saturation or inundation.

Seasonal changes in water levels and the effect of recent precipitation events and irrigation must be considered when evaluating an area's hydrology, particularly outside of the growing season or during the dry summer months (see Section 3.1.2). Wetland hydrology can be determined during the dry summer and early fall months by observing one primary indicator (e.g., watermarks on

vegetation, drift deposits, sediment deposits, surface-scoured areas, algal mats, and oxidized rhizospheres on live root channels) or two secondary indicators (e.g., water-stained leaves, drainage patterns, geomorphic position, shallow aquitard, or FAC-Neutral Test).

2.2.2 Hydric Soil

Soil pits were dug at sample plot centers to 18 or more inches bgs. Soil color and other characteristics were used to distinguish hydric versus non-hydric soils. The Munsell Soil Color Chart (X-Rite 2009), NRCS (2023a) soil maps, the 2010 Regional Supplement, and *Field Indicators of Hydric Soils in the United States*, version 8.0 (NRCS 2016), aided in the determinations.

2.2.3 Hydrophytic Vegetation

Sample plot centers were situated so that the plots best represented the vegetation present within the wetland or upland near the plot location. Plant species and their percent cover were recorded for each vegetative stratum, generally using a 30-foot radius for trees, a 15-foot radius for shrubs and woody vines, and a 5-foot radius for herbaceous plants. Each species' wetland indicator status was recorded based on its listing in the 2020 National Wetland Plant List (USACE 2020). The plot's hydrophytic vegetation status was calculated per the delineation manual methods to determine whether a sample plot met the wetland vegetation criteria.

2.3 Wetland Classification and Functions Assessment

Wetlands were classified using both the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) and the *Hydrogeomorphic Classification for Wetlands* (Brinson 1993). A wetland rating was completed using Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby 2014). The 2014 version of the wetland rating system is used by both Ecology and Pierce County. The Ecology wetland rating system recognizes four categories of wetlands based on their sensitivity to disturbance, rarity, the functions they provide, and difficulty of replacement. Wetland rating forms and figures are provided in **Appendix B**.

Wetland professionals visited the wetlands and determined wetland classes and categories using field observations and resources utilized during the preliminary data review process. A semi-quantitative functions assessment was also conducted for the wetlands based on the Ecology wetland rating system. Hydrology, water quality, and habitat functions were evaluated based on the scores on the rating forms and the scoring criteria listed in **Table 1.** The breakdown into low, moderate, and high functional categories is adapted from guidance provided in Ecology's *Wetland Mitigation in Washington State Part 1* (Ecology et al. 2021) and modified for the 2014 version of the Ecology wetland rating system.

Table 1. Wetland Functions Assessment Criteria

	Criteria[1]		
Wetland Functions	**Low Score**	**Moderate Score**	**High Score**
Water Quality Functions	3-5	6-7	8-9
Hydrology Functions	3-5	6-7	8-9
Habitat Functions	3-5	6-7	8-9

[1]Low, moderate, and high breakdown adapted from guidance in Ecology et al. (2021) and modified for the 2014 version of the wetland rating system.

2.4 Stream Delineation

The ordinary high water mark (OHWM) for streams was identified according to guidance from the USACE (Mersel and Lichvar 2014) and Ecology (Anderson et al. 2016). The OHWM was established by locating where the fluctuations of water in the stream have created a clear, natural line on the bank indicated by changes in the character of the soil/substrate and changes in the nature of the vegetation. The OHWM of streams was mapped directly where possible. In areas where access to a stream was obstructed (e.g., fencing, dense vegetation), the OHWM was estimated. For smaller streams/ditches less than 6 feet wide, only the stream centerline was mapped.

2.5 Wetland and Stream Mapping

All sample plots, wetland boundary points, and stream OHWM or centerline points were recorded using an Arrow 100 Global Navigation Satellite System receiver connected to an Apple iPad. This unit provides submeter accuracy. Wetland and stream boundaries were not flagged in the field. Data were collected using the Washington State Plane North NAD83 coordinate system. The data were exported to ArcGIS to produce the wetland and stream delineation map (**Figure 5**).

3.0 RESULTS

3.1 Study Area Description

The study area includes light industrial areas along East Valley Highway East, and the slope between the highway and the White River Substation. Light industrial facilities include a general contractor yard and a recreational vehicle self-storage lot. Several above-ground transmission lines and an access road extend down the slope from the White River substation. In addition, water from Lake Tapps is conveyed down the slope to the Dieringer Powerhouse through several underground pipes (penstocks), and from the powerhouse to the White River through a tailrace canal.

3.1.1 Landforms and Topography

The western side of the study area (generally west of East Valley Highway East) occurs on a level former floodplain of the White River. This area is no longer connected to the active floodplain due to historic filling and the railroad berm along its west edge. This part of the study area is at an elevation of approximately 70 feet and is 20 feet in elevation above the river channel.

Just east of the highway and the Dieringer Powerhouse is a very steep (>50 percent slope) escarpment representing the edge of the glacially modified hillside. Elevation relief is approximately 150 feet. The glaciomarine terrace upslope of the escarpment averages 15 to 30 percent slope gradient, with slopes becoming gentler to the east. Elevation ranges from approximately 230 to 630 feet. A primary dirt access road extends up the slope and several dirt roads extend laterally across the slope.

Two wetlands identified in this study (discussed in Section 3.2) occur at the bottom of the steep escarpment where groundwater seepage is present, and seasonal surface runoff is concentrated. A ravine with a seasonal stream occurs mostly off site north of the study area. A branch of the stream enters the northwest corner of the study area on the east side of East Valley Highway East. The stream enters a culvert along the highway and discharges to the tailrace canal south of the Dieringer Powerhouse.

3.1.2 Climate and Water

The nearest climate station with long-term data is the Tacoma #1 station, which is approximately 9 miles west of the study area. Climatic conditions for this station are characterized by warm, dry summers and cool, wet winters. Average maximum temperature in summer is 75°F, and average minimum temperature in winter is 37°F. The 32-degree growing season is about 253 days per year, from March 10 to November 18 (NRCS 2023b). Average annual precipitation is approximately 41 inches. Precipitation from October to March accounts for approximately 77 percent of the total.

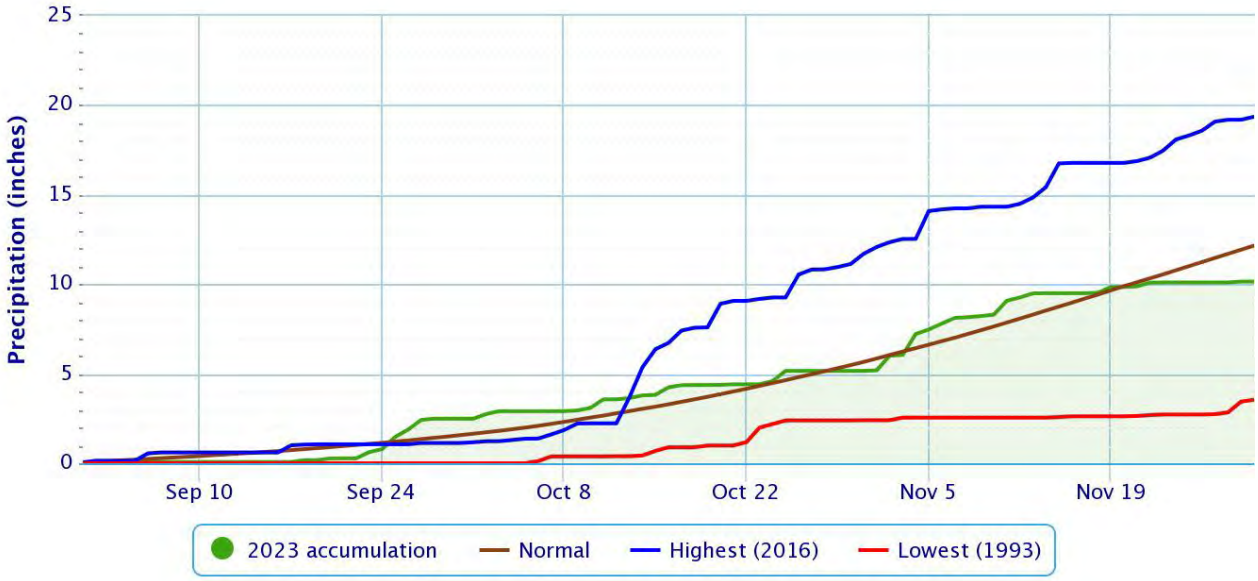
Table 2 provides antecedent rainfall recorded at the Tacoma #1 climate station for September through November, 2023, prior to the wetland delineation field investigation, as well as monthly averages and normal rainfall (30 and 70 percentiles). Precipitation was wetter than normal for September, slightly drier than normal for October, and normal for November. Between April 21 and June 1, only 1 inch of precipitation was recorded. Overall, accumulated precipitation during the previous 3 months was slightly below average, but within the normal range based on long-term climate records (see also the **accumulation graph** below).

Table 2. Summary of Normal and Recorded Precipitation near Study Area (2023)

Category[1]	September	October	November
Recorded Precipitation	2.49	2.67	4.99
Precipitation Average	1.63	4.21	6.51
Monthly Normal			
30% Chance Less Than	0.58	2.78	4.49
30% Chance More Than	1.90	5.05	7.75
Result	Wet	Dry	Normal

[1]Climate data (1993-2022) in inches for Tacoma #1 Station (NRCS 2023b)

Accumulated Precipitation – Tacoma, WA (September 1 to November 30, 2023)



Source: NOAA Regional Climate Center, Applied Climate Information System

The recent Antecedent Precipitation Tool (USACE 2021) was also utilized to determine whether site conditions were normal, drier than normal, or wetter than normal at the time of the delineation. The tool compares the 30-day rolling total precipitation to the 30-year normal range, as deduced from a network of weather stations. Based on the tool, conditions were normal (**Appendix C**).

Based on the climate analysis, the water table and saturation depths documented during the delineation were likely consistent with long-term variability at the site, though slightly drier than average. Inundation and saturation were observed at Wetland A during the wetland delineation on November 30.

Water tables in this area typically recharge beginning in October, reach maximum height in February or March, and begin to draw down in April and May as precipitation declines, temperatures rise, and vegetation growth accelerates.

3.1.3 Soil Types

According to the *Soil Survey of Pierce County Area* (NRCS 2023a), the study area occurs on five soil map units (**Figure 3)**. A summary of soil hydrologic characteristics is provided in **Table 3**. Roughly 22 percent of the study area is mapped as predominantly hydric soils (soil map units 37A and38A) with very poor drainage. This corresponds to the developed areas along East Valley Highway East and does not reflect the current developed state. The native soils in this area contain layers of muck or mucky peat at least 24 inches deep. These soils developed in the backwater areas of the floodplain.

The majority of the study area is mapped as Alderwood gravelly sandy loam (soil map units 1C and 1D). These soils developed in glacial drift or outwash over dense glaciomarine deposits. They occur on glacially modified hills. Hydric soil inclusions on average make up 5 percent of the map unit and occur in depressions and drainageways.

The very steep escarpment at the valley edge is mapped as undifferentiated Xerochrepts (soil map unit 47C), which are young soils with little horizon development due to ongoing erosion.

Table 3. Hydrologic Characteristics of Soil Map Units

Map Unit Number	Map Unit Name	Drainage Class	Depth to Seasonal High Water Table (Inches)	Flooding/ Ponding	Hydric Soil (%)	Approximate Percent of Study Area
1C	Alderwood gravelly sandy loam, 8 to 15 percent slopes	Moderately Well Drained	18-37	None	5	10
1D	Alderwood gravelly sandy loam, 15 to 30 percent slopes	Moderately Well Drained	18-37	None	5	61
37A	Semiahmoo muck	Very Poorly Drained	0-12	Frequent	100	18
38A	Shalcar muck	Very Poorly Drained	0	Frequent	100	4
47C	Xerochrepts, 45 to 70 percent slopes	Well Drained	>80	None	0	7

Source: NRCS 2023a

3.1.4 Vegetation

Vegetation communities in the study area include coniferous and deciduous upland forest, upland shrubland, and forested wetlands. Dominant deciduous trees in the upland forest include red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), cascara (*Frangula purshiana*), and Scouler's willow (*Salix*

scouleriana). Dominant conifer trees are Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), and western redcedar (*Thuja plicata*).

Common shrubs in the upland forest understory include vine maple (*Acer circinatum*), salmonberry (*Rubus spectabilis*), snowberry (*Symphoricarpos albus*), low Oregon grape (*Mahonia nervosa*), red elderberry (*Sambucus racemosa*), oceanspray (*Holodiscus discolor*), Nootka rose (*Rosa nutkana*), beaked hazelnut (*Corylus cornuta* var. *californica*), osoberry (*Oemleria cerasiformis*), Himalayan blackberry (*Rubus armeniacus*), evergreen blackberry (*Rubus laciniatus*), and trailing blackberry (*Rubus ursinus*). Sword fern (*Polystichum munitum*) is the dominant herbaceous species.

Transmission line corridors occur over much of the study area on the slope. Woody vegetation in these areas is regularly cut or pruned to prevent interference with transmission lines. These areas are dominated by a dense cover of shrubs and tree saplings that are also present in the upland forest, with the addition of numerous, mostly non-native herbaceous species.

Common plant species in each wetland are provided in the wetland descriptions in Section 3.3. **Table 4** provides common and scientific names of the most common species observed within the study area.

Table 4. Common Native Plants in the Study Area

Common Name	Scientific Name
Trees	
Bigleaf maple	*Acer macrophyllum*
Bitter cherry	*Prunus emarginata*
Black cottonwood	*Populus balsamifera* spp. *trichocarpa*
Cascara	*Frangula purshiana*
Douglas-fir	*Pseudotsuga menziesii*
Grand fir	*Abies grandis*
Red alder	*Alnus rubra*
Scouler's willow	*Salix scouleriana*
Shore pine	*Pinus contorta* var. *contorta*
Sitka willow	*Salix sitchensis*
Western redcedar	*Thuja plicata*
Shrubs	
Beaked hazelnut	*Corylus cornuta* var. *californica*
Black hawthorn	*Crataegus douglasii*
Douglas spirea	*Spiraea douglasii*
English hawthorn*	*Crataegus monogyna*
English holly*	*Ilex aquifolium*
English laurel*	*Prunus laurocerasus*
Evergreen blackberry*	*Rubus laciniatus*
Low Oregon grape	*Mahonia nervosa*
Himalayan blackberry*	*Rubus armeniacus*

Common Name	Scientific Name
Nootka rose	*Rosa nutkana*
Oceanspray	*Holodiscus discolor*
Osoberry	*Oemleria cerasiformis*
Red elderberry	*Sambucus racemosa*
Red-osier dogwood	*Cornus alba*
Salal	*Gualtheria shallon*
Salmonberry	*Rubus spectabilis*
Scotch broom*	*Cytisus scoparius*
Snowberry	*Symphoricarpos albus*
Thimbleberry	*Rubus parviflorus*
Trailing blackberry	*Rubus ursinus*
Vine maple	*Acer circinatum*
Herbs, Grasses, Ferns	
Bentgrass species	*Agrostis* spp.
Bluegrass species	*Poa* spp.
Bracken fern	*Pteridium aquilinum*
Butterfly bush*	*Buddleja davidii*
Canada goldenrod	*Solidago canadensis*
Canada thistle*	*Cirsium arvense*
Common horsetail	*Equisetum arvense*
Common Saint John's wort*	*Hypericum perforatum*
Common tansy*	*Tanacetum vulgare*
Common velvetgrass*	*Holcus lanatus*
Creeping buttercup*	*Ranunculus repens*
English ivy*	*Hedera helix*
Giant horsetail	*Equisetum telmateia*
Giant peavine*	*Lathyrus latifolius*
Hairy cats-ear*	*Hypochaeris radicata*
Lady fern	*Athyrium cyclosorum*
Orchardgrass*	*Dactylis glomerata*
Queen Anne's lace*	*Daucus carota*
Reed canarygrass*	*Phalaris arundinacea*
Robert geranium*	*Geranium robertianum*
Stinging nettle	*Urtica dioica*
Sword fern	*Polystichum munitum*
Tall fescue*	*Schedonorus arundinaceus*
Teasel*	*Dipsacus fullonum*
White clover*	*Trifolium repens*
Youth-on-age	*Tolmiea menziesii*

*Non-native/invasive plant

3.2 Wetland and Stream Inventories

The NWI map and City of Sumner and Pierce County wetland inventories (**Figure 4**) were used to determine potential wetland locations within the study area. The WDFW PHS and SalmonScape online mappers (WDFW 2023a, 2023b), and the National Hydrography Dataset (NHD) (USGS 2023b), were also referenced to identify surface water connections and potential fish habitat. The NWI generally relies on aerial photo interpretation, which tends to underestimate wetlands in dense forest or tall shrub canopies. Depending on the date of the photography, NWI mapping may also underestimate wetlands that are only saturated or inundated for a short part of the growing season.

No wetlands are mapped within the study area by the NWI. A north-south running segment of the Union Pacific Railroad borders the BESS site to the west. The NWI shows a seasonally flooded man-made drainage ditch on the west side of the railroad embankment on tax parcel 0420014081. The NWI also shows several open water ponds and palustrine emergent wetlands farther west of the railroad; these are all greater than 200 feet from the BESS site. There are also NWI-mapped wetlands within undeveloped portions of the floodplain approximately 400 feet southwest of the southwest corner of the study area. Numerous scrub-shrub, emergent and open water wetlands occur within the floodplain. Some of these are also mapped by the City of Sumner wetland inventory.

WDNR, WDFW, and NHD stream data and the City of Sumner wetland data show an intermittent non-fish-bearing stream and two wetlands north of the proposed gen-tie. The intermittent stream is mapped as starting in off-site tax parcel 05200072004 and flowing west in a forest ravine through off-site tax parcel 9520000130 and the northwest corner of on-site tax parcels 9520000110 and 05200072002 to East Valley Highway East, then continuing south in a culvert to the tailrace canal west of the Dieringer Powerhouse. The tailrace canal is also mapped by the NWI.

One of the City of Sumner mapped wetlands is shown in the off-site parcels 05200072004 and 9520000130 in the ravine associated with this stream. This off-site wetland is approximately 130 feet north of the proposed gen-tie at its closet point. However, this off-site wetland was not verified in the field as part of the wetland delineation conducted for this project as it is located on private land that is not part of the project site.

The second City of Sumner mapped wetland is shown north of the eastern portion of the proposed gen-tie in tax parcels 0520071007 and 0520071008. Pierce County wetlands data also shows an unconfirmed wetland north of the proposed gen-tie on tax parcel 0520071008. The mapped wetland is shown extending slightly into the study area just downslope of the White River Substation. This appears to correspond with an area of concave slope shape. No wetlands were identified within the study area in the eastern portion of the site during the wetland delineation.

3.3 Wetlands and Streams Delineated in the Study Area

The wetland delineation field investigation confirmed the presence of two wetlands in the study area, both within the City of Sumner. These wetlands are referred to as Wetlands A and B in this report (**Figures 5a and 5b**). An unnamed, intermittent stream (Stream A) flows through Wetland A. Wetlands and streams identified in the study area are described below. Wetland Determination Data Forms for each sample plot are provided in **Appendix A**. Wetland rating forms and figures are in **Appendix B**.

3.3.1 Wetland A

Wetland A is a small palustrine forested wetland that is seasonally saturated (PFOB) (**Photo 1**). The wetland is not mapped by the NWI or the City of Sumner. It is located at the base of a steep slope in the northwest corner of the study area, on the east side of East Valley Highway East (**Figures 5a and 5b**). Wetland A is a slope wetland that receives groundwater discharge. A small, intermittent stream flows through a portion of the wetland. The onsite portion of Wetland A is 0.11 acre. It appears to extend a short distance offsite to the northeast.

The wetland was saturated to the surface and had a water table within 4 inches at the time of the site visit. The wetland drains to the intermittent stream which flows into a culvert at the highway. The culvert discharges into the tailrace canal west of the Dieringer Powerhouse, which flows into to the White River approximately 2,000 feet to the west.

Observed soils had a mucky loam surface about 7 inches deep which met the Loamy Mucky Mineral (F1) hydric soil indicator.

The vegetation community consists of red alder, black cottonwood, salmonberry, red-osier dogwood (*Cornus alba*), Himalayan blackberry, giant horsetail (*Equisetum telmateia*), youth-on-age (*Tolmiea menziesii*), lady fern (*Athyrium cyclosorum*), stinging nettle (*Urtica dioica*), and reed canarygrass (*Phalaris arundinacea*).

Wetland A rates as **Category III** (17 out of 27 points). It rates low (5 out of 9 points) for improving **water quality**. Site potential is low since the site lacks dense herbaceous cover to trap sediments. Landscape potential is low since there are no known sources of pollutants. Societal value is high since the wetland discharges within 1 mile to a stream with impaired waters, and the basin has a total maximum daily load (TMDL)/water quality improvement project. Wetland A rates low (5 out of 9 points) for **hydrologic functions**. Site potential is low since the site lacks dense rigid plants to reduce surface flow velocity. Landscape potential is low since the wetland does not receive excess surface runoff. Societal value is high as flooding may occur in the sub-basin immediately down-gradient of the wetland. Wetland A rates moderate (7 out of 9 points) for **habitat functions**. Site potential is moderate due to moderate habitat and species diversity. Landscape potential is high based on the percent of undisturbed habitat near the wetland. Societal value is moderate based on the presence of priority habitats nearby.

Photo 1: Wetland A

In the City of Sumner, Category III wetlands with a habitat function score of 7 points require a **150-foot buffer** [Sumner Municipal Code (SMC) 16.46.150]. This can be reduced to 110 feet if measures are used to minimize impacts to the wetland, as summarized in Table 2 of SMC 16.46.150. The SMC also allows for reduced buffer widths where the standard buffer width is crossed by a legally established road or other linear facility or barrier, thus isolating a portion of the buffer. The west side of Wetland A abuts the road prism of East Valley Highway East and lacks a functional buffer. Part of the north buffer is constrained by a house and driveway. The functional part of the buffer is forested with Douglas-fir, vine maple, beaked hazelnut, low Oregon grape, and sword fern. The functional wetland buffer is shown on **Figures 5a and 5b**.

3.3.2 Wetland B

Wetland B is located in the southwest corner of the study area on the east side of East Valley Highway East (**Figures 5a and 5b**). This wetland was delineated by others in 2022 (Terracon 2022a) and was confirmed by AECOM for this study, with revisions as indicated below. Terracon delineated two small wetlands in this location (A and B) based on different hydrogeomorphic (HGM) classes, even though they were contiguous. They are considered one wetland for this report, with both slope and depressional HGM classes.

Wetland B is seasonally inundated and saturated with scrub-shrub and emergent vegetation classes (PSS/EMC) (**Photo 2**). It is not mapped by the NWI or City of Sumner. The wetland is in

a shallow depression between the highway and a steep slope, beneath electrical transmission lines. The wetland is approximately 0.04 acre.

The wetland receives both groundwater discharge and surface runoff from the steep slope. Active seeps are present along the toe of the slope. The interior of the wetland had indicators of shallow ponding including algal mats and crusts. There was no apparent outlet for the wetland, which is therefore considered hydrologically isolated.

The woody vegetation community consists of black cottonwood and red alder saplings, Sitka willow (*Salix sitchensis*), Douglas spiraea (*Spiraea douglasii*), and Himalayan blackberry. Herbaceous vegetation includes common horsetail (*Equisetum arvense*), common velvetgrass (*Holcus lanatus*), fringed willowherb (*Epilobium ciliatum*), clover (*Trifolium* sp.), and creeping buttercup (*Ranunculus repens*).

Wetland B rates as **Category III** (Terracon 2022a). It rates low for improving **water quality**. It rates low for **hydrologic functions**. It rates moderate for **habitat functions**. Refer to the Terracon report for rating forms and figures.

In the City of Sumner, Category III wetlands with a moderate habitat function require a **150-foot buffer** (SMC 16.46.150). This can be reduced to 110 feet if measures are used to minimize impacts to the wetland, as summarized in Table 2 of SMC 16.46.150. The SMC also allows for reduced buffer widths where the standard buffer width is crossed by a legally established road or other linear facility or barrier, thus isolating a portion of the buffer. The west side of Wetland B abuts the road prism of East Valley Highway East and lacks a functional buffer. The functional part of the buffer contains managed woody vegetation under powerlines. The functional wetland buffer is shown on **Figures 5a and 5b**.

Photo 2: Wetland B from East Valley Highway

3.3.3 Stream A

Stream A is an unnamed, intermittent stream located in the northwest corner of the study area on the east side of East Valley Highway East (**Figures 5a and 5b**). It starts as groundwater seeps at the base of the steep slope, flows through Wetland A, then joins another stream channel just outside of the study area boundary before flowing into an 18-inch concrete culvert at the highway. This flow discharges to the tailrace canal west of the Dieringer Powerhouse, approximately 400 feet to the south.

Stream A is approximately 4 to 6 feet wide and 6 inches deep at the OHWM. The stream was flowing at the time of inspection (**Photo 3**). The channel narrows and becomes less discernable upstream of Wetland A. Downstream of Wetland A, the stream flows through dense Himalayan blackberry.

Stream A is not mapped by the NHD, the NWI, or other inventories. The offsite stream is mapped by the NHD and WDNR (2023a). It begins in a ravine north of the study area and is mapped as a Type Ns (non-fish, seasonal) stream per the WDNR water typing classification system (WAC 222-16-030). Stream A would also be classified as Type Ns stream. The SMC 16.56.100 specifies that Type Ns waters require a 25-foot-wide buffer. This buffer is exceeded by the 150-foot buffer required for Wetland A.

Photo 3: Unnamed Intermittent Stream

3.3.4 Tailrace Canal

This is the artificial canal downstream of the Dieringer Powerhouse. The upper 40 feet of the canal extend onto the study area. The canal is about 45 feet wide and flows for 2,200 feet west to the White River. The canal is designated as a non-typed water (X) per the WDNR classification system. The SMC does not require a buffer for the canal.

Based on information from the WDFW (2023a, 2023b) and SWIFD (2023) online mapping applications, the canal provides documented habitat for coho (*Oncorhynchus kisutch*), pink (*O. gorbuscha*), fall Chinook (*O. tshawytscha*), sockeye (*O. nerka*), fall chum (*O. keta*) salmon, and winter steelhead (*O. mykiss*).

3.4 Other Critical Areas

The City of Sumner and Pierce County regulate other potentially sensitive areas under their critical area ordinances (SMC Title 16 and Pierce County Code [PCC] Title 18E, respectively). The assessment below utilizes publicly available resources to determine the presence or absence of such designated critical areas within the study area.

3.4.1 Critical Aquifer Recharge Areas

Aquifer recharge areas have been designated to protect areas around aquifers especially susceptible to contamination and support groundwater recharge (SMC 16.48.050). Aquifer recharge areas in the City of Sumner are defined in SMC 16.48.060, and include areas rated above 180 on the DRASTIC index, which have high groundwater pollution potential, and wellhead protection areas within the municipal boundary. Pierce County Aquifer Recharge and Wellhead Protection Areas are defined under the same criteria, while also includes the Clover/Chambers Creek Aquifer. Any proposed development must comply with water source protection requirements and must be designed to meet applicable stormwater standards.

Three wellhead protection areas are mapped in the project vicinity, and include County Springs, Dieringer Well, and Sumner Springs (**Figure 6**). The Dieringer well is located within the project area, as well as the 6-month, 1-year, 5-year, and 10-year wellhead protection areas. No other wells are located within the project area (Ecology 2023b). The entire project area is within the 10-year wellhead protection area for Sumner Springs and the southern portion is within the 10-year County Springs wellhead protection area. Parcels within the City of Sumner in the project area also are in a DRASTIC zone rated 180-199, which is defined as an aquifer recharge area by City of Sumner. Construction of utility lines or facilities are not prohibited or restricted under SMC 16.48.090 within these areas, subject to critical areas review. However, best management practices should be followed during construction to avoid fuel spills or introduction of other contaminants that could enter the aquifer.

3.4.2 Geologic Hazard Areas

The City of Sumner regulates two geological hazard areas, landslide and erosion areas and seismic hazard areas. Seismic hazard areas are defined in SMC 16.52.060 and include Earthquake-Induced Landslide Hazard Areas described in SMC 16.50.050 and Liquefaction and Dynamic Settlement Hazard Areas. The west side of East Valley Highway including the proposed location of the BESS and substation are a seismic hazard area, as it has high dynamic settlement hazard and high liquefaction hazard (**Figure 7**). Landslide and erosion hazard areas are defined in SMC 16.50.050 and include steep slope areas that have been mapped by the City of Sumner within the project area (**Figure 8**). Pierce County also recognizes landslide hazard areas (PCC 18E.80.020) and seismic hazard areas (PCC 18E.90.020). Both shallow and deep landslide susceptibility areas have been mapped by Pierce County within the project area within unincorporated Pierce County (**Figure 8**). A geological assessment will be prepared to assess risk of landslides, erosion, or other geologic hazards, designate areas of high risk, and suggest

appropriate mitigation if relevant for areas designated as steep slopes. Further studies may be required due to the location of the BESS and substation within the seismic hazard area.

3.4.3 Frequently Flooded Areas

The City of Sumner has adopted by reference areas of special flood hazard identified in "The Flood Insurance Study for Pierce County including the City of Sumner, Community Number 530147" released by the Federal Insurance Administration (SMC 15.52.070). Pierce County has defined flood hazard areas under PCC 18E.70.020. Based on City of Sumner mapping, FEMA designated flood zones (1 percent annual chance or 100-year floodplain) only occur within the project area on parcels 0520072001 and 0520072002 where the Dieringer Powerhouse releases water into the tailrace canal that flows to the White River (**Figure 9**). No floodways are mapped within the study area, and there are no flood hazard areas identified within the unincorporated Pierce County parcels. There are no project activities proposed within special flood hazard areas.

3.4.4 Fish and Wildlife Habitat Conservation Areas

The City of Sumner maintains jurisdiction over fish and wildlife habitat areas per its Fish and Wildlife Habitat Area Ordinance (SMC 16.56) in order to protect critical habitat for endangered fish and wildlife. Pierce County also has designated Fish and Wildlife Species and Habitat Conservation Areas in PCC 18E.40.020. These areas are typically identified either by known point locations of specific species or by habitat area or both. Wildlife habitat under the SMC also includes waters of the state classified by the WDNR water typing classification system, areas within 200-feet of the OHWM of lakes, rivers, or streams, and water bodies stocked by government or tribal entities. These areas may require buffers (SMC 16.56.100) determined by the WDNR water typing classification. One stream was delineated in the study area (Stream A) and flows for 230 feet within parcel 9520000110 in the northwest corner of the project area. Stream A is discussed above in Section 3.3.3.

Fish and wildlife habitat areas are defined in SMC 16.56.050. Critical fish and wildlife habitat conservation areas described in the SMC and PCC include federally listed threatened or endangered species and their designated critical habitat, and state priority habitats and areas associated with state priority species.

General observations of habitats indicate that there is virtually no habitat value at the proposed location of the BESS and substation given its current land use. The proposed location of the gen-tie transmission line and towers east of East Valley Highway East contains pockets of large deciduous trees surrounded by managed shrub or small tree vegetation under existing PSE transmission lines.

The PHS online mapper does not show any occurrences within the project area (WDFW 2023a).

Several federally listed salmonid species are documented to occur within the tailrace canal, including coho, pink, Chinook, sockeye, and chum salmon and steelhead (WDFW 2023b). Only a small 40-foot section of the canal extends into the study area west of the Dieringer Powerhouse, but this area will not be impacted by the project. Chum salmon and steelhead are

also mapped as occurring in the penstocks between Lake Tapps and the tailrace canal; however, fish screens are maintained by Cascade Water Alliance to prevent fish from passing through the tailrace canal into the penstocks. Stream A, found in the northwest corner of the site, is classified as non-fish bearing.

The Washington Natural Heritage Program online mapper (WDNR 2023a) does not show any rare plant species or high-quality ecosystems near the study area.

Federally listed species and critical habitats were reviewed for the project in previous studies (Terracon 2022b, 2022c). Data from the USFWS Information, Planning, and Conservation (IPaC) system was reviewed for the project vicinity. It was determined that no critical habitat was identified in the project vicinity. Six threatened or endangered species have historic ranges within the project vicinity: North American wolverine (*Gulo gulo luscus*), marbled murrelet (*Brachyramphus marmoratus*), streaked horned lark (*Eremophila alpestris strigata*), yellow-billed cuckoo (*Coccyzus americanus*) (extirpated in Washington), monarch butterfly (*Danaus plexippus*), and Taylor's (=whulge) checkerspot (*Euphydryas editha taylori*). None of these species has been documented in the project vicinity, and the Terracon habitat assessment (2022b) determined that no suitable habitat was present for these species within the current project vicinity.

The IPaC system also indicates that bull trout (*Salvelinus confluentus*), federally listed as threatened, may occur in the project area. Review of the WDFW PHS, WDFW SalmonScape mapping, and USFWS StreamNet mapping indicates that bull trout occur in the White River to the west of the project site, but they are not documented in the tailrace canal which flows into to the White River. Stream A, located on the project site on the east side of East Valley Highway East, is not mapped in these data sources, but the off-site stream that Stream A flows into is a non-fish-bearing intermittent stream.

Based on review of existing documentation from WDFW, Washington Natural Heritage Program, USFWS, and the 2022 Terracon studies, no federal or state listed threatened or endangered species are known to occur within portions of the study area that will be impacted by this project.

4.0 IMPACTS ASSESSMENT and MITIGATION

4.1 Proposed Impacts

The proposed BESS facility, BESS substation, and gen-tie transmission lines and associated transmission towers are shown in **Figure 10**. Project planning is still underway and final designs were not available at the time of this report. This assessment is based on the preliminary conceptual designs available as of January 4, 2024.

4.1.1 BESS and Substation

Construction of the BESS and electrical substation will occur on approximately 8 acres of previously developed land that is currently used for the Peterson Brothers general contractor yard and RV self-storage. The old Dieringer School gym (now owned by Peterson Brothers.) is also located in this area. The surface is either paved or hard-packed gravel on several feet of fill material that has been in place for over 30 years.

This area is flat, lacks any wetlands, streams or fish and wildlife habitat, and is outside of the 100-year floodplain. Prior to development, this area was likely a backwater area within the White River floodplain. Based on NRCS soils mapping (**Figure 3**), the pre-development soils were very poorly drained mucks and mucky peats. Based primarily on this soils mapping, this area is included as an Aquifer Recharge Area (**Figure 6**) and Seismic Hazard Area (with High Dynamic Settlement Hazard) (**Figure 7**) on the City's critical areas maps.

The proposed BESS and substation will not substantially alter groundwater recharge to the underlying aquifer. Currently, runoff from impervious surfaces drains into private on-site catchbasins and flows through in-ground stormwater pipes which either discharge directly to the trailrace canal to the south or connect to municipal stormwater pipes along the west side of East Valley Highway East, which also discharge to the canal. Existing stormwater management facilities will be modified or upgraded as required. A Stormwater Management Plan will be developed and submitted to the City of Sumner during the permitting process.

Structural properties associated with the mapped organic soils at the site will need to be considered for construction design. These soils may pose liquefaction hazards that typically occur from shaking during seismic events. These soils are also susceptible to subsidence and settlement with changes in land use and drainage. A geotechnical report with a seismic hazard analysis will be prepared for this project.

4.1.2 Gen-Tie and Transmission Towers

The proposed 1-mile-long gen-tie transmission lines connecting the PSE White River substation to the BESS substation will require installation of 17 90-foot-tall steel towers. The gen-tie lines and towers will be primarily located on the slope east of East Valley High East. They will be located between existing PSE transmission line corridors near Cottage Road East, and near the

buried penstocks that convey water from Lake Tapps to the Dieringer Powerhouse. As a result, vegetation near the proposed tower locations is highly managed. Nevertheless, the project will have temporary and permanent impacts associated with temporary construction access and laydown areas, vegetation clearing, grading, foundation and tower construction, and stringing of cables. Given the height of the transmission lines and the managed vegetation, it is not expected that extensive cutting or trimming of trees will be required throughout the corridor. Precise areas of clearing and grading cannot be determined at this time. A clearing and grading plan will be submitted to Sumner and Pierce County prior to any ground disturbance.

Construction impacts will occur outside of any wetlands, streams, buffers, floodplains, habitat conservation areas, or sensitive aquifer recharge areas. Most of the towers will occur in areas mapped as Steep Slopes in the City of Sumner [Type 1 (≥25%) or Type 2 (15 to 25%)], or as Landslide Hazard Areas (deep or shallow) in Pierce County (**Figure 8**). The steepest part of the slope (>40%) just above the highway will generally be avoided, with the possible exception of one tower (structure 14). Based on general observations during the field investigations, there were no signs of current or historic mass movements on the main part of the slope. In order to meet requirements of both Sumner and Pierce County codes, a geological assessment with a landslide hazard analysis specific to this project will be prepared.

4.2 Proposed Avoidance and Minimization Measures

Project planning has been underway for several months, and the project proponent has utilized critical area mapping included in this report as well as mapping and reconnaissance studies outside the current study area to avoid and minimize impacts to wetlands, streams and floodplains. The proposed location of the BESS is an existing developed area. Nearby alternative locations that were assessed included an undeveloped field with wetlands in the floodplain. The current site selection thus potentially avoids several acres of wetland and floodplain fill.

The proposed gen-tie location also avoids all impacts to the onsite wetlands, streams and buffers. Since the project will not result in impacts to these critical areas, no compensatory mitigation is proposed.

Avoidance and minimization measures related to work on steep slopes and landslide hazard areas will need to be developed in the required geotechnical report. In general, clearing and grading on steep slopes could accelerate erosion and sedimentation. Clearing of woody vegetation will be kept to a minimum, and clearing and grading limits will be clearly marked onsite. During construction, bare soil and fill exposure will be minimized, especially for work that occurs during the rainy season (generally between October and May). Phasing of work, and seeding and covering of bare soil will be implemented. A Temporary Erosion and Sediment Control (TESC) plan will be developed and implemented prior ground disturbance. Controls will be maintained throughout the duration of construction.

Transmission lines, corridors, and facilities are permitted uses subject to City of Sumner and Pierce County critical areas review. Several critical areas occur within the study area. The proposed project will avoid impacts to all wetlands, streams, buffers, floodplains, and habitat conservation areas. The BESSs and BESS substation would be located in areas mapped as

Aquifer Recharge Areas and Seismic Hazard Areas by the City of Sumner. Aquifer recharge would not change substantially since the site is already developed. Any potential impacts associated with seismic hazards will be addressed in a separate geotechnical report. The gen-tie transmission line and associated towers between the PSE substation and the BESS substation will not be able to avoid crossing steep slopes and mapped landslide hazard areas. A geotechnical report addressing potential impacts of the project will be required. Specific tower locations may need to be adjusting pending results of the report. The report will also provide specific measures to minimize impacts to the slope during construction.

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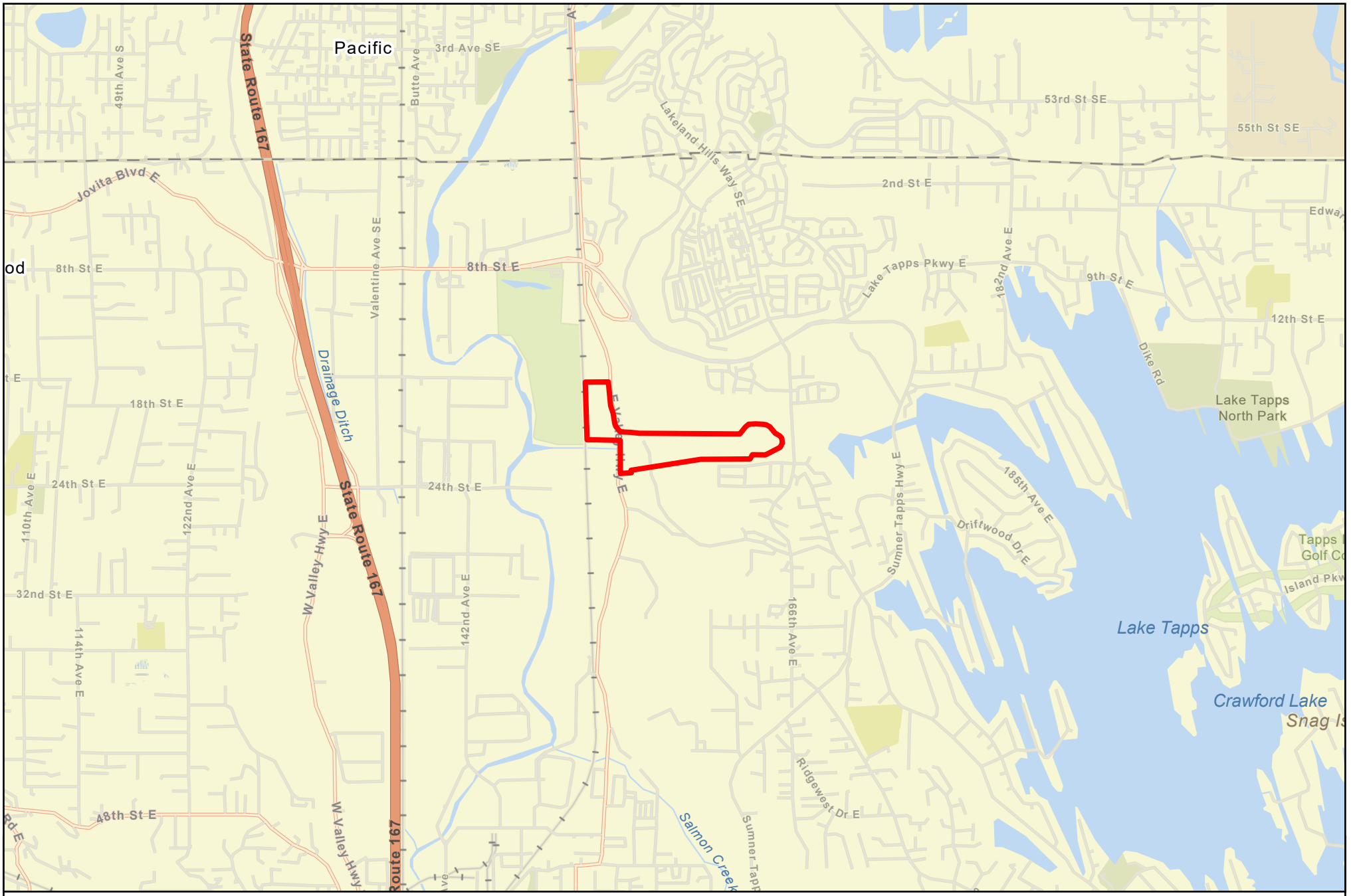
Figures



Legend

Study Area

N
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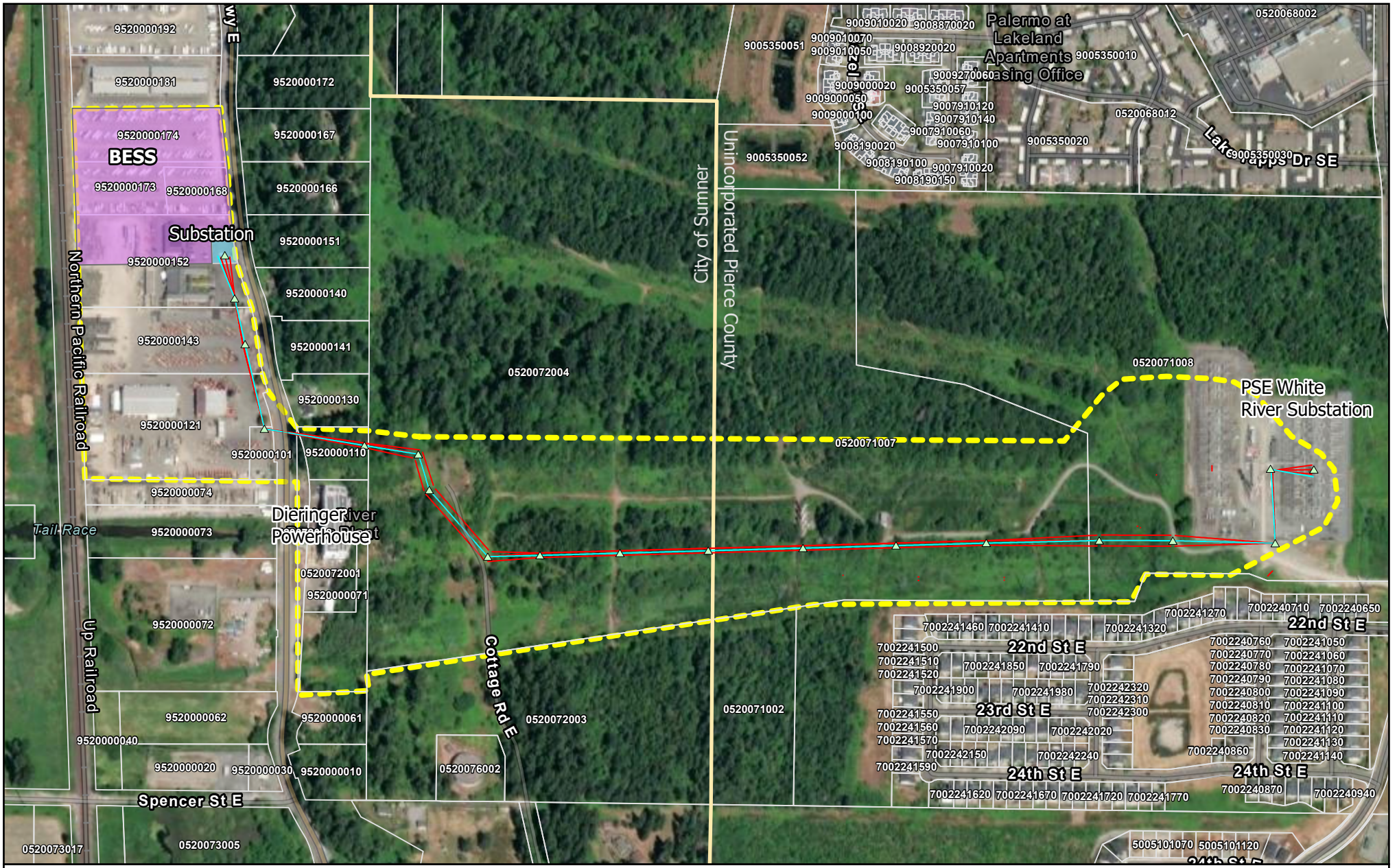
0 0.25 0.5 1 Miles

FIGURE 1. VICINITY MAP

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

- Study Area
- Parcels
- Sumner City Limits

Gen-Tie Alignment

- Transmission Towers
- Transmission Cable
- Tension Cable
- BESS
- Substation

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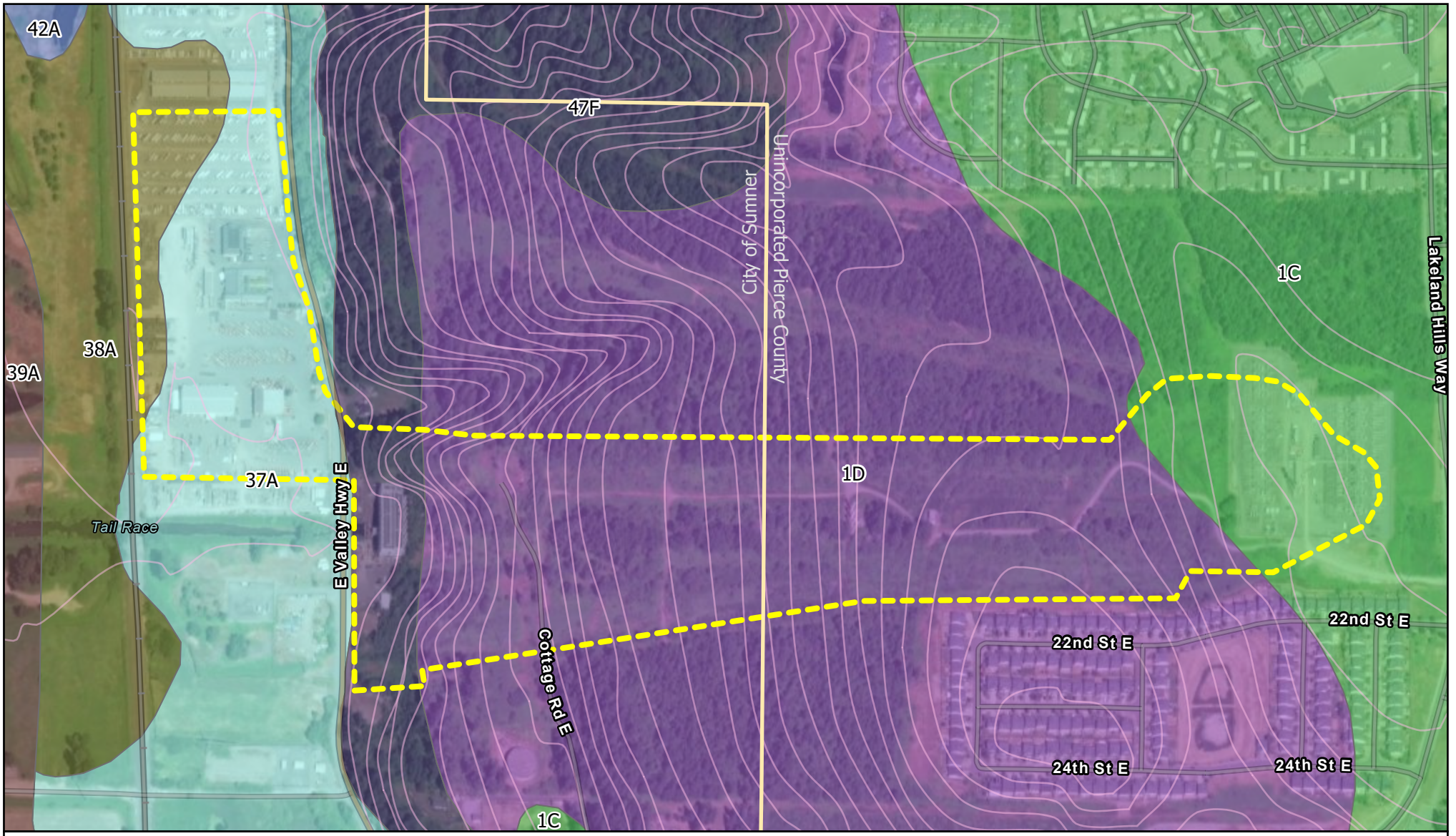
FIGURE 2. STUDY AREA MAP

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

0 250 500 1,000
Feet



Legend

- Study Area
- 20-Foot Contours

NRCS Soil Data

- 1C - Alderwood gravelly sandy loam, 8 to 15 percent slopes
- 1D - Alderwood gravelly sandy loam, 15 to 30 percent slopes
- 37A - Semiahmoo muck
- 38A - Shalcar muck
- 39A - Snohomish silty clay loam
- 42A - Sultan silt loam
- 47F - Xerochrepts, 45 to 70 percent slopes
- Sumner City Limits

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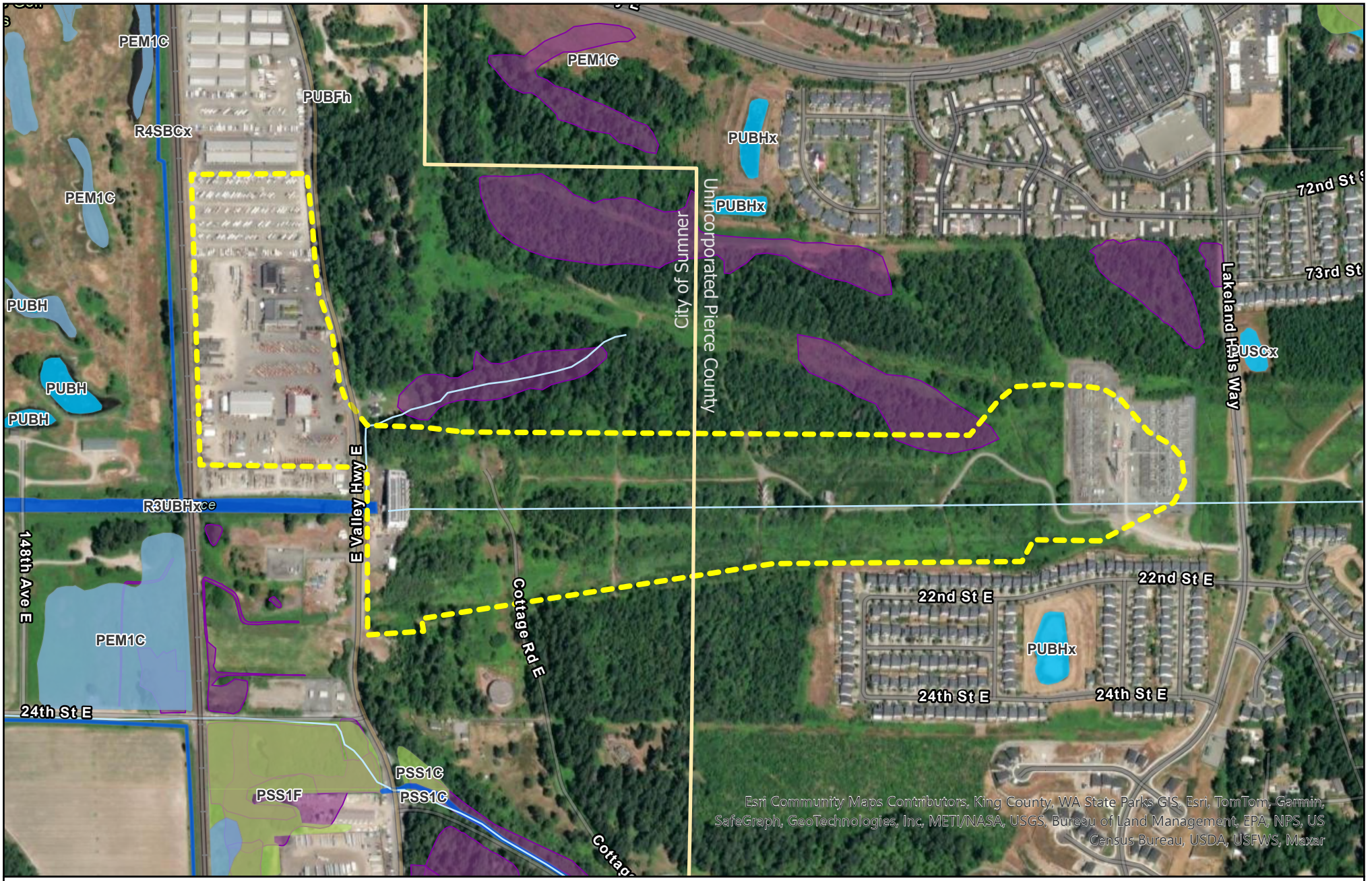
0 250 500 1,000
Feet

FIGURE 3. NRCS SOIL SURVEY

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Study Area
- Study Area
- Sumner City Limits

National Hydrography Dataset
- Stream/River

NWI Wetlands
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

City of Sumner Mapping
- Wetland

N
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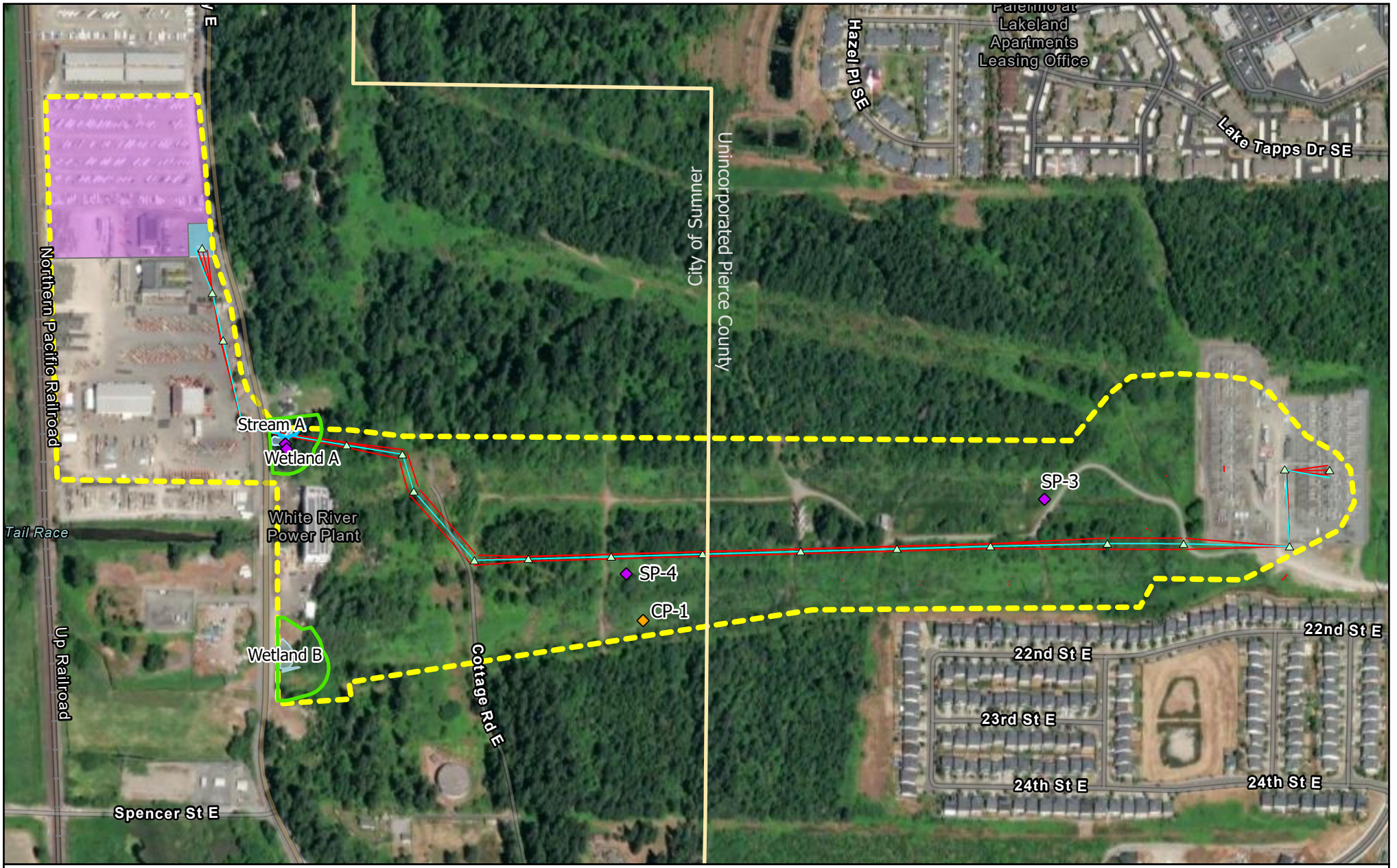
0 250 500 1,000 Feet

FIGURE 4. WETLAND INVENTORY

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

- Study Area
- Sumner City Limits

Gen-Tie Alignment

- Transmission Towers
- Transmission Cable
- Tension Cable
- Substation
- BESS

Wetland Delineation

- Check Point
- Sample Point
- Delineated Wetland Boundary
- Delineated Stream
- City of Sumner Wetland Buffer (150 Feet)

N
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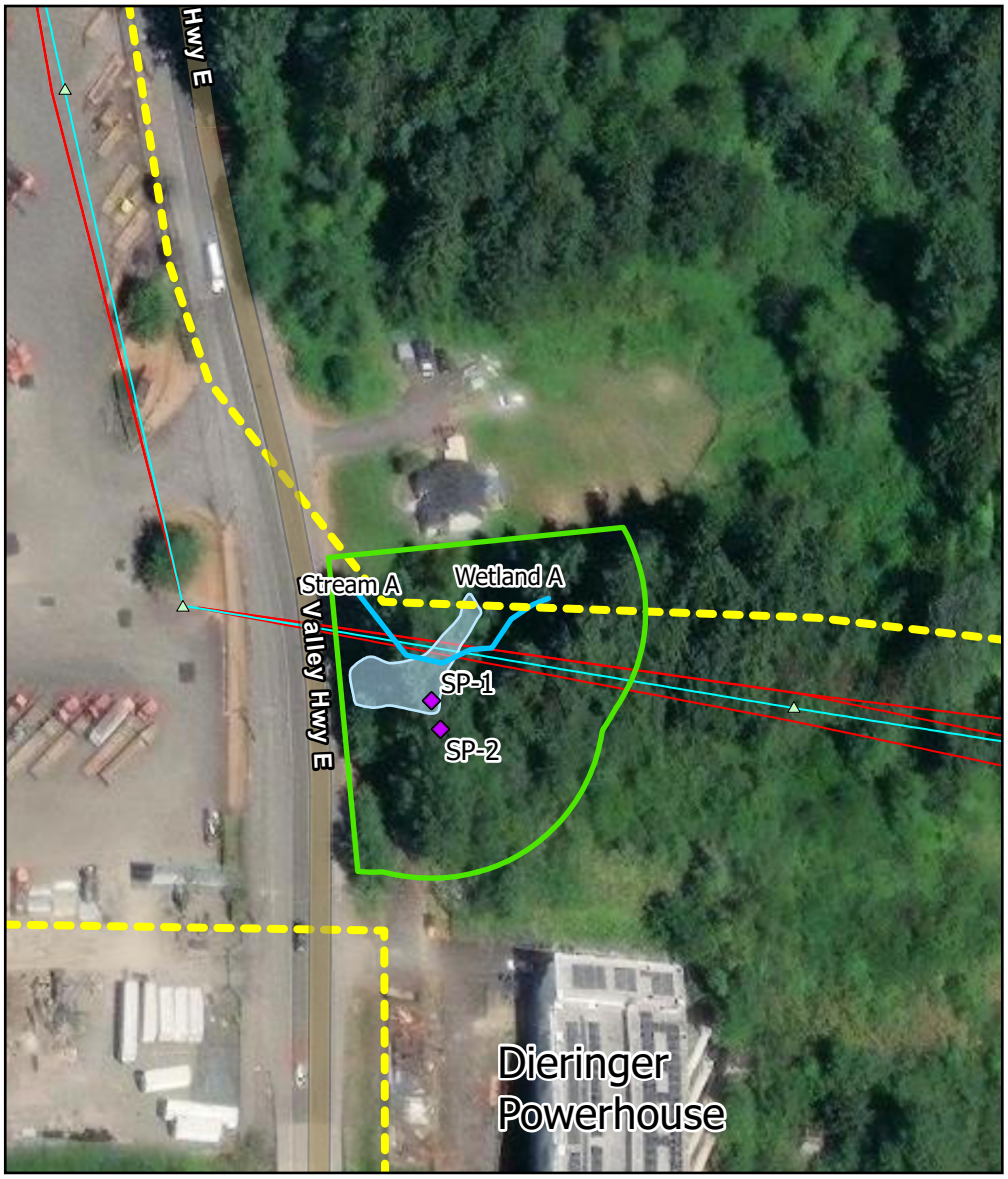
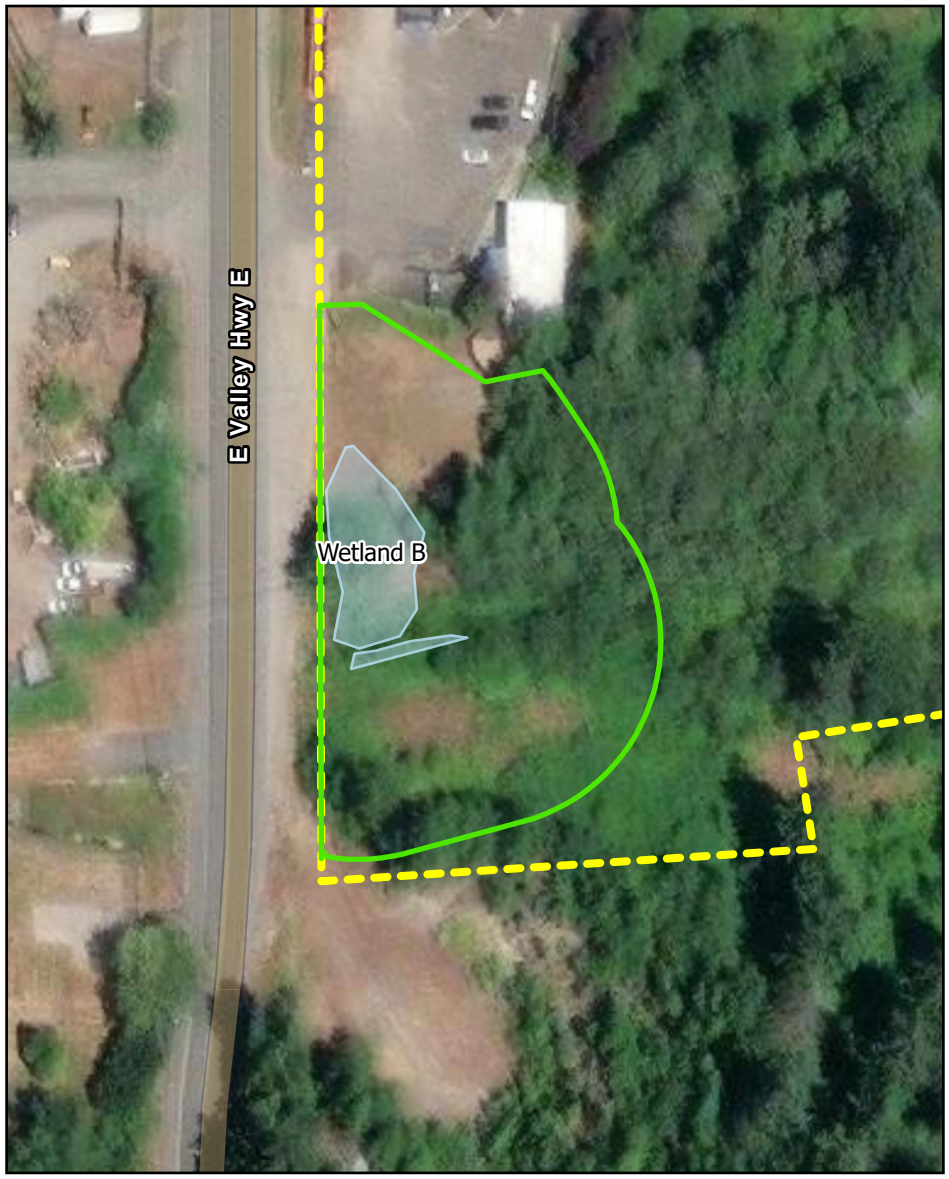
FIGURE 5A. WETLANDS, STREAMS & BUFFERS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

0 250 500 1,000 Feet





Legend

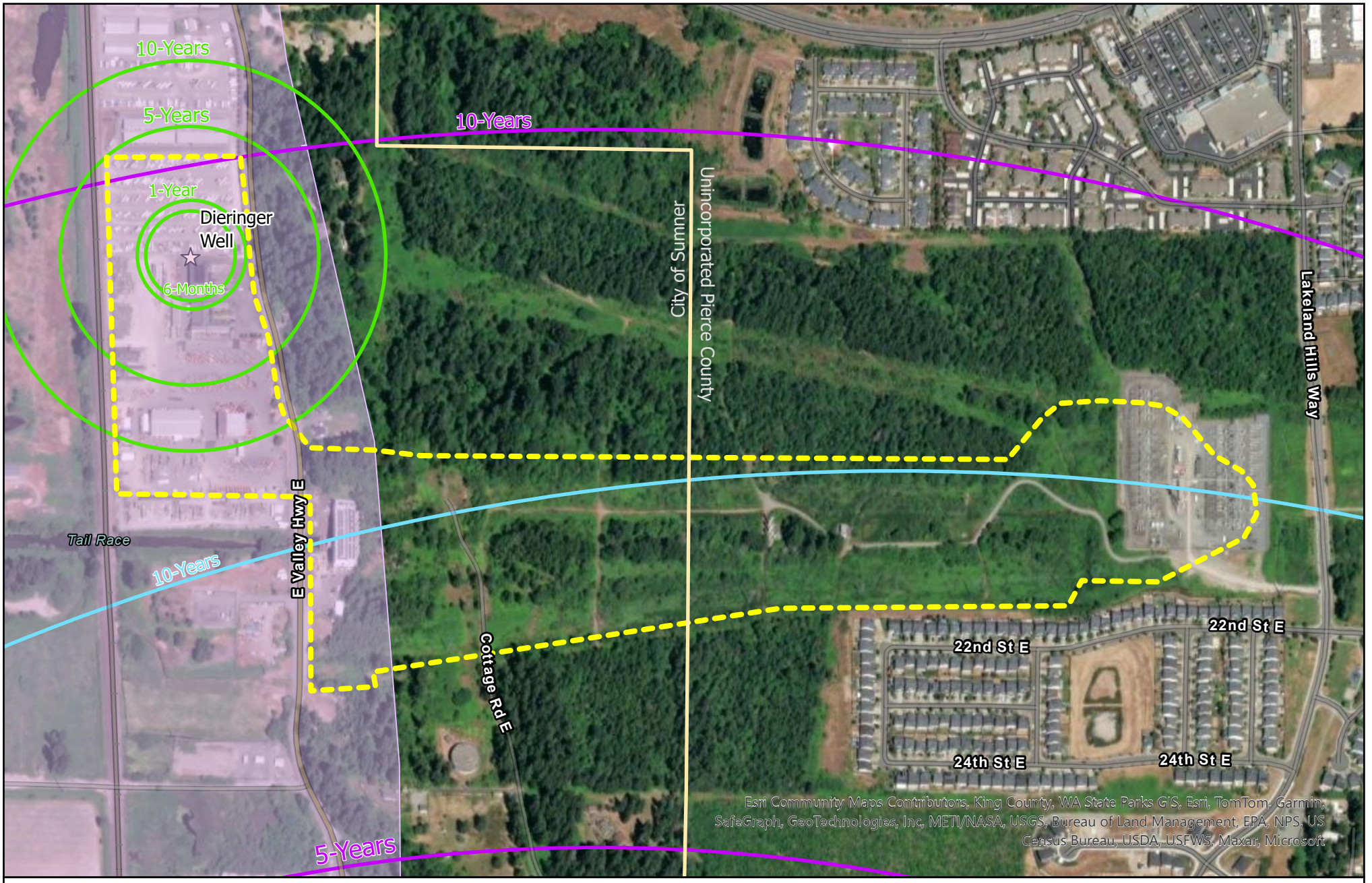
- Study Area
- **Wetland Delineation**
  - Sample Point
  - Delineated Stream
  - Delineated Wetland Boundary
  - City of Sumner Wetland Buffer (150 Feet)
- **Gen-Tie Alignment**
  - Transmission Towers
  - Transmission Cable
  - Tension Cable

N
W E
S

FIGURE 5B. DETAIL VIEW OF WETLANDS, STREAMS, & BUFFERS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

0 100 200 400 Feet



Legend

- Study Area
- Well/Water Source Site
- Sumner City Limits
- Drastic Zones Rated 180 or Greater

Wellhead Protection Areas

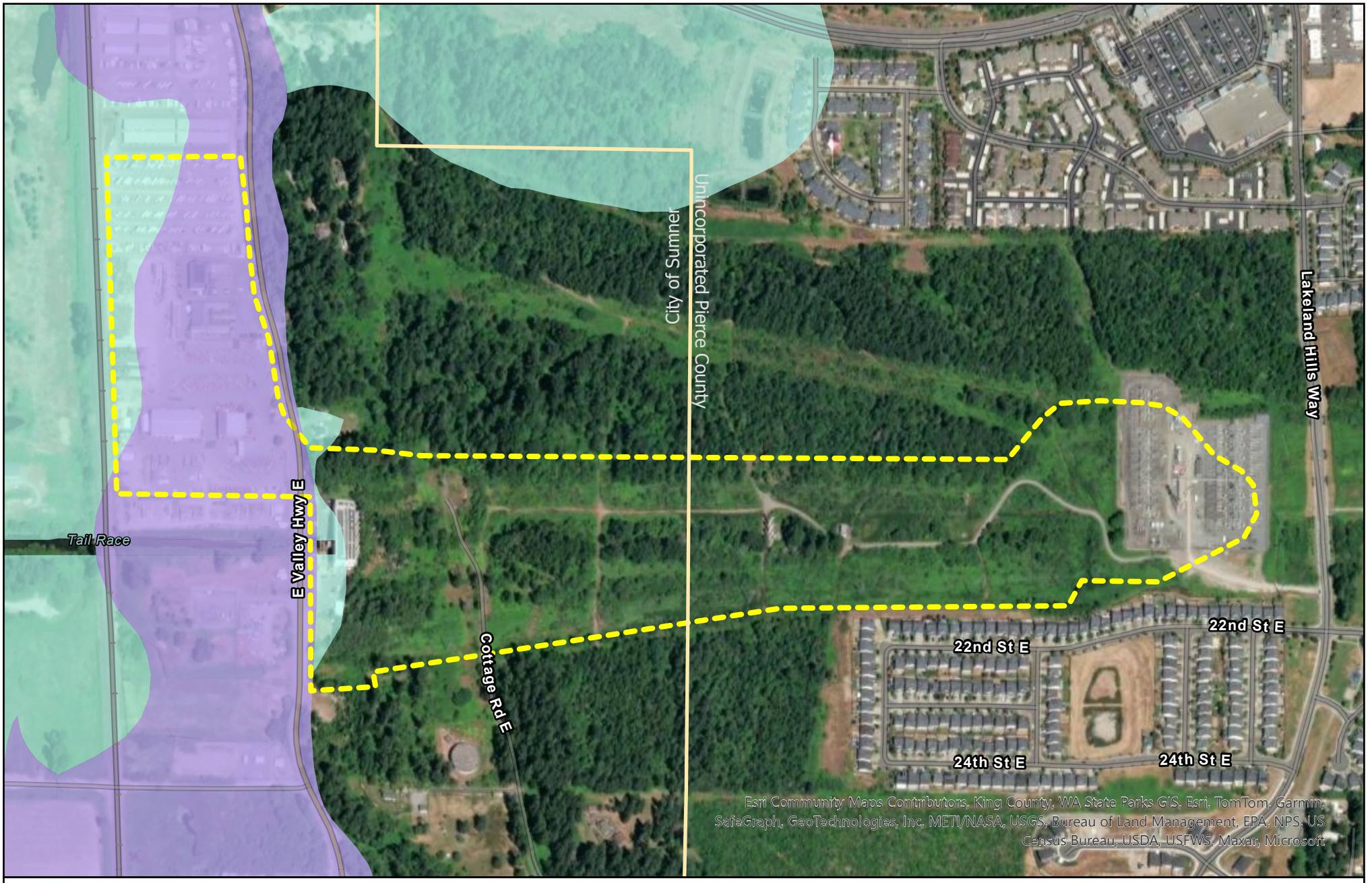
- County Springs
- Dieringer Well
- Sumner Springs

N W E S

0 250 500 1,000 Feet

FIGURE 6. AQUIFER RECHARGE AREAS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

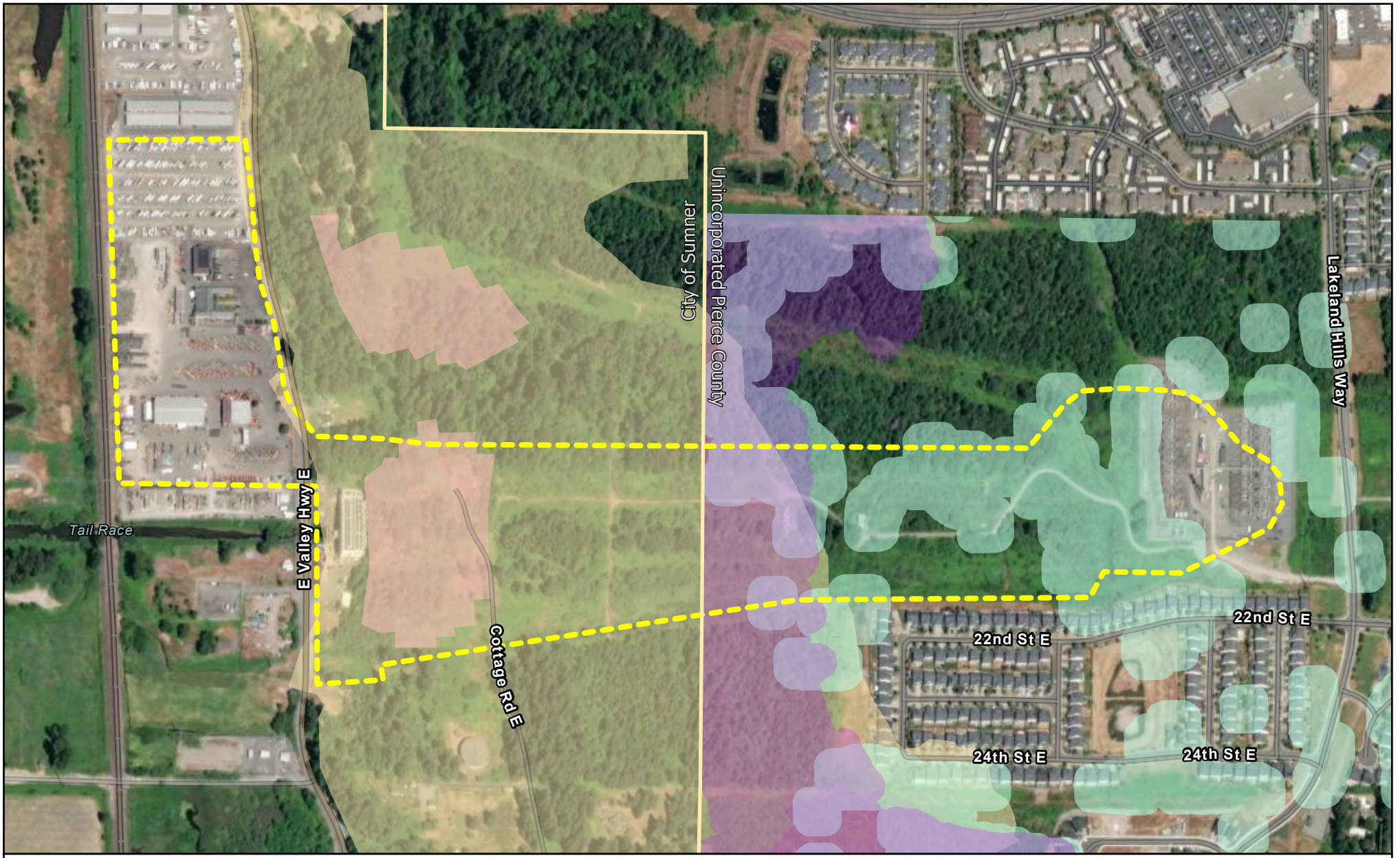
- Study Area
- Sumner City Limits
- High Dynamic Settlement Hazard
- Seismic Hazard Area

N
W E
S

0 250 500 1,000
Feet

FIGURE 7. SEISMIC HAZARD AREAS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

- Study Area
- Sumner City Limits

City of Sumner Steep Slopes

- 25% or Greater Slopes (Type 1)
- 15% Slopes or Greater - Less than 25% Slopes (Type 2)

Unincorporated Pierce County Landslide Hazard Areas

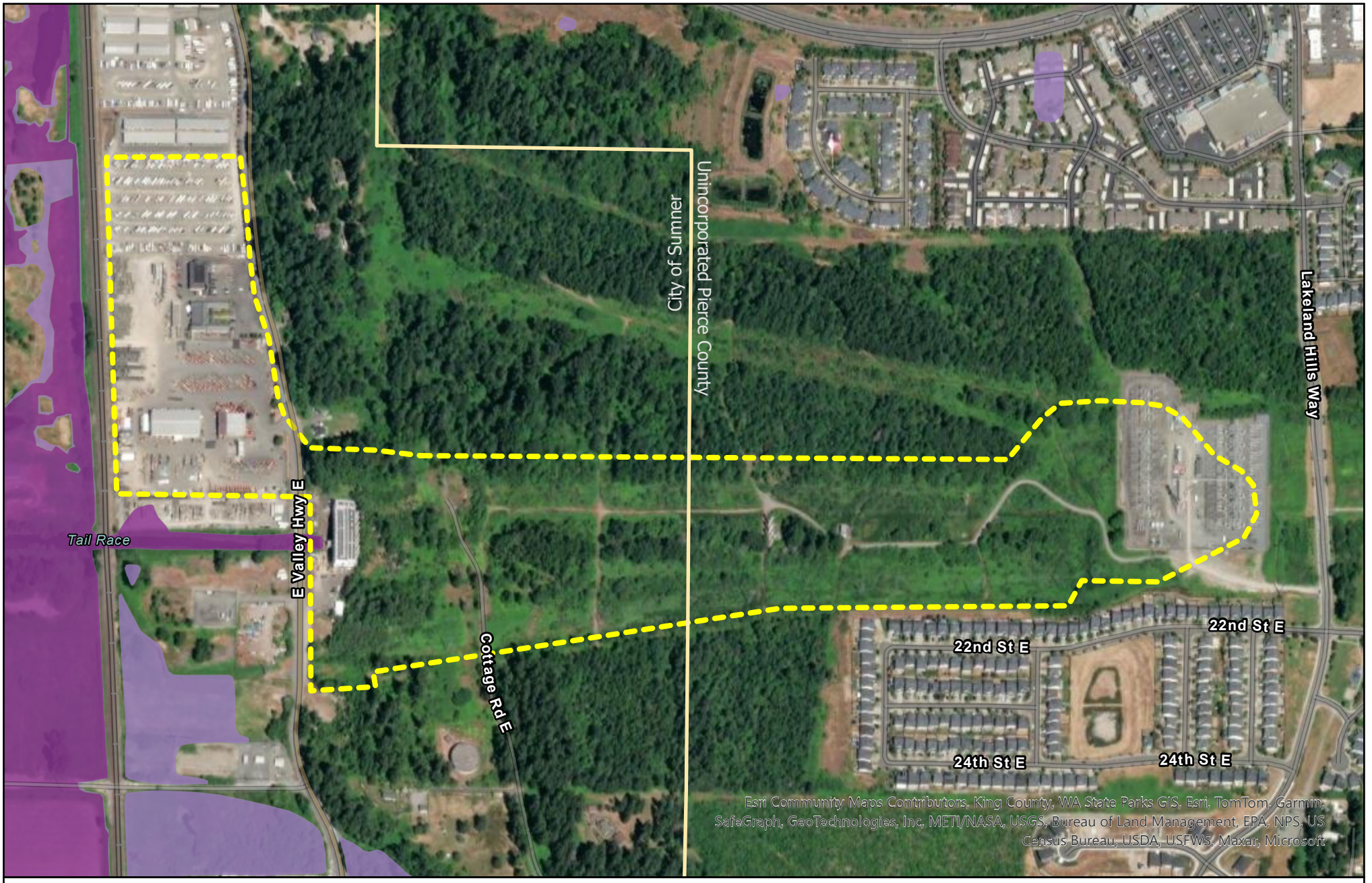
- Deep Landslide Susceptibility
- Shallow Landslide Susceptibility

N
W E
S

0 250 500 1,000 Feet

FIGURE 8. STEEP SLOPES AND LANDSLIDE HAZARD AREAS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

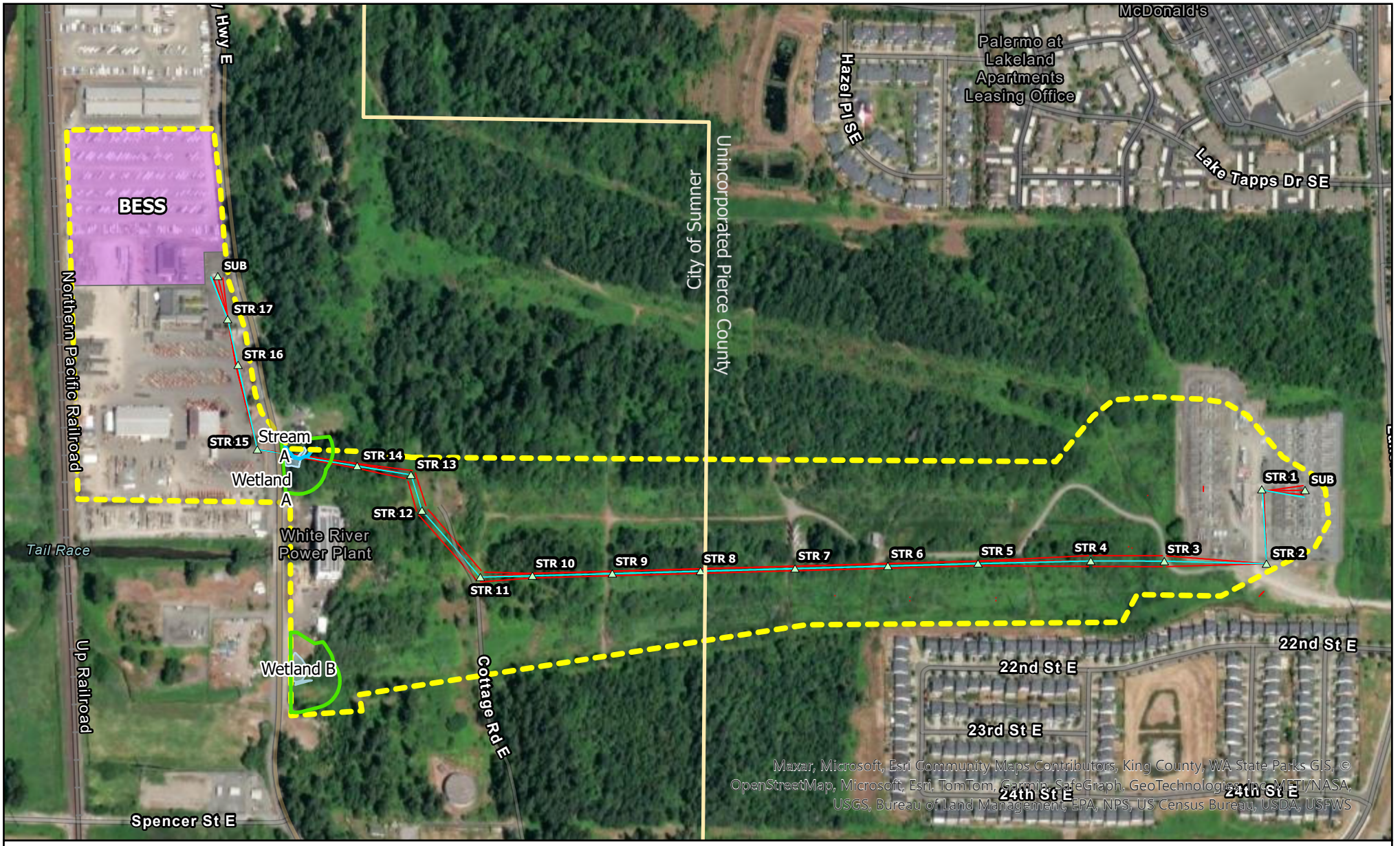
- Study Area
- 1% Annual Chance Flood Hazard (100-Year Floodplain)
- 0.2% Annual Chance Flood Hazard (500-Year Floodplain)
- Sumner City Limits

N W E S

0 250 500 1,000 Feet

FIGURE 9. FLOOD HAZARD AREAS

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON



Legend

- Study Area
- Sumner City Limits

Gen-Tie Alignment

- Transmission Towers
- Transmission Cable
- Tension Cable
- BESS

Wetland Delineation

- Delineated Stream
- Delineated Wetland Boundary
- City of Sumner Wetland Buffer (150 Feet)

N
W E
S

0 250 500 1,000 Feet

FIGURE 10. BESS & GEN-TIE ALIGNMENT

GREENWATER BATTERY ENERGY STORAGE SYSTEM
GREE BN, LLC, A SUBSIDIARY OF BRIGHTNIGHT LLC
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

Appendix A
Wetland Determination Data Forms

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

Project/Site: Greenwater Bess City/County: Sumner, Pierce County Sampling Date: 11/30/23

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

Investigator(s): Paul Hamid, Linda Howard, Rebecca Conner Section, Township, Range: Section 8, Township 20N, Range 05E

Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): convex Slope (%): 6

Subregion (LRR): A Lat: 47.2391135 Long: -122.22489570 Datum: WGS84

Soil Map Unit Name: Xerochrepts, 45 to 70 percent slopes NWI classification: PFOB

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____	**Is the Sampled Area within a Wetland?** **Yes X No _____**
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	75	Y	FAC
2. Alnus rubra	25	Y	FAC
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Rubus spectabilis	60	Y	FAC
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Polystichum munitum	5	N	FACU
2. Equisetum telmateia	50	Y	FACW
3. Phalaris arundinacea	10	N	FACW
4. Athyrium cyclosorum	20	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 5)			
1. Rubus armeniacus	10	Y	FAC
2. Helix hedera	10	Y	FACU
3. Rubus ursinus	2	N	FACU
	22	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 70	x 2 = 140
FAC species 192	x 3 = 576
FACU species 17	x 4 = 68
UPL species 0	x 5 = 0
Column Totals: 279 (A)	784 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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 X 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	Remarks
0-7	10 YR 2/1	100					mucky loam	2' litter; extensive roots
7-13	10 YR 3/1	100					loam	extensive roots
14-18	10 YR 3/2						gravelly loam	gravelly

[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)
- X 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 Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X 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 Stressed 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)
- X 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 X Depth (inches): _____

Water Table Present? Yes X No _____ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes X 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: Greenwater BESS City/County: Pierce County Sampling Date: 11/30/2023

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

Investigator(s): Paul Hamid, Lisa Howard, Rebecca Conner Section, Township, Range: Section 8, Township 20N, Range 05E

Landform (hillslope, terrace, etc.): mid hillslope Local relief (concave, convex, none): convex Slope (%): 6

Subregion (LRR): A Lat: 47.2390658 Long: -122.2249327 Datum: WGS84

Soil Map Unit Name: Xerochrepts, 45 to 70 percent slopes NWI classification: PFOB

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:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus trichocarpa	30	Y	FAC
2. Pseudotsuga menziesii	10	N	FACU
3. Ilex aquifolium	15	Y	FACU
4.			
	55	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. Rubus spectabilis	15	N	FAC
2. Corylus cornuta	50	Y	FACU
3. Mahonia nervosa	5	N	FACU
4. Rubus armeniacus	10	N	FAC
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Equisetum telmateia	10	N	FACW
2. Polystichum munitum	90	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 5)			
1. Helix hedera	20	Y	FACU
2. Rubus ursinus	20	Y	FACU
	40	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	110
FACU species	210	x 4 =	840
UPL species	0	x 5 =	0
Column Totals:	265 (A)		950 (B)

Prevalence Index = B/A = 3.6

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:

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 %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
2-0							Duff	
0-8	10YR 3/2	100					gr-loam	
8-18	10YR 4/2	100					vgr-loam	

[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 Soil Present? Yes _____ No ✔

Remarks:
slope above old access road

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 Stressed 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: Greenwater BESS City/County: Pierce County Sampling Date: 11/30/2023

Applicant/Owner: BrightNight State: WA Sampling Point: SP-3

Investigator(s): Paul Hamid, Lisa Howard, Rebecca Conner Section, Township, Range: Section 8, Township 20N, Range 05E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): A Lat: 47.2378145 Long: -122.2199329 Datum: WGS84

Soil Map Unit Name: Alderwood gravelly sandy loam, 15-30% slope NWI classification: upland

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:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prunus emarginata	8	Y	FACU
2.			
3.			
4.			
	8 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Symphoricarpos albus	15	Y	FAC
2. Corylus cornuta	20	Y	FACU
3. Holodiscus discolor	5	N	FACU
4. Rubus armeniacus	5	N	FACU
5. Cytisus scoparius	10	Y	FACW
	55 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Pteridium aquilinum	20	Y	FACW
2. Solidago canadensis	15	N	FAC
3. Tanacetum vulgare	45	Y	FACU
4. Phalaris arundinacea	30	Y	FACW
5. Polystichum munitum	5	N	FACU
6. Urtica dioica	2	N	FAC
7.			
8.			
9.			
10.			
11.			
	117 = Total Cover		
Woody Vine Stratum (Plot size: 5)			
1. Rubus ursinus	30	Y	FACU
2.			
	30 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (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	x 1 =	
FACW species	60	x 2 =	120
FAC species	32	x 3 =	96
FACU species	118	x 4 =	472
UPL species	0	x 5 =	0
Column Totals:	210 (A)		688 (B)

Prevalence Index = B/A = 3.3

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:

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	Remarks
0-8	10YR 3/2	100					loam	
8-16	10YR 3.5/2	100					gr-sandy-loam	gravelly

[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 Soil 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 Stressed 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: Greenwater BESS City/County: Pierce County Sampling Date: 11/30/2023

Applicant/Owner: BrightNight State: WA Sampling Point: SP-4

Investigator(s): Paul Hamid, Lisa Howard, Rebecca Conner Section, Township, Range: Section 8, Township 20N, Range 05E

Landform (hillslope, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): A Lat: 47.2373499 Long: -122.2196925 Datum: WGS84

Soil Map Unit Name: Alderwood gravelly sandy loam, 15-30% slope NWI classification: upland

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:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	10	Y	FAC
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. Symphoricarpos albus	5	Y	FAC
2. Crataegus douglasii	3	N	FAC
3. Rubus armeniacus	5	Y	FAC
4.			
5.			
	13 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Phalaris arundinacea	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (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	x 1 =	
FACW species	100	x 2 =	200
FAC species	23	x 3 =	69
FACU species		x 4 =	
UPL species	0	x 5 =	
Column Totals:	123 (A)		269 (B)

Prevalence Index = B/A = 2.2

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:

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)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					silt loam	
4-12	10YR 3/1	99	10YR 3/2	1	C	M	silt-clay-loam	
12-18	10YR 3.5/1	99	10YR 4/3	1	C	M	silty clay loam	

[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 Soil 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 Stressed 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:

Appendix B
Wetland Rating Forms and Figures

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 11/30/23

Rated by Paul Hamidi Trained by Ecology? ☑ Yes ☐ No Date of training 2015

HGM Class used for rating Slope Wetland has multiple HGM classes? ☐ Y ☑ N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.

Source of base aerial photo/map ESRI

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics___)

1. Category of wetland based on FUNCTIONS

☐ **Category I** – Total score = 23 - 27

☐ **Category II** – Total score = 20 - 22

☑ **Category III** – Total score = 16 - 19

☐ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H M (L)	H M (L)	H (M) L	
Landscape Potential	H M (L)	H M (L)	(H) M L	
Value	(H) M L	(H) M L	H (M) L	**TOTAL**
Score Based on Ratings	5	5	7	17

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
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	(X)

Wetland name or number A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
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	
Map of the contributing basin	D 4.3, 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	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
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)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
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 unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	A1
Hydroperiods	H 1.2	A2
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 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	A1
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	A3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	A4
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	A5

Wetland name or number A

HGM Classification of Wetlands in Western Washington

For questions 1-7, 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 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   - ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   - ☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. 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 5 **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 ft deep).

5. 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 2 years.

Wetland name or number A

NO – go to 6 **YES** – The wetland class is **Riverine**

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

6. 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 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. 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 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 along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*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.*

Wetland name or number A

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: *(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance*) Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0	2
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*: Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	0
Total for S 1 Add the points in the boxes above	2

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

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0	0
Total for S 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is: ___ **1-2 = M** X **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list*. Yes = 1 No = 0	1
S 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 basin in which unit is found.* Yes = 2 No = 0	2
Total for S 3 Add the points in the boxes above	4

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

Wetland name or number A

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 All other conditions points = 0	0

Rating of Site Potential If score is: ___ **1 = M** X **0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0	0

Rating of Landscape Potential If score is: ___ **1 = M** X **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	2
S 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 S 6 Add the points in the boxes above	2

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

NOTES and FIELD OBSERVATIONS:

Wetland name or number A____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
____Emergent	3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
X___Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

X___The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
____Seasonally flooded or inundated	3 types present: points = 2
X___Occasionally flooded or inundated	2 types present: points = 1
X___Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
X___Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

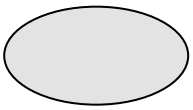
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

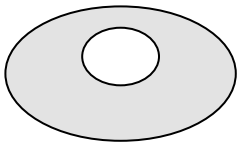
1

H 1.4. Interspersion of habitats

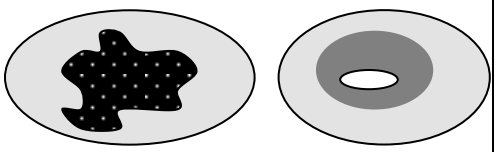
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

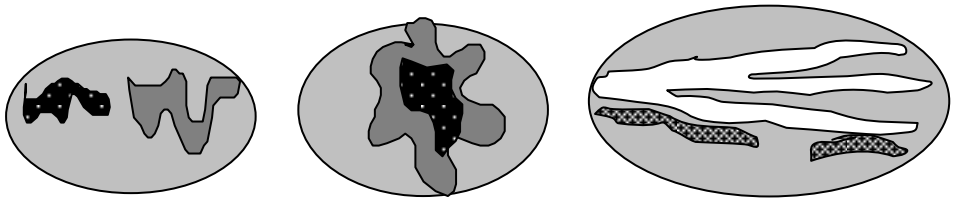


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



1

Wetland name or number A

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). X Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	7

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

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 1 + [(% moderate and low intensity land uses)/2] 12 = 13 % If total accessible habitat is: > 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	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 26 + [(% moderate and low intensity land uses)/2] 24.5 = 50.5 % 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	3
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	0
Total for H 2 Add the points in the boxes above	4

Rating of Landscape Potential If score is: ✔ **4-6 = 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 next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority 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 (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: ___ **2 = H** ✔ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number A

WDFW Priority Habitats

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*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. 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 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.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **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.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

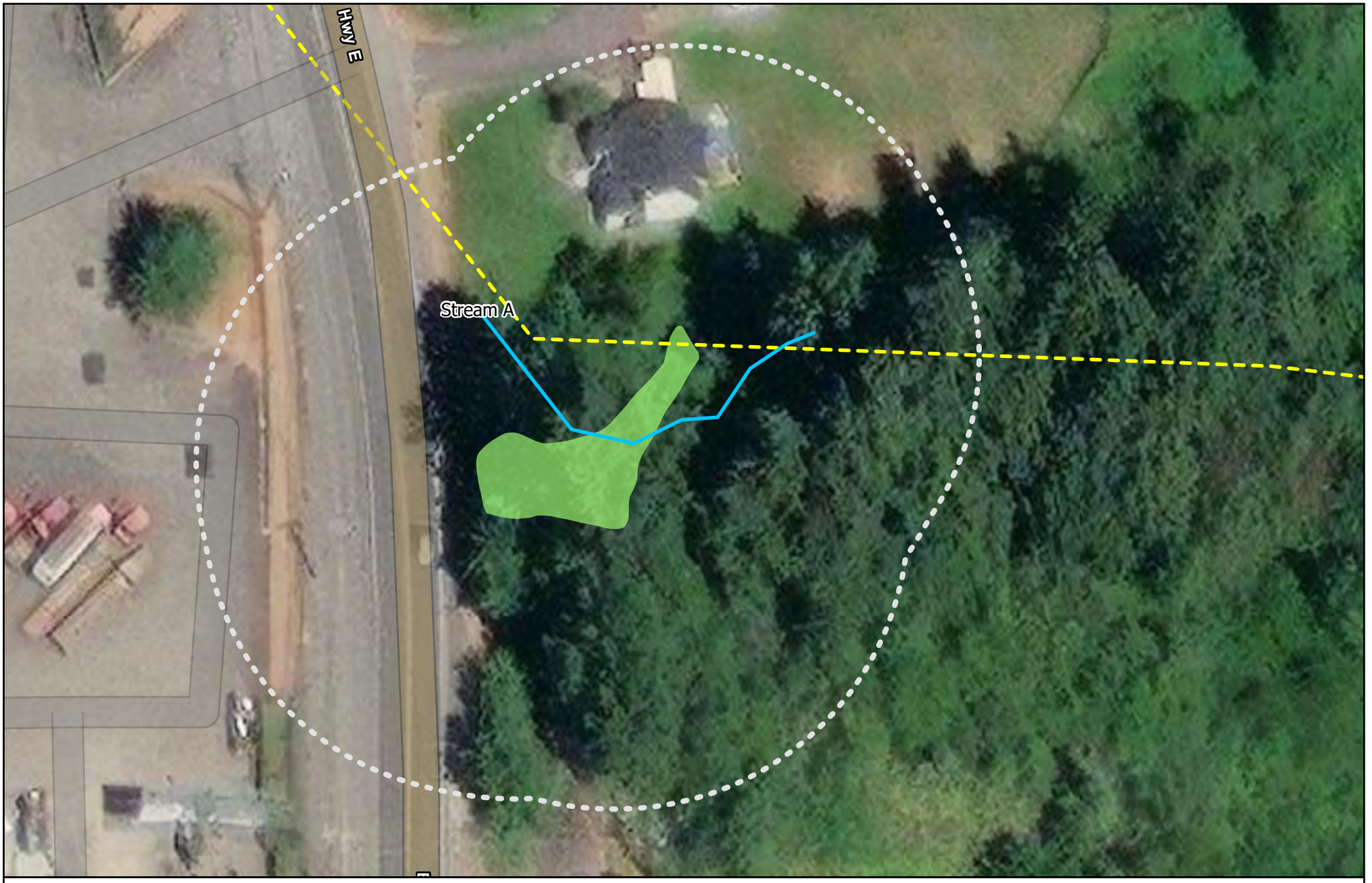
☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **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.

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



Legend

150 Foot Buffer
Study Area
Delineated Stream

Cowardin

Forested (0.11 Acres)

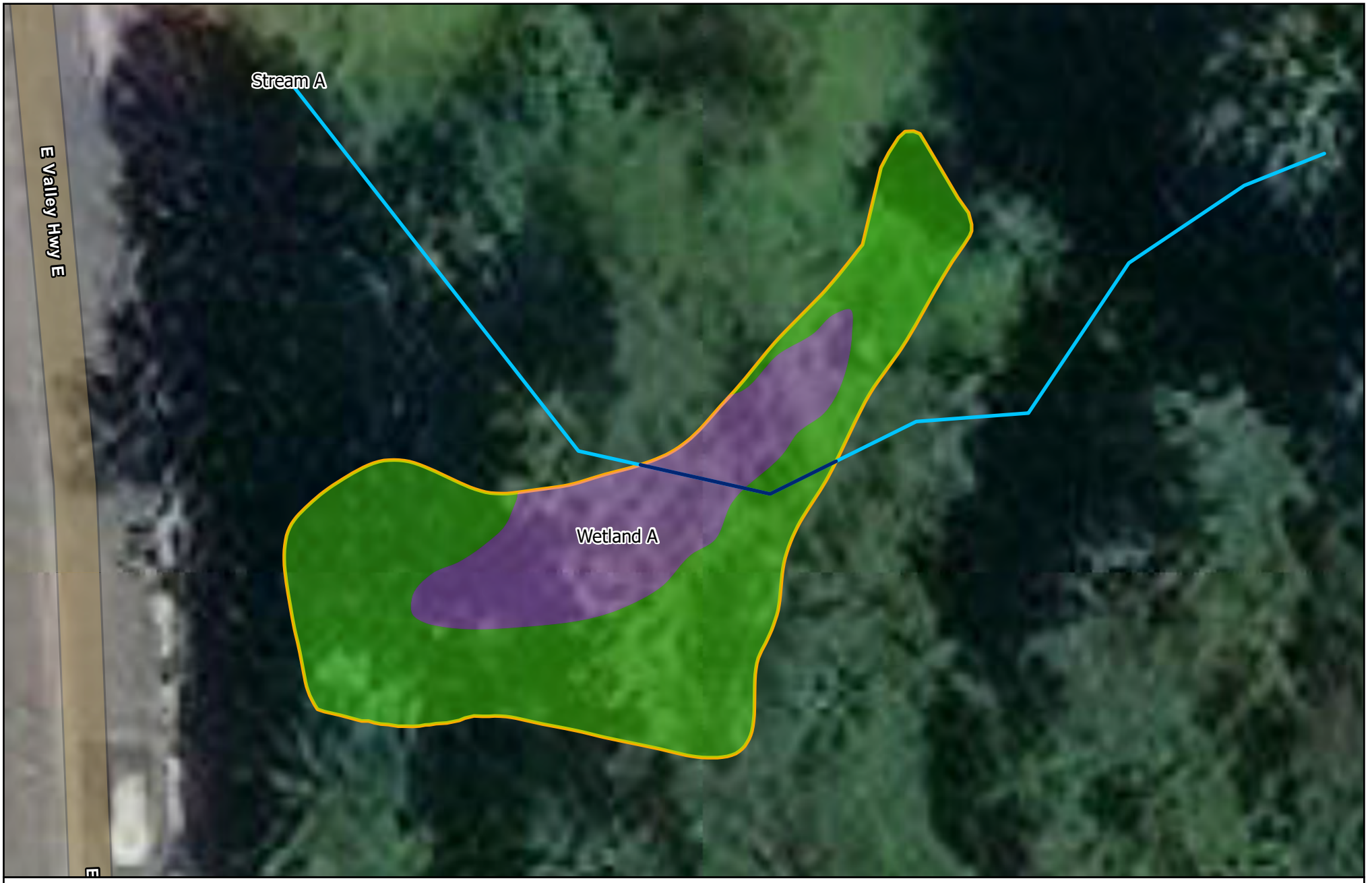
N
W E
S

0 25 50 100
Feet

A1. RATING FIGURES

GREENWATER BESS
BRIGHTNIGHT
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

COWARDIN CLASSES



Legend

- Wetland Boundary (0.11 Acres)
- Delineated Stream

Hydroperiod

- Saturated (0.08 Acres)
- Occasionally Flooded (0.03 Acres)
- Intermittent/Seasonally Flowing Stream (36 Feet)

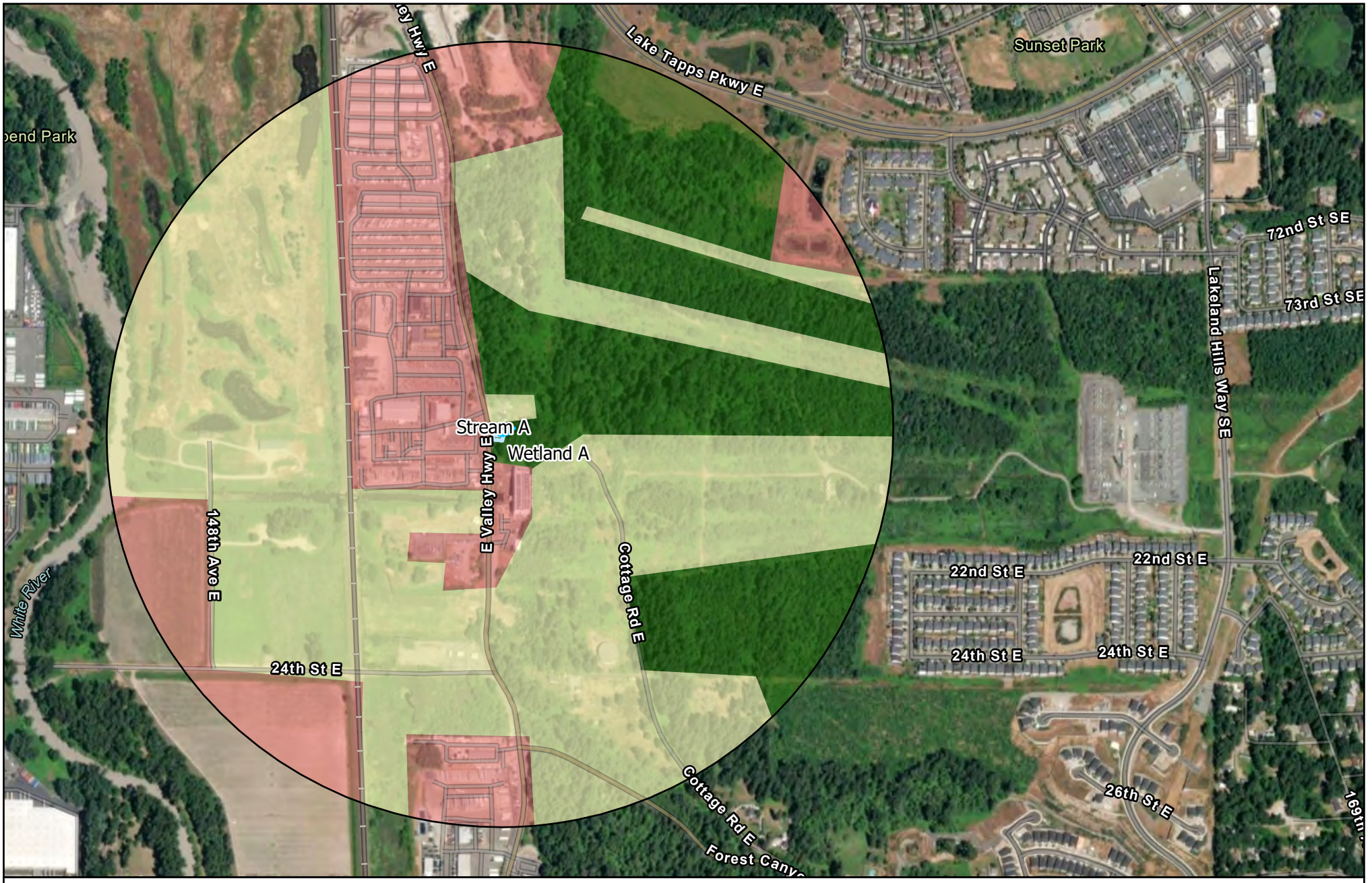
N W E S

0 10 20 40 Feet

A2. RATING FIGURES

GREENWATER BESS
BRIGHTNIGHT
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

HYDROPERIODS



Legend

- Wetland Boundary (0.11 Acres)
- 1 Km Buffer (803 Acres)
- Low/Moderate Intensity (422 Acres)
- High Intensity (192 Acres)

Land Use Intensity

- Undisturbed (189 Acres)

N
W E
S

0 385 770 1,540 Feet

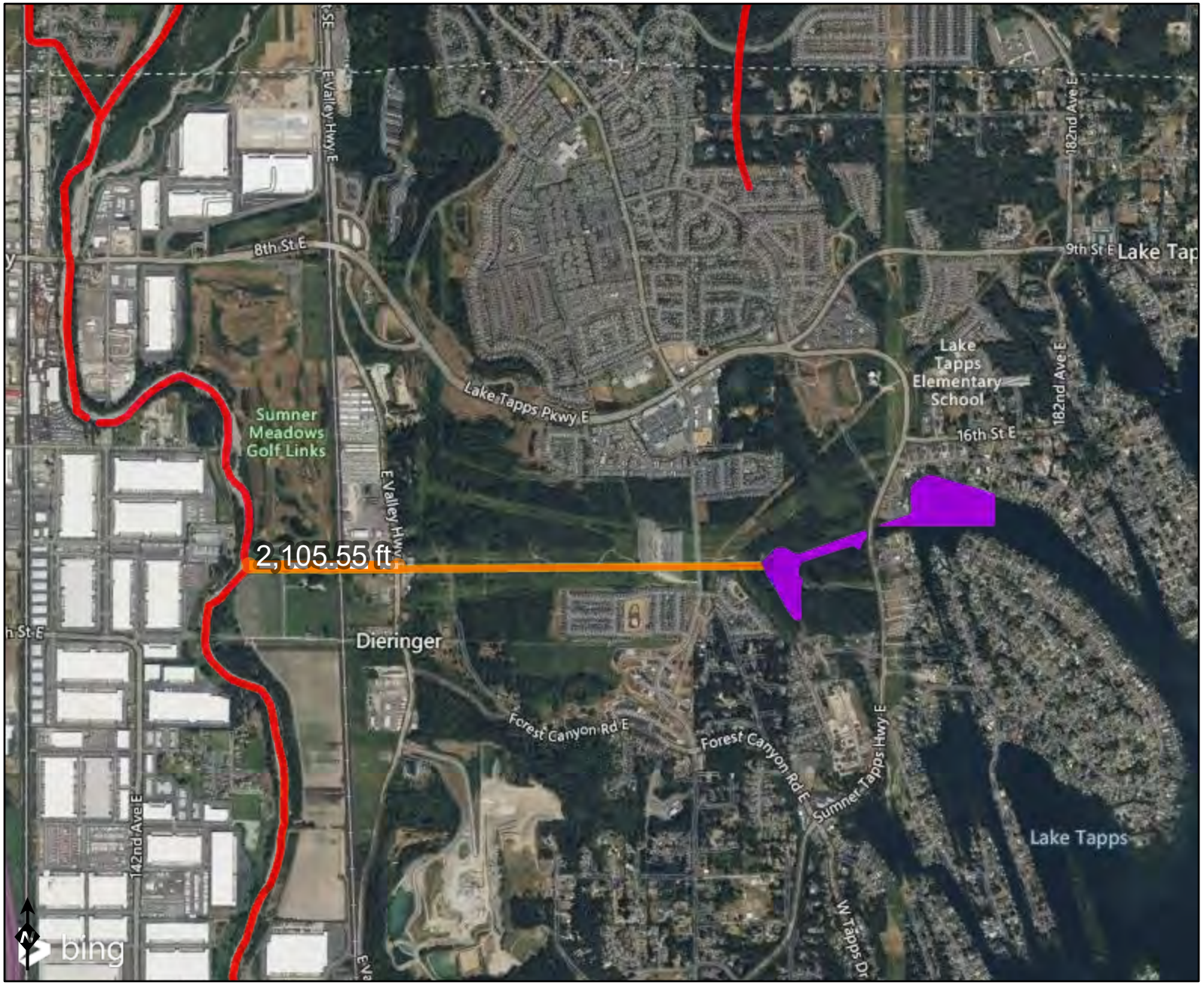
A3. RATING FIGURES

GREENWATER BESS
BRIGHTNIGHT
CITY OF SUMNER AND PIERCE COUNTY, WASHINGTON

ACCESSIBLE HABITAT (1KM BUFFER)

December 18, 2023

A4. Water Quality Map



Assessed Water/Sediment

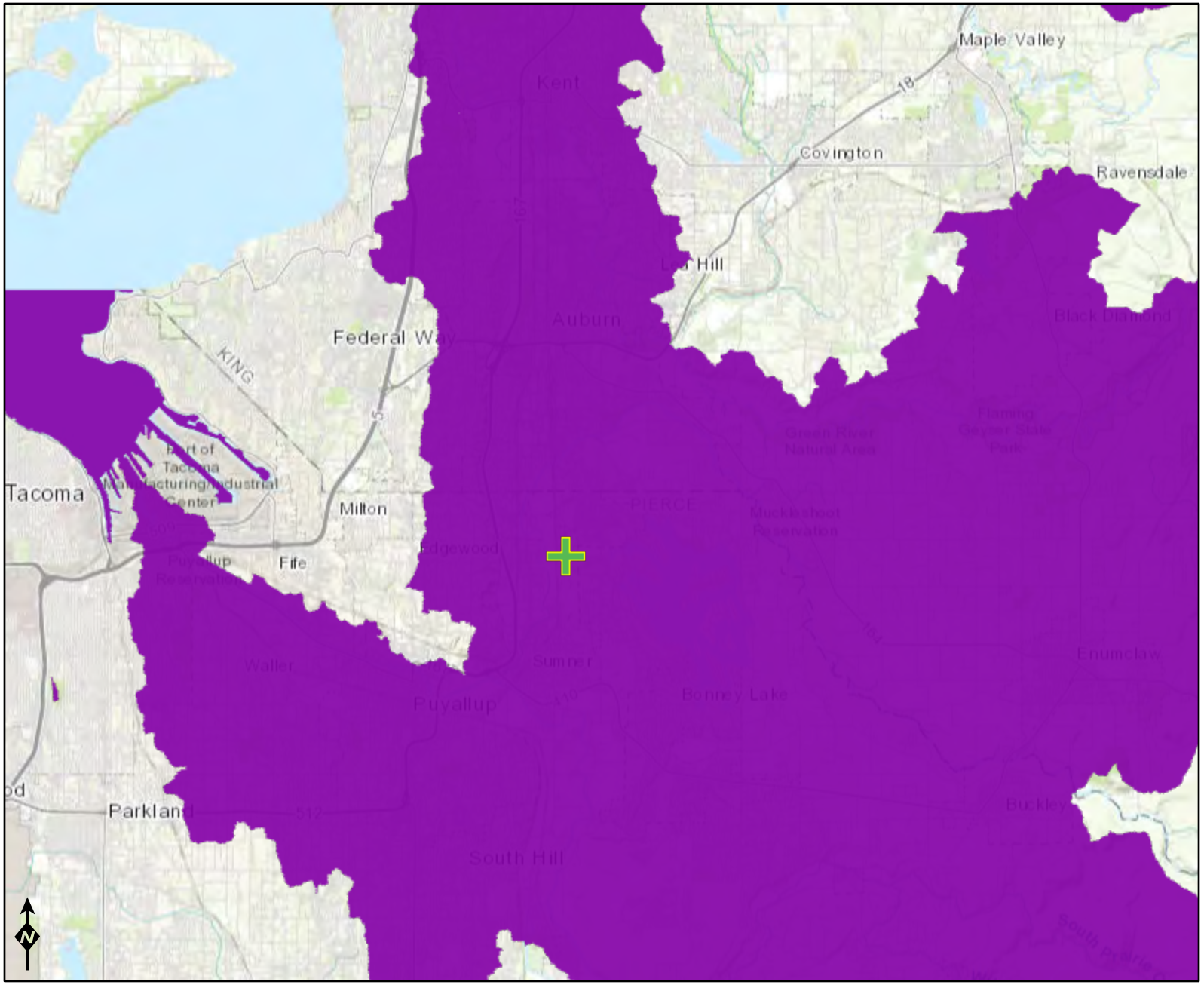
Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Miles
0 0.23 0.45 0.9

December 21, 2023

A5. TMDL Water Quality

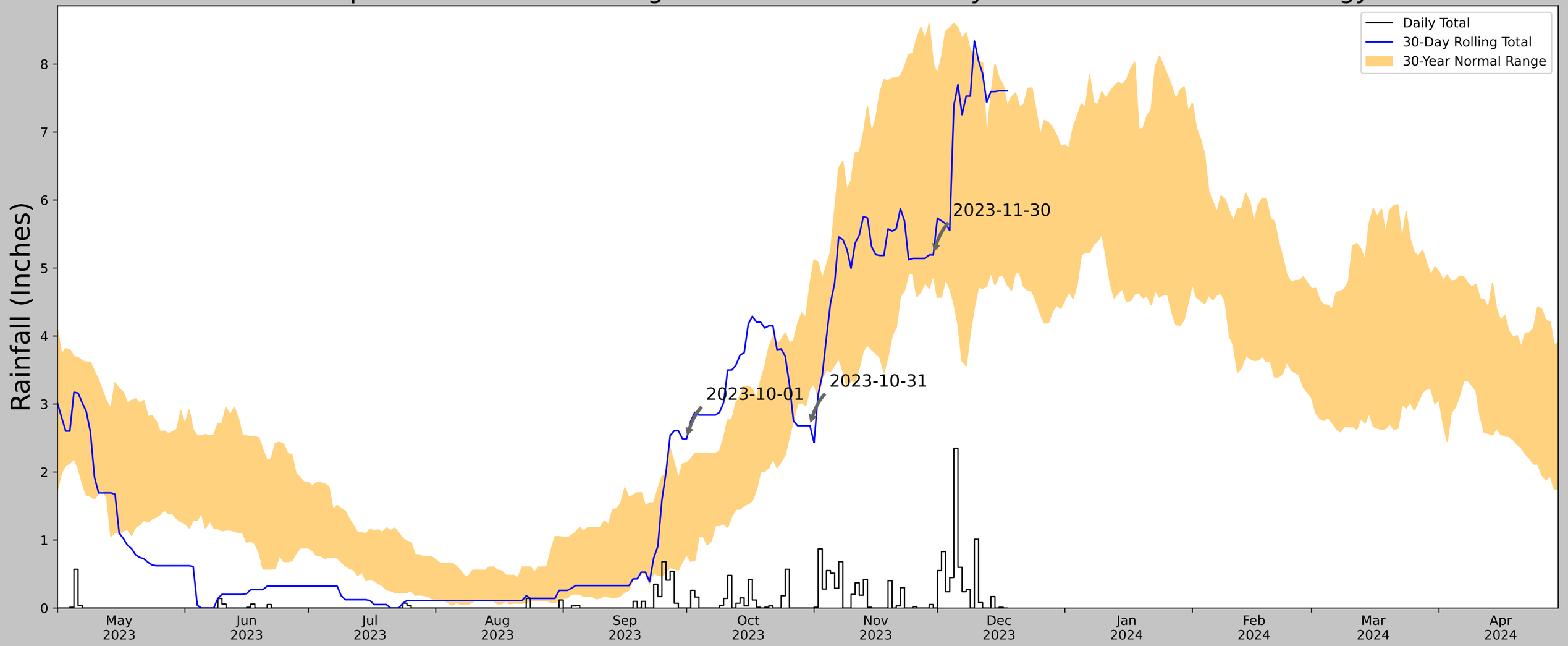


WQ Improvement Projects
- Approved
- In Development

Esri, NASA, NGA, USGS
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Appendix C
Antecedent Precipitation Summary

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	47.2391135, -122.22489570
Observation Date	2023-11-30
Elevation (ft)	70.752
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-11-30	4.900788	8.001181	5.192914	Normal	2	3	6
2023-10-31	3.23937	4.758662	2.681102	Dry	1	2	2
2023-10-01	0.785433	2.131496	2.488189	Wet	3	1	3
Result							Normal Conditions - 11

US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TACOMA #1	47.2472, -122.4122	24.934	8.804	45.818	4.365	10870	68
TACOMA 0.9 NW	47.26, -122.4751	342.848	3.08	317.914	2.365	44	0
TACOMA 1.1 NW	47.2618, -122.4772	337.927	3.211	312.993	2.45	15	21
PUYALLUP 2.1 NW	47.1997, -122.32	32.152	5.43	7.218	2.483	4	0
PUYALLUP 1.1 NNW	47.1954, -122.2955	46.916	6.542	21.982	3.088	93	0
TACOMA 2.9 NNW	47.2876, -122.4941	293.963	4.747	269.029	3.413	6	0
TACOMA 4.4 W	47.2407, -122.5511	104.003	6.531	79.069	3.455	0	1
TACOMA 3.1 NW	47.2867, -122.5025	270.997	5.037	246.063	3.506	7	0
TACOMA NARROWS AP	47.2675, -122.5761	290.026	7.813	265.092	5.587	160	0
KENT	47.4172, -122.2433	28.871	14.161	3.937	6.428	150	0
WAUNA 3 W	47.3725, -122.7028	17.06	16.133	7.874	7.387	3	0