
Permit Application

Teanaway Solar Reserve Conditional Use Permit Application

Submitted to

Kittitas County, Washington

by

Teanaway Solar Reserve, LLC

August 2009



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SECTION 1

Request

Teanaway Solar Reserve, LLC (Applicant) proposes to construct and operate the Teanaway Solar Reserve (project), a solar farm capable of generating up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy. The proposed project area consists of 982 acres within the County's Forest and Range (F-R) zoning district. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area.

The Applicant worked with staff from Kittitas County to determine the applicable land use approvals and permits in addition to the relevant provisions from the *Kittitas County Code* (KCC). This narrative is a component of the application submitted to Kittitas County for a Conditional Use Permit (CUP) necessary to construct and operate the proposed project. The Applicant understands that the following approvals and permits are also required from Kittitas County:

- The Applicant must demonstrate project compliance with the State Environmental Policy Act (SEPA) through a decision rendered by Kittitas County. This application notebook also includes the Applicant's Expanded SEPA Checklist to demonstrate compliance with SEPA.
- The project is subject to compliance with the County's Critical Areas Ordinance (CAO). The CAO is introduced in this narrative (see Section 3), but a thorough demonstration of compliance is included in the Land Use section of the Expanded SEPA Checklist.
- Kittitas County has indicated that the size and complexity of the project generates the need for a Development Agreement (DA) between the Applicant and County. To ensure mitigation consistency and jurisdictional efficiency, the requirement for the DA is expected to be a condition for approval of this CUP, and will condition and govern this CUP. As set forth in the DA, any inconsistencies between the CUP and the DA will be resolved in favor of the DA. A draft DA is included as Attachment E to this CUP application and will also be submitted concurrent with the other application material described above, under separate cover. The SEPA Expanded Checklist is intended to apply to all of Applicant's County proposals triggering SEPA, including this CUP and the DA.

Subsequent sections of this narrative are organized as follows:

- **Section 2, Project Description:** This section provides information about the project in general, including the purpose and need (Section 2.1), proposed schedule (Section 2.2) site setting (Section 2.3), key components (Section 2.4), permits and authorizations (Section 2.5), summary of construction activities and features (Section 2.6), and summary of operations and maintenance activities and features (Section 2.7).
- **Section 3, Compliance with Kittitas County Land Use Regulations:** This section provides specific detail on how the project is consistent with the applicable provisions from the KCC. The section is organized numerically by applicable code.

- **Attachment A:** Contains figures referenced in the text of this narrative.
- **Attachment B:** Contains photographs showing examples of proposed project components.
- **Attachment C:** Contains a table identifying landowners of real property within 500 feet of the proposed project.
- **Attachment D:** Contains a legal description of the proposed project.
- **Attachment E:** Contains the Draft Development Agreement, which will be submitted to the Board of County Commissioners of Kittitas County.

SECTION 2

Project Description

This section provides an overview of the project. Topics addressed are project purpose and need, proposed schedule, site setting, key components, permits and authorizations, summary of construction activities and components, and a summary of operations and maintenance activities and components.

2.1 Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy the power from the project could change over time.

The Applicant proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming a leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors will be analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of environmentally sensitive areas
- Limited visibility from offsite locations

2.2 Project Schedule

The proposed project schedule is outlined in Table 2-1.

TABLE 2-1
Proposed Project Schedule

Task/Milestone	Start	Finish
Obtain Necessary Permits	June 2009	April 1, 2010
Engineering	June 2009	October 2010
Construction	April 1, 2010	As early as October 2011 or as late as December 2012
Initial Operation	Fall 2010	Not applicable

Note: Two to three 7- to 9-month construction seasons are anticipated, from April to as early as October or as late as December in 2010, 2011, and 2012.

2.3 Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (Figure 3), and private roads such as Loping Lane and Weihl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line runs east to west along the southern site boundary (Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line (Figure 5). An interconnection substation with an approximate footprint of 10 acres will be located either on the project site, or within the BPA line right-of-way (Figure 5).

Some structural and residential development has taken place on the site's southern boundary. Figure 4 shows the identified structures within the vicinity of the site boundary. The closest identified residence is approximately 200 feet southeast of the proposed project area.

The site is currently zoned Forest and Range (F-R) (Figure 6). The site was most recently selectively logged in 2001 and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza*

sagittata), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species.

2.4 Key Components

The proposed project will consist of the following key components:

- Solar modules
- Inverter Buildings
- Underground Electrical Conductors
- Substation
- Transmission Line
- Access and Maintenance Roads
- Operations and Maintenance (O&M) Building

Key components are described in the following subsections.

2.4.1 Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. A representative module from Sharp Electronics Corporation is shown in Attachment B, Photo 1. The module measures 1.0 by 1.6 meters (3.3 feet by 5.3 feet) and is rated at 216 watts (Sharp Electronics, 2009). The solar modules are mounted in a fashion that orients the modules toward the sun.

Several mounting types will be considered to best address the slope of land at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure or a pole-mounted tracking system.

A representative single-axis tracking system is presented in Attachment B, Photo 2. The mounting system foundations could consist of precast foundations or embedded posts or poles. The embedment could be done by driving a ground screw, or by boring the ground to a depth of approximately 4 to 6 feet and width of approximately 8 to 10 inches, then backfilling with concrete. For one type of support approach, one post is needed for every five to six solar modules. If the entire 75 MWdc were to be installed with this mounting system, then approximately 70,000 posts would need to be set. About 70 percent of the solar modules for the proposed site will likely use this mounting type, meaning that about 50,000 posts would need to be set (primarily on lands with a south-facing slope). The excavated earth would not be removed from the site.

Another mounting method is to place the solar modules on top of a single pole. The “top of pole mount” system could be installed in areas with a slope facing the southeast. This system consists of a large steel pole that supports the solar module. The pole would attach to a post buried into the ground to a depth of 10 to 15 feet, with a width of 10 to 24 inches. A representative top of pole mount system is shown in Attachment B, Photo 3. The system shown attaches eight solar modules. The most likely configuration is to have between 12 to

20 solar modules mounted on one pole. It is estimated that about 10 percent of the solar installation will be installed using this method, and approximately 3,000 posts will need to be set.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in Attachment B, Photo 4. A dimensioned view is shown in Attachment B, Photo 5, and a cutaway view is shown in Attachment B, Photo 6. It is estimated that 20 percent of the solar installation will be installed using this mounting method.

2.4.2 Inverter Buildings

Up to 40 inverter buildings will be needed for the project. The inverters can be placed outdoors, as shown in Attachment B, Photo 8. While the inverter enclosures are rated for outdoor use, the manufacturer recommends an enclosure to protect the inverters from the elements and extreme temperature changes. An example inverter building includes a concrete pad, and prefabricated facilities are available such as the 2-MW enclosed system offered by Xantrex. Systems similar to the offering from Xantrex enclose four 500-kilowatt (kW) inverters and a 2-MW transformer in a weather-resistant structure measuring 40 feet by 9 feet by 8 feet 6 inches tall. The 2-MW structure shown in Attachment B, Photo 9, is representative of an inverter building that will be used onsite.

2.4.3 Underground Electrical Conductors

Underground electrical conductors will be installed in trenches at a depth in compliance with the Kittitas County (36 inches or greater). Conductors either will be direct burial or in a polyvinylchloride (PVC) conduit.

2.4.4 Substation

The Applicant proposes to construct an electrical substation that will interconnect with the 345-kV BPA transmission line. The substation will require a level, fenced area of approximately 10 acres. The 10-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, and overhead electrical bus work. Its appearance will be similar to that of many other substations throughout the Pacific Northwest.

2.4.5 Transmission Line

A new 345-kV transmission line will be needed to connect the new substation to the existing BPA line. If the substation is located at the BPA right-of-way, this line would be very short. The line would have two circuits, one into the substation and one out of the substation. The construction could be similar to the existing lattice towers, and require a right-of-way of up to 300 feet in width.

2.4.6 Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Loping Lane and Weihl Road are private roads over which the Applicant has easement rights. Loping Lane is subject to several road use and cost-sharing agreements, and the Applicant will be subject to

those agreements. Additionally, the Applicant will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. The project will be served internally by a network of existing and/or new maintenance roads. The existing maintenance roads, along with Wehl Road and Loping Lane, generally consist of gravel and dirt and will be improved pursuant to County requirements. As set forth in the attached DA, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department. Figure 3 shows the location of the access and maintenance roads in relation to the project site.

2.5 Permits and Authorizations

Table 2-2 outlines the permits and authorizations required to construct the proposed project.

TABLE 2-2
Required Permits and Authorizations

Act/Law	Permit/Authorization	Agency/Contact
Section 404 Clean Water Act Compliance	Section 404—Nationwide Permit	U.S. Army Corps of Engineers
Historic Preservation Act Compliance	Section 106 Review	State Historic Preservation Office
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Kittitas County
Clean Water Act—Section 401 Compliance	Water Quality Certification	Washington Department of Ecology
Forest Practices Act	Forest Practices permit	Washington Department of Natural Resources
Land Use Review	Conditional Use Permit	Kittitas County
Land Use Review	Development Agreement	Kittitas County
Land Use Review	Cultural Resources	Kittitas County
Land Use Review	Stormwater	Kittitas County
Land Use Review	Critical Areas Ordinance	Kittitas County

2.6 Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where driveways and modular construction will be undertaken, grading, and establishing temporary staging areas (including stockpile and laydown areas). Site preparation will be limited to staging areas, maintenance roads, O&M facilities, and some extreme portions of the larger site as needed to accommodate a level field for the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter equipment pads, and substation foundation can begin.

2.6.1 Site Clearing and Grading

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as provided below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating the next construction phase of the project (Table 2-1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. The Applicant will obtain a permit from the Washington Department of Natural Resources (WDNR) and contract with a professional forester to harvest these trees in accordance with the permit. Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

2.6.2 Staging Areas

A temporary staging area of approximately 5 acres will be used as a laydown area for parts and materials such as solar crates, electric cable, structural supports, and perhaps a concrete batching facility. The staging area could be located at the intersection of logging roads on the property, as illustrated on Figure 7. Attachment B, Photo 10, shows a typical staging area for a 10-MW solar project. Mobilization of the site will consist of fencing off a 5 acre section of land that will be needed to store materials. Mobilization will also include a temporary facility and staging area for solar module deliveries, and metal racking. Mobilization will last approximately 1 month.

2.6.3 Foundations, Trackers, and Modules

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structure used. One foundation type consists of boring a hole approximately 12 inches wide and 48 inches deep to hold a steel support pipe. The hole is then filled with concrete. A support pier will be required for every 45 square feet of land area, or approximately 1,000 piers per installed MW of solar capacity. Approximately 145 acres of modules will be installed within the 982-acre proposed project area.

A second type of foundation consists of an abovegrade concrete ballast used to support the uplift forces of the solar mounting structure. These ballasts will contain 0.25 to 0.35 cubic yards of concrete per block, and two concrete ballasts will support a small array of solar modules.

Pending final design, the solar module foundations will require site work, potential boring, trucking of materials, and concrete. The number of foundations could be as high as 70,000, and require approximately four thousand truck deliveries.

Installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction seasons (April to December).

2.6.4 Inverter Equipment Pads and Substation Foundation

Electrical equipment will be located onsite in multiple locations. There will be one inverter building (that houses two inverters and one associated transformer) for every approximately 7 acres of solar field. One inverter building will house (2) 500-kW inverters, so there will be one inverter building for every 1 MW of solar field. Approximately 7 acres are needed for a 1-MW solar array. As stated in Section 2.6.3, approximately 145 acres of modules will be installed within the 982 acre proposed project area.

Up to 75 inverter buildings will be needed. The inverter stations will require a concrete pad of approximately 40 by 10 feet. The inverter buildings will be approximately 10 feet tall.

Wiring connecting module arrays to the inverters and the inverters to the substation will need to be run in underground cables (Attachment B, Photos 11, 12, and 13). Trenching is required for the conductors from the inverter buildings to the main substation. Trenching requires removing earth in a section of several feet wide by approximately 2 to 3 feet deep.

The substation will require an area of approximately 10 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small control building, approximately 20 feet wide by 20 feet long, that is enclosed with air conditioning.

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Poles supporting the overhead lines will be required approximately every 750 feet.

Installation of inverter equipment pads and other foundations will occur over a period of approximately 5 to 6 months.

2.6.5 Construction Materials and Equipment

If the project uses above-ground mounting methods with ballasted (concrete) blocks, the amount of concrete required is subject to wind loading and engineering analysis. An estimated 33,000 cubic yards of concrete could be used to create the ballasted footings, equivalent to approximately 3,500 truckloads of concrete. The concrete is expected to be pre-mixed. If a concrete batch plant is necessary for the site, it will only be used for onsite purposes and will be removed when construction is completed. The structural supports and other mounting materials would require an estimated 800 trucks to deliver materials to the site based on vendor estimates. Thus, a total number of truck deliveries to the site would be in the range of 4,300 for deliveries of goods and materials.

The 75 MWdc anticipated to be generated from this project equates to 75,000,000 watts-dc, or 347,222 solar modules of 216 watts-dc each. It is estimated that the project will require up to 450 shipping containers of solar modules.

Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible.

Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

2.6.6 Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 and access Highway 970 by way of County roads such as Red Bridge Road (see Figure 3), and private roads such as Loping Lane and Weihl Road. Road service within the project area will be provided by an existing network of maintenance roads, although new maintenance roads or segments may be necessary. Road improvements will be conducted pursuant to County requirements. Road improvements are further addressed through the attached DA with Kittitas County (see Attachment E). For further discussion of the traffic impacts, please see the Transportation section of the SEPA.

2.6.7 Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers, during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in fabricating the concrete forms and placing the concrete ballasts in the field. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (two to three 7- to 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers are not typically housed onsite, but this is subject to the cost of transportation to the site. Subject to the needs of any security personnel for the project, it is not expected that a significant number of workers will remain onsite and require temporary housing. Security crews will likely consist of up to eight onsite workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

2.6.8 Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire Protection District #7. Further, the project will be bordered by a firebreak no less than 100 feet wide. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

2.6.9 Water Use

Water will be needed for activities such as dust control and module cleaning. The Applicant proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

2.6.10 Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

2.7 Summary of Operations and Maintenance Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

2.7.1 Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with dimensions of roughly 20 feet by 20 feet.

2.7.2 Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required. Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

2.7.3 Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed onsite. A staff of 2 to 4 technicians will perform system monitoring. The staff will work out of the O&M building and make frequent trips to the facility by way of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. The project is also anticipated to require the need for personnel to monitor and secure the site.

2.7.4 Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

2.7.5 Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

2.7.6 Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

2.7.7 Weed Control and Site Reclamation

Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. The Applicant is under a contractual obligation with the landowner to return the site in good condition and, at the landowner's request, to remove any or all of the project's components. Applicant is also contractually bound to reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the site, including the project.

SECTION 3

Compliance with Kittitas County Land Use Regulations

This section demonstrates compliance with the relevant provisions from the KCC. The project is proposed entirely within the Kittitas County F-R zoning district and the applicable review procedure includes approval of a CUP. The relevant provisions from the KCC are reviewed below in numerical order by title and then chapter. The KCC provisions are included in *italics* followed by the Applicant's response (i.e., finding of fact, or "finding").

3.1 Title 17—Zoning

3.1.1 Chapter 17.56—Forest and Range Zone

17.56.020 Uses permitted.

17.56.030 Conditional uses.

Finding: The project is a "Major alternative energy facility" as defined in Section 17.61.010(9) and is an authorized use in the Forest and Range Zone subject to approval of a CUP per Section 17.61.020(4) & (6). Sections 17.61.010(9) and 17.61.020(4) & (6) are reviewed further later in this narrative.

17.56.040 Lot – Minimum size.

The minimum lot size in the Forest and Range Zone shall be:

1. *Twenty acres;*
2. *One-half acre minimum for any lot with an approved platted cluster subdivision, served by public water and sewer;*
3. *Six thousand square feet for lots on existing municipal sewer and water systems.*

Response: The project is proposed on four existing tax parcels. The smallest parcel is 22 acres and exceeds the 20-acre minimum. The project does not include a request for approval of a subdivision or municipal sewer and water, and criteria 2 and 3 are not applicable. Therefore, the project complies with these criteria.

17.56.050 Lot – width.

1. *No parcel created after the adoption of the ordinance codified in this chapter shall have a length-width dimension less than five hundred feet unless the parcel is approved under provisions established in Section 17.56.040 (2) and (3).*
2. *No platted parcel shall have dimensions in excess of a 4:1 length by width ratio.*

Finding: The proposed project does not include the creation of any new parcels nor does it modify the boundaries of existing lots. Therefore, the project complies with these criteria.

17.56.060 Yard –requirements.

1. *Front Yard.* There shall be a minimum front yard of twenty-five feet.
2. *Side Yard.* Side yard shall be ten feet, except on corner lots which shall have a fifteen-foot side yard.
3. *Rear Yard.* There shall be a rear yard with a minimum depth of ten feet to the main building.

Finding: The proposed project will not include any buildings or improvements within 25 feet of a property boundary. The Applicant will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Therefore, the project complies with these criteria.

17.56.065 Yard requirements – Zones Adjacent to Commercial Forrest Zone

Properties bordering or adjacent to the Commercial Forest zone are subject to a 200' setback from the Commercial Forest Zone. (KCC 17.57.050(1)). For properties where such setback isn't feasible, development shall comply with Kittitas County Code 17.57.050(2).

Finding: The northernmost extent of the proposed project boundary is directly adjacent to an area encompassed by the Commercial Forest (CF) zone. To achieve 75 dcMW of generating capacity, use of the entire area within the project boundary may be required, including the area within 200 feet of the adjacent CF zone. The closest structure is a PV array, which is located 104 feet from the adjacent CF property boundary. Assuming the 200 feet setback applies to the project, the Applicant will seek a modification to this dimensional standard as set forth in Section 5.3 of the DA, which is attached in draft to this CUP and submitted to the County under a separate cover.

17.56.070 Structure height

No structure shall exceed two and one-half stories or thirty-five feet in height, whichever is greater. This limit does not apply to agricultural buildings.

Finding: The solar modules and associated structures currently proposed for the project will be less than 2 1/2 stories or 35 feet in height. The solar modules will be approximately 14 feet in height, inverter buildings 12 feet, switchgear structures 10 feet, substation 14 feet, and storage/O&M building 24 feet.

A new 345-kV transmission line may be needed to connect the proposed substation to the existing BPA line, if the substation is not located at the BPA right-of-way. The construction could be similar to the existing lattice towers for the BPA line, which are approximately 150 feet tall. A maximum of five towers would be needed for the 3,000-foot-long line. The line would be constructed at the lowest elevation on the site to minimize its visibility. A modification to 17.56.070 may be needed to address the height of the transmission line towers. More detailed information regarding this modification can be found in the DA (Attachment E).

Although potentially necessary as an accessory use for the project (if the substation is not located at the BPA right-of-way), the 345-kV transmission line is likely considered a "Special utility" as defined in the KCC (see Section 17.61.010(2)(b)). The substation is also likely considered a "special utility" under the KCC (see Section 17.61.010(2)(c)). Special utilities may be authorized as a conditional use in all zoning districts per KCC Section 17.61.020(6),

and subject to the additional review criteria of KCC 17.61.030. Thus, the potential for this transmission line and substation can be processed as part of the CUP for the overall project and the project will comply with the structure height criterion.

17.56.080 Setbacks

The following setbacks shall be enforced for residential and accessory buildings constructed or placed on shorelines or floodplains under the jurisdiction of the Washington State Shoreline Management Act:

1. *One hundred feet (measured horizontally) from the ordinary high water mark or line of vegetation for lots abutting such waterways;*
2. *One hundred feet (measured horizontally) from the ordinary high water mark of line of vegetation for lots fronting on reservoirs including Keechelus, Cle Elum, Kachess, and Easton Lakes and Wanapum reservoir.*

Finding: The proposed project site and adjacent areas do not include shorelines or floodplains under the jurisdiction of the Washington State Shoreline Management Act. In addition, the proposed project does not include any residential structures. The proposed buildings for operation and maintenance activities will not be anywhere near a regulated shoreline or floodplain. Therefore, the project complies with these criteria.

3.1.2 Chapter 17.60A—Conditional Uses

17.60A.010 Review Criteria

The Board of Adjustment, upon receiving a properly filed application or petition, may permit and authorize a conditional use when the following requirements have been met:

1. *The Board of Adjustment shall determine that the proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood.*

Finding: The proposed project is desirable to the public convenience. The Applicant proposes to develop the project site so that solar energy potential is maximized, in accordance with the commitment to establishing a leading sustainable energy production location in North America. The Applicant is committed to energy production and environmentally sensitive development and management of its solar production site.

The project is desirable as it will have the capacity to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, RCW Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter. Therefore, the project will provide a clean energy source and assist utilities in achieving the Renewable Electricity Standard.

Construction and operation of the project is desirable as it will benefit the local and regional economies. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (two to three 7- to 9-month construction seasons). The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million. Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits. Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. For a more detailed analysis of the economic benefits provided by the construction and operation of the proposed project, please see the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington*, which has been prepared at the County's request.

The project will not be injurious to the public health, peace, or safety or to the character of the surrounding neighborhood. The Applicant is in the process of applying for all necessary approvals and permits from federal and state agencies. The proposal involves a clean energy source without emissions to air or water for the life of the project.

The solar modules do not present a health or safety hazard. Contact with the modules will not lead to electrocution or contamination. No combustible materials will be used except for fuel and oil used in construction equipment. The project will be constructed in accordance with applicable federal, state and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures would be implemented to reduce the risk of hazards and accidents. The project is proposed in a rural area with a limited existing neighborhood character and a limited number of surrounding residences. In addition, it is being designed and sited to minimize its visibility from all surrounding areas and will not result in any noise or odors.

For the reasons stated above, the project complies with this criterion.

2. *The Board of Adjustment shall determine that the proposed use at the proposed location will not be unreasonably detrimental to the economic welfare of the county and that it will not create excessive public cost for facilities and services by finding that (1) it will be adequately serviced by existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers, and schools; or (2) that the applicant shall provide such facilities or (3) demonstrate that the proposed use will be of sufficient economic benefit to offset additional public costs or economic detriment.*

Finding: The proposed project will not be unreasonably detrimental to the economic welfare of the county and will not create excessive public cost for facilities and services for the following reasons:

- Construction and operation of the project is desirable as it will benefit the local and regional economies. Construction will employ 150 to 250 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million.

- Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits.
- Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. Fifty (50) percent of the onsite peak construction workforce of 450 is assumed to be from the local labor market (within Kittitas County) while the remaining 50 percent, or 225 peak period workers could come from outside the County and are assumed to relocate to Kittitas County for the duration of the construction period or phase.
- The Applicant assumes that in general the project will be adequately served by existing facilities, as discussed below, and the economic benefits summarized above and in the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* are adequate to offset any minor public costs. However, the Applicant also understands that specific negotiations occur through the process of generating the DA.

The project's use of existing facilities is summarized as follows:

Highways and Roads. The site will be accessible via Kittitas County and private roads that interconnect with Highway 970 (see Figure 3). The major County access road is Red Bridge Road. Loping Lane and Wehl Road are private roads over which the Applicant has easement rights. Loping Lane is subject to several road use and cost sharing agreements, and Applicant will be subject to those agreements. The Applicant will additionally work with neighbors who use Loping Lane to identify improvements that will minimize disruption to their use during construction and to the roadway itself. The project will be internally served by a network of existing and/or new maintenance roads. These maintenance roads, along with Wehl Road and Loping Lane, consist of gravel and dirt and may need improvements pursuant to County requirements. As set forth in attached Draft DA, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department. Figure 3 shows the location of the maintenance and access roads in relation to the project site.

Police Protection. Police protection of the project area is provided by the County's Sheriff's Office. The project will include periodic visits by security staff. As a result of proposed project security measures and personnel, it is not anticipated that the project will generate any new demand for police services. The construction contractor will notify the police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, the Applicant will contact police services in the event of an emergency.

Fire Protection. The project area is currently subject to the fire suppression services of the Washington Department of Natural Services. Should project construction require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression services are in place during project construction and ongoing operations. The construction contractor will notify the fire protection services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, the Applicant will contact fire protection services in the event of an emergency.

The project will be constructed in accordance with applicable federal, state, and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures will be implemented to reduce the risk of hazards and accidents. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Irrigation and Drainage. The project will be adequately served by existing drainage. The project will maximize existing pervious surface on the site by maintaining natural ground cover wherever possible including areas under solar modules. In addition, the Applicant will maintain existing contours whenever possible during grading and site preparation. Therefore, site runoff and drainage will remain largely unchanged. During construction, the Applicant will implement Best Management Practices (BMPs) to minimize erosion and sediment release.

Refuse. Construction workers will be directed to dispose of all refuse in defined containers. Following construction, the only refuse generated by the project will be from the two to four O&M staff. This limited refuse will be disposed of as required by the County.

Water and Sewers. The need for water rights is not anticipated. The Applicant proposes to truck in water from the Cle Elum area or elsewhere as necessary for activities such as dust control during construction and module cleaning for operation.

The need for sewer services is not anticipated. Portable toilets will be placed onsite during construction and as necessary during operation. Service visits to the onsite toilets will occur on a regular basis.

Schools. The project will not be unreasonably detrimental or cause an increased burden on local school resources. It is unlikely that any school age children will move to the surrounding area due to the proposed project.

17.60A.020 Conditions

- 1. In permitting such uses the board of adjustments may impose in addition to the regulations specified herein, such conditions as it deems necessary to protect the best interests of the surrounding property or neighborhood or the county as a whole.*
- 2. Uses subject to conditions which exist in an R or S zone on the effective date of the ordinance codified herein shall not be changed, expanded nor structures used in connection therewith altered without first applying to the board of adjustment for review and under provisions of this chapter.*
- 3. Any change, enlargement or alternation in such use shall require a review by the board of adjustment and new conditions may be imposed where finding requires.*

Finding: The Applicant understands the criteria listed under KCC 17.60A.020. To ensure mitigation consistency and jurisdictional efficiency, Applicant further intends this CUP to be conditioned and governed by the attached Draft DA once it is approved by the County (per KCC Chapter 15A.11).

3.1.3 Chapter 17.61—Utilities

17.61.010 Definitions.

2. “Special utility” or “special utilities” shall mean the following:

- b. Electrical transmission lines exceeding 115,000 volts
- c. Electrical substations

Finding: The proposed project will include a new 345-kV transmission line and a substation. The transmission line will connect the new substation to the existing BPA line. If the substation is located at the BPA right-of-way, this line would be very short. The line would have two circuits, one into the substation and one out of the substation. The construction could be similar to the existing lattice towers, and require a right-of-way of up to 300 feet in width. Therefore, both the transmission line and substation are considered “special utilities” per the KCC.

9. “Major alternative energy facility” means a hydroelectric plant, solar farm, or wind farm that is not a minor alternative energy facility.

11. “Minor alternative energy facility” or “minor alternative energy system” means a fuel cell or a facility for the production of electrical energy that:

- a.
 - i. Uses as its fuel either solar, wind, or hydropower;
 - ii. Is located on the power beneficiary’s premises;
 - iii. Is intended primarily to offset part or all of the beneficiary’s requirements for electricity;
 - and
 - iv. Is secondary to the beneficiary’s use of the premises for other lawful purpose(s)

Finding: The proposed project is a major alternative energy facility. It does not qualify as a minor alternative energy facility because the production of electrical energy is not intended to primarily offset part of all of the beneficiary’s requirements for electricity per KCC Section 17.61.010(11)(a)(iii). Instead, the solar energy will be distributed to the existing electrical grid.

17.61.020 Permitted and conditional uses.

4. Major alternative energy facilities may be authorized in the Agriculture-20, forest and range, commercial agriculture, and commercial forest zone as follows:

- b. All other major alternative energy facilities may be authorized by the board of adjustments as a conditional use.

Finding: The Applicant understands this provision and requests approval of a CUP for the proposed project from the board of adjustments.

17.61.030 Review criteria – Special utilities and associated facilities.

1. The board of adjustment shall determine that adequate measures have been undertaken by the proponent of the special utility and/or associated facility to reduce the risk of accidents caused by hazardous materials.

The proposed project will include a transmission line and substation. The risk of exposure to hazardous materials will be minimal. The transmission line will contain no hazardous materials. The substation will contain oil-filled equipment; however, proper spill clean-up kits will be available. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

2. The board of adjustment, as required by existing statutes, shall determine that the proposed special utility and/or associated facilities are essential and desirable to the public convenience and/or not detrimental or injurious to the public health or safety, or to the character of the surrounding neighborhood.

The proposed project is desirable to the public convenience. The Applicant proposes to develop the project site so that solar energy potential is maximized, in accordance with the commitment to establishing a leading sustainable energy production location in North America. The Applicant is committed to energy production and environmentally sensitive development and management of its solar production site.

The project is desirable as it will have the capacity to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, RCW Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter. Therefore, the project will provide a clean energy source and assist utilities in achieving the Renewable Electricity Standard.

Construction and operation of the project is desirable as it will benefit the local and regional economies. Construction will employ 150 to 250 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million. Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits. Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. For a more detailed analysis of the economic benefits provided by the construction and operation of the proposed project, please see the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington*, which has been prepared at the County's request.

The project will not be injurious to the public health, peace, or safety or to the character of the surrounding neighborhood. The Applicant is in the process of applying for all necessary approvals and permits from federal and state agencies. The proposal involves a clean energy source without emissions to air or water for the life of the project.

The solar modules do not present a health or safety hazard. Contact with the modules will not lead to electrocution or contamination. No combustible materials will be used except for fuel and oil used in construction equipment. The project will be constructed in accordance with applicable federal, state and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures would be implemented to reduce the risk of hazards and accidents. The project is proposed in a rural area with a limited existing neighborhood character and a limited number of surrounding residences. In addition, it is being designed and sited to minimize its visibility from all surrounding areas and will not result in any noise or odors.

For the reasons stated above, the project complies with this criterion.

3. The board of adjustment shall determine that the proposed special utility and/or associated facilities will not be unreasonably detrimental to the economic welfare of the county and /or it will not create excessive public cost for the public services by finding that:

a. It will be adequately serviced by existing services such as highways, roads, police and fire protection, emergency response, and drainage structures, refuse disposal, water and sewers, and schools; or

b. The applicant shall provide such services or facilities.

Finding: The proposed project will not be unreasonably detrimental to the economic welfare of the county and will not create excessive public cost for facilities and services for the following reasons:

- Construction and operation of the project is desirable as it will benefit the local and regional economies. Construction will employ 150 to 250 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million.
- Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits.
- Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. Fifty (50) percent of the onsite peak construction workforce of 450 is assumed to be from the local labor market (within Kittitas County) while the remaining 50 percent, or 225 peak period workers could come from outside the County and are assumed to relocate to Kittitas County for the duration of the construction period or phase.
- The Applicant assumes that in general the project will be adequately served by existing facilities, as discussed below, and the economic benefits summarized above and in the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* are adequate to offset any minor public costs. However, the Applicant also understands that specific negotiations occur through the process of generating the DA.

The project's use of existing facilities is summarized as follows:

Highways and Roads. The site will be accessible via Kittitas County and private roads that interconnect with Highway 970 (see Figure 3). The major County access road is Red Bridge Road. Loping Lane and Wehl Road are private roads over which the Applicant has easement rights. Loping Lane is subject to several road use and cost sharing agreements, and Applicant will be subject to those agreements. The Applicant will additionally work with neighbors who use Loping Lane to identify improvements that will minimize disruption to their use during construction and to the roadway itself. The project will be internally served by a network of existing and/or new maintenance roads. These maintenance roads, along with Wehl Road and Loping Lane, consist of gravel and dirt and may need improvements pursuant to County requirements. As set forth in attached Draft DA, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department. Figure 3 shows the location of the maintenance and access roads in relation to the project site.

Police Protection. The project will include periodic visits by security staff. As a result of proposed project security measures and personnel, it is not anticipated that the project will generate any new demand for police services.

Fire Protection. The fire protection needs of the site are currently served by WDNR. After the project is constructed, it will be served by the Kittitas County Fire Protection District #7. Further, the project will be bordered by a firebreak no less than 100 feet wide. The project will be constructed in accordance with applicable federal, state, and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures will be implemented to reduce the risk of hazards and accidents. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Irrigation and Drainage. The project will be adequately served by existing drainage. The project will maximize existing pervious surface on the site by maintaining natural ground cover wherever possible including areas under solar modules. In addition, the Applicant will maintain existing contours whenever possible during grading and site preparation. Therefore, site runoff and drainage will remain largely unchanged. During construction, the Applicant will implement Best Management Practices (BMPs) to minimize erosion and sediment release.

Refuse. Construction workers will be directed to dispose of all refuse in defined containers. Following construction, the only refuse generated by the project will be from the two to four O&M staff. This limited refuse will be disposed of as required by the County.

Water and Sewers. The need for water rights is not anticipated. The Applicant proposes to truck in water from the Cle Elum area or elsewhere as necessary for activities such as dust control during construction and module cleaning for operation.

The need for sewer services is not anticipated. Portable toilets will be placed onsite during construction and as necessary during operation. Service visits to the onsite toilets will occur on a regular basis.

Schools. The project will not be unreasonably detrimental or cause an increased burden on local school resources. It is unlikely that any school age children will move to the surrounding area due to the proposed project.

4. Special utilizes and/or associated facilities as defined by this chapter shall use public rights-of-way or established utility corridors when reasonable. Although Kittitas County may map utility corridors, it is recognized and reaffirmed that the use of such corridors is subject to conditional use and approval and just compensation to the landowner for the use of such corridor. While a utility corridor may be used for more than one utility or purpose, each utility or use should be negotiated with the landowner as a separate easement, right-of-way, or other agreement, or other arrangement between the landowner and all owners of interests in the property. Any county map which shows utility corridors shall designate such corridors as "private land closed to trespass and public use" where such corridors are on private land. Nothing in this paragraph is intended to conflict with the right of eminent domain.

Finding: The Applicant understands the criteria listed under KCC 17.61.030(4) and intends to comply with this provision.

5. The board of adjustment shall consider industry standards, available technology, and proposed design technology for special utilities and associated facilities in promulgating conditions of approval.

Finding: The Applicant understands the criteria listed under KCC 17.61.030(5) and intends to comply with this provision. Current industry standards and technology will be utilized in the design and implementation of the proposed project.

6. The construction and installation of utilities and special utilities may necessitate the importation of fill material which may result in the displacement of native material. The incidental generation of earthen spoils resulting from the construction and/or installment of a utility or special utility, and the removal said material from the development site shall not require a separate zoning conditional use permit.

Finding: The Applicant understands the criteria listed under KCC 17.61.030(6) and intends to comply with this provision.

7. The operation of some utilities and special utilities identified within this chapter may necessitate unusual parcel configurations and/or parcel sizes.

Finding: The Applicant understands the criteria listed under KCC 17.61.030(7) and does not seek to reconfigure or resize any parcels. The proposed project will be located on land leased from the property owner. Therefore, this criterion does not apply.

3.2 Title 17A—Critical Areas

3.2.1 Chapter 17A.02—Critical Areas Ordinance Definitions

17A.02.060 Critical areas.

“Critical areas” are (1) wetlands; (2) areas with a critical recharging effect on aquifers used for potable water; (3) fish and wildlife habitat conservation areas; (4) frequently flooded area; and (5) geologically hazardous areas.

Finding: The Applicant understands the critical areas definition. All five critical areas are discussed in the Land Use section of the Expanded SEPA Checklist. The proposed project site does not include any of the critical areas defined in KCC Section 17A.02.060 except for wetlands.

3.2.2 Chapter 17.A.03—Critical Areas Administration

17A.03.015 Land use activities to which this chapter applies.

1. *The following land use activities shall be subject to and coordinated with the requirements of this chapter:*
 - a. *Any activity which is not exempt from a threshold determination under the State Environmental Policy Act, as subject to the threshold exemptions established by the county SEPA ordinance;*
 - b. *Any activity which requires approval through a public hearing process under the county ordinance;*
 - k. *Conversion of forest land to nonforest land uses.*

Finding: The Applicant understands that the proposed project fits under the provisions listed above. Therefore, the Critical Areas Ordinance applies as part of the proposed project review and approval.

17A.03035 Critical area checklist and required information.

An applicant is required to submit a checklist of critical area information before commencement of all land use activities which are subject to this chapter. This information shall be used in processing all other site related development permits and approvals. Development may be required to be modified or may be conditioned to meet the requirements of this chapter. The checklist shall contain the following information:

1. *Legal description of the land, and assessor’s parcel number.*

Finding: The legal description of the land is located in Attachment D to this CUP application. The assessor’s parcel numbers are as follows: 20-16-22000-0001, 20-16-23000-0002, 20-16-22000-0002, 20-16-27000-00025, and 20-16-27000-0009.

2. *As defined herein, the location of the following, if applicable:*
 - a. *Wetlands;*
 - b. *Erosion hazard areas;*
 - c. *Floodplains and floodways;*
 - d. *Riparian habitat;*
 - e. *Geologically hazardous areas;*
 - f. *Landslide hazard areas;*
 - g. *Mine hazard areas;*
 - h. *Seismic hazard areas;*
 - i. *Streams and rivers*

Finding: The proposed project site contains wetlands, riparian areas, streams, and erosion hazards. Impacts to riparian areas, streams, and erosion prone soils will be avoided through project design. Minimal impacts to wetlands will occur. See the Land Use section of the Expanded SEPA Checklist for additional discussion.

3. *Any voluntary methods or activities anticipated by the applicant pertaining to critical areas, including incentives being offered by local or state government.*

Finding: The Applicant has coordinated with all applicable local and state agencies. The Applicant will comply with all associated regulations and apply for all applicable licenses and permits.

4. *Duplicate plans drawn to scale showing the nature, location, dimensions and elevations of the area in question, including existing or proposed structures, estimated amounts of fill material, drainage facilities, significant natural features, and the location of the above items, if applicable. Survey quality documents will not normally be required.*

Finding: Plans showing the nature, location, dimensions, and elevations of the area in question are contained in Attachment A to this CUP application.

5. *The requirement for delineating the location of possible critical areas will be waived if field investigation by county staff indicates the following:*
 - a. *Sufficient information exists for staff to estimate the boundaries of any critical areas without a delineation by the applicant; or*
 - b. *No structures and uses, except for exempt activities, are proposed to be located within the possible critical areas.*
6. *Subject to field investigation by county staff, or other reliable and relevant information, the information submitted by the applicant shall be presumed valid for all purposes under this chapter.*

Finding: The Applicant conducted significant research and field surveys for critical areas located within or directly adjacent to the project site (Attachment A, Figure 5). The Land Use section of the Expanded SEPA Checklist provides additional discussion of critical areas and the various technical reports attached to the SEPA Checklist demonstrate the research and field surveys. The wetlands located within the proposed project area have been delineated by professional wetland scientists. A full description of the wetland boundaries will be included in the Joint Aquatic Resources Permit Application (JARPA).

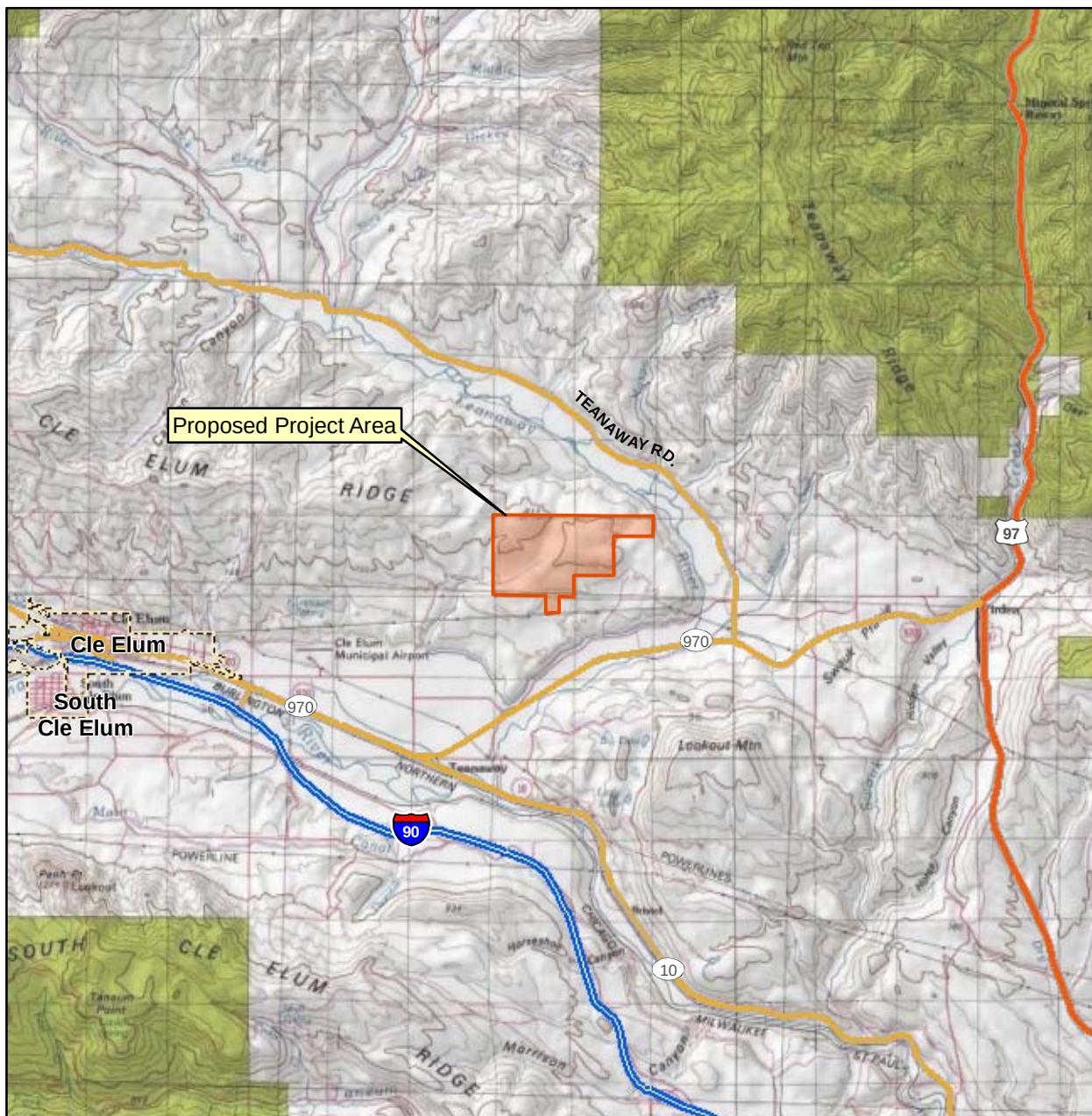
17A.03.045 Coordination with the State Environmental Policy Act and other concurrent permitting.

The director shall coordinate application of the critical areas ordinance with any required SEPA review and the processing of any other associated permits. Any required critical areas mitigation shall be separate from SEPA conditions imposed as part of a threshold determination. The objective is to provide a concurrent, coordinated, and consistent review of development activities within critical areas, without creating another regulatory review or appeal process.

Finding: The Applicant understands this criterion. A detailed discussion of critical areas is provided in the Land Use section of the Expanded SEPA Checklist.

ATTACHMENT A

Figures Referenced in Text



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

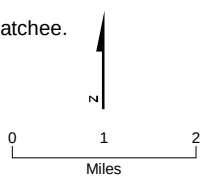
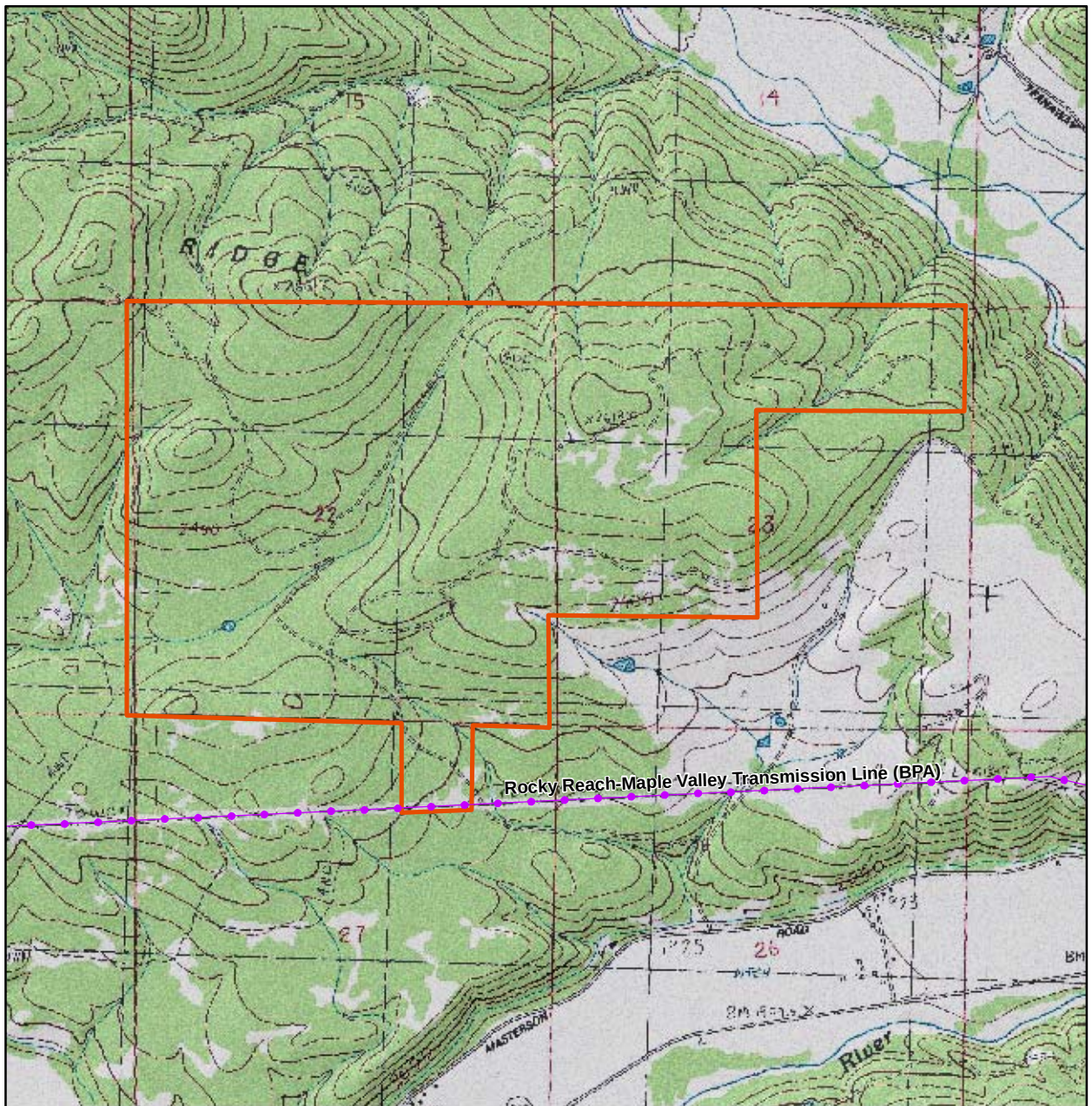


FIGURE 1
Vicinity Map

Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Existing BPA Transmission Line
- Proposed Project Area

Note:

1. USGS 24K Quadrangle: Teanaway.

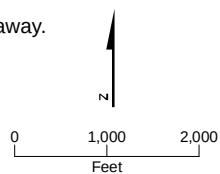
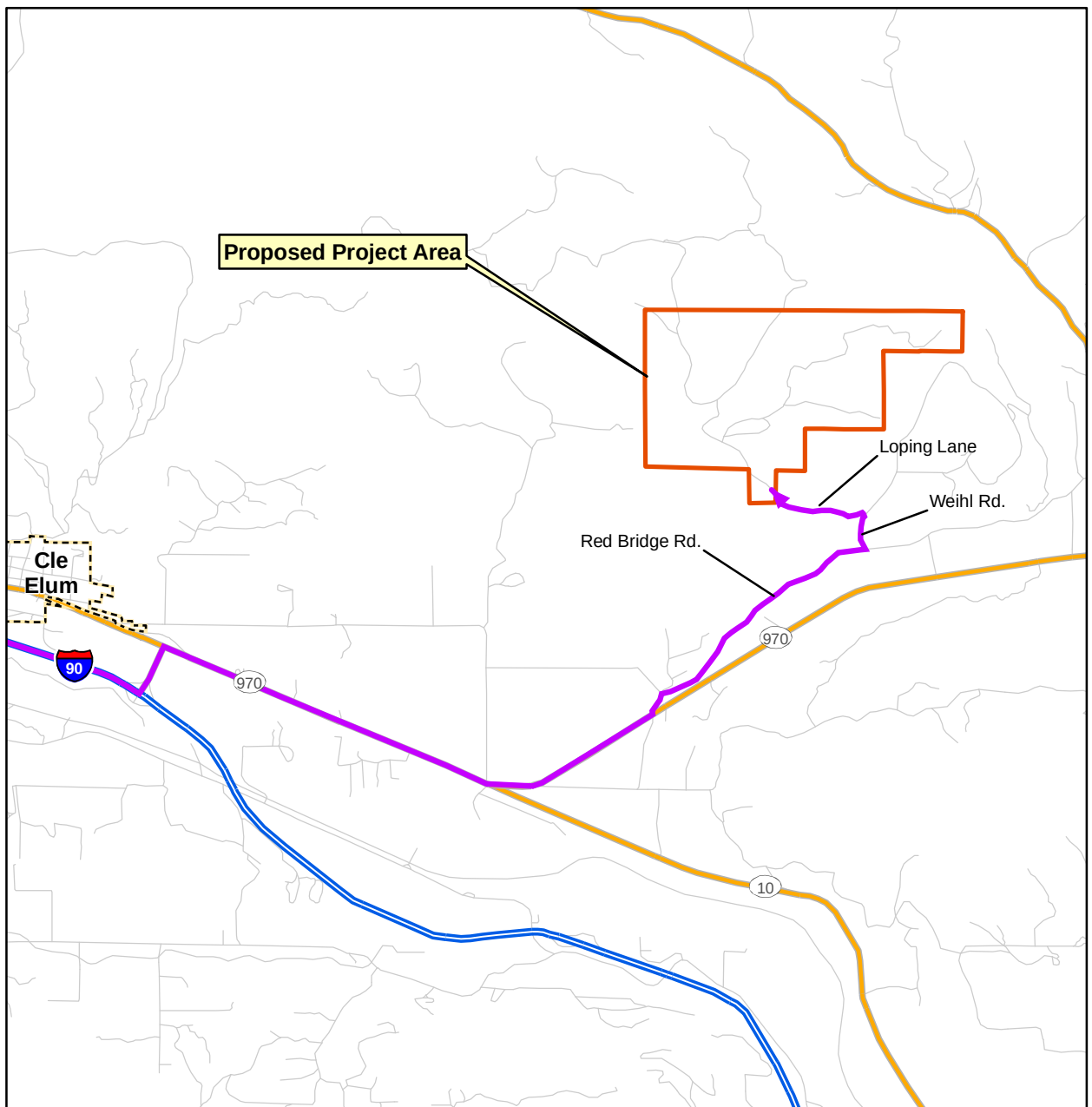


FIGURE 2
U.S. Geological Survey Topographic Map
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Proposed Project Area
- Site Access Route
- City Boundary
- Interstate
- Highway
- Major Road
- Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

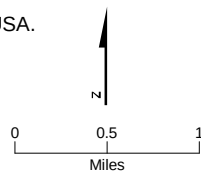
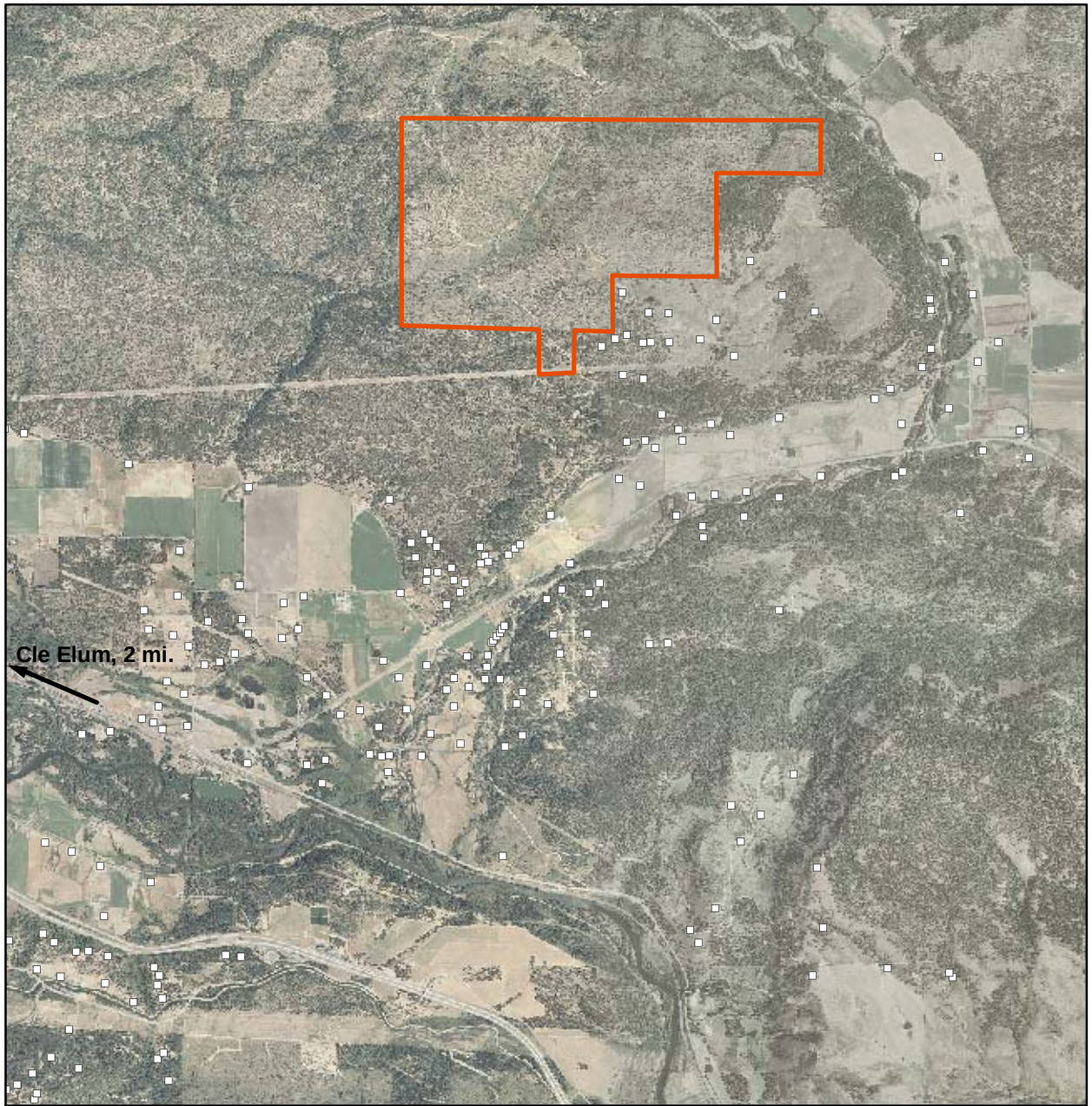


FIGURE 3
Site Access Map
 Teanaway Solar Reserve
 Kittitas County, Washington

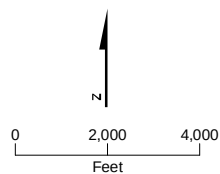


LEGEND

-  Proposed Project Area
-  Identified Structure

Notes:

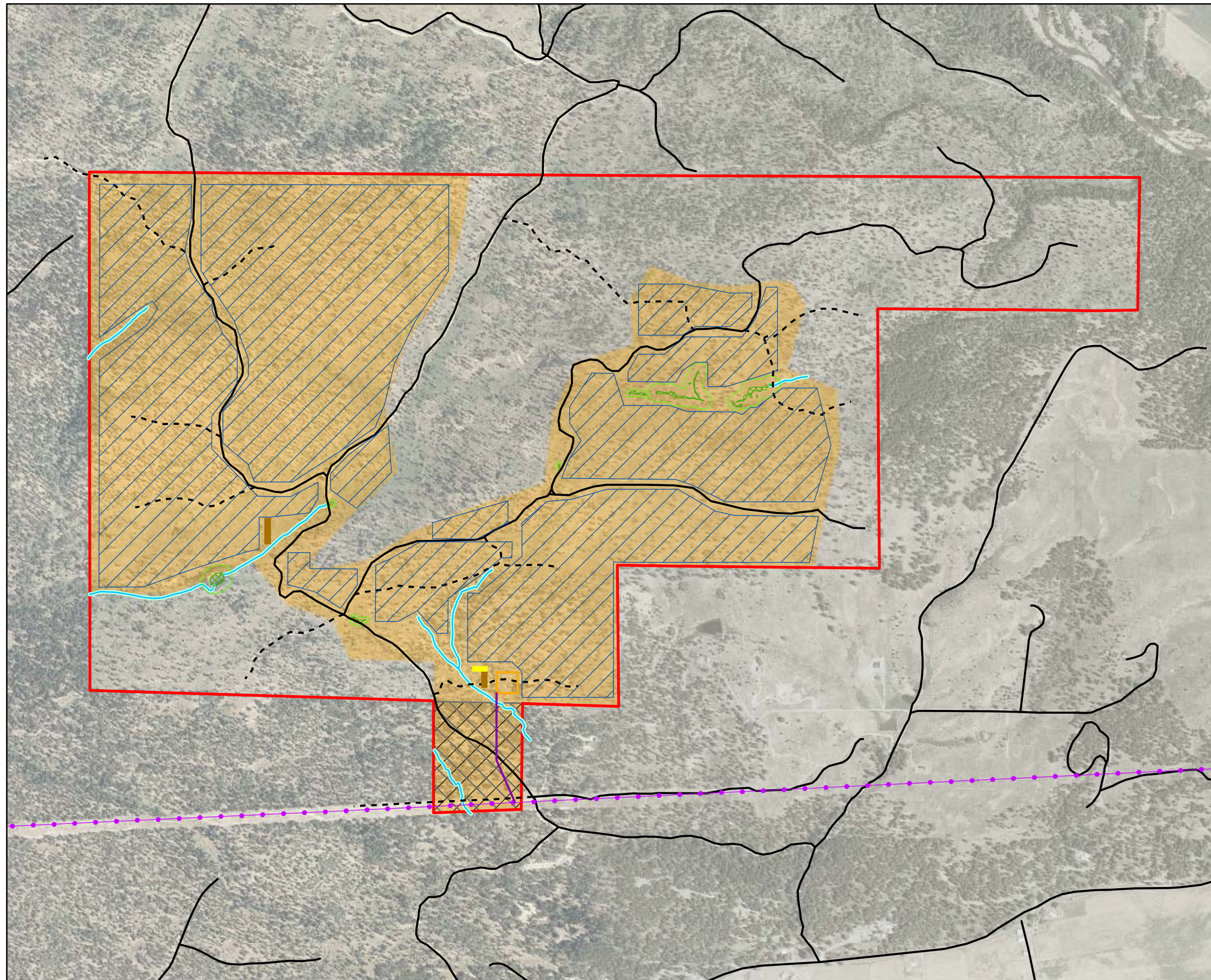
1. Aerial Imagery: 2006 1m NAIP.
2. Structures identified from aerial, not ground verified.



VICINITY MAP



FIGURE 4
Identified Structure Map
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Proposed Project Area
 - Proposed Project Site (580 acres)
 - Proposed Powerline Route to Grid
 - Potential Module Placement Area
 - Proposed O&M Facility
 - Proposed Substation
 - Proposed Switchgear
 - Transmission and Access Corridor
 - Existing Transmission Line
 - Road
 - Minor Dirt Road
 - Wetland
 - Wetland Buffer
 - Stream
 - Stream Buffer

Note:
1. Aerial Imagery: 2006 1m NAIP.

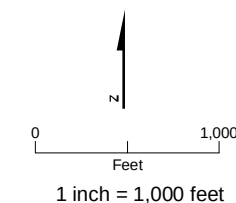
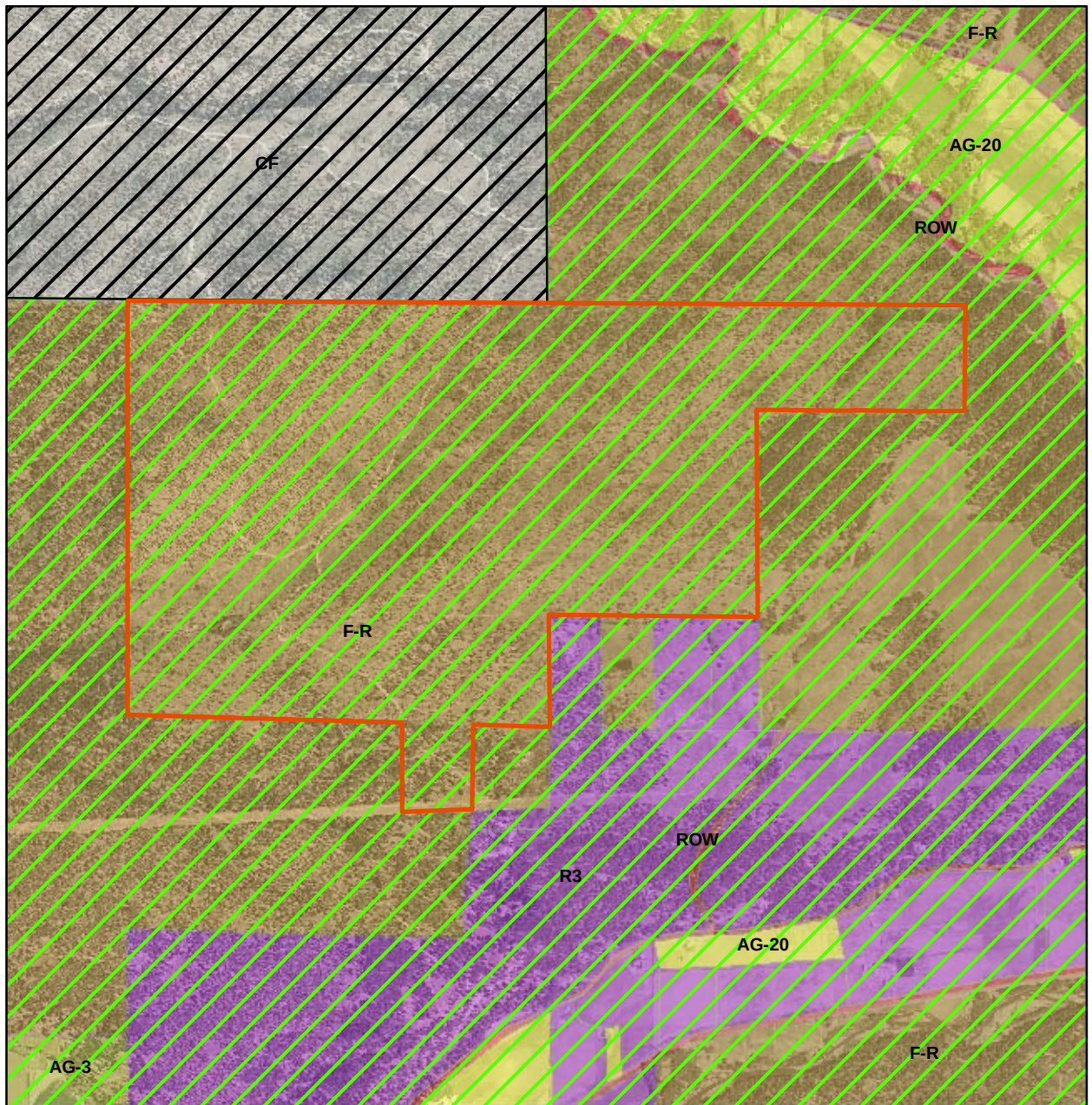


FIGURE 5
Conceptual Site Layout
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

 Proposed Project Area

Land Use

 COMMERCIAL FOREST

 RURAL

Zoning

 AG-20, Agricultural 20

 AG-3, Agricultural 3

 CF, Commercial Forest

 F-R, Forest & Range

 R3, Rural 3

 ROW, Right-of-Way

Note:

1. Aerial Imagery: 2006 1m NAIP.

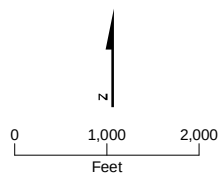
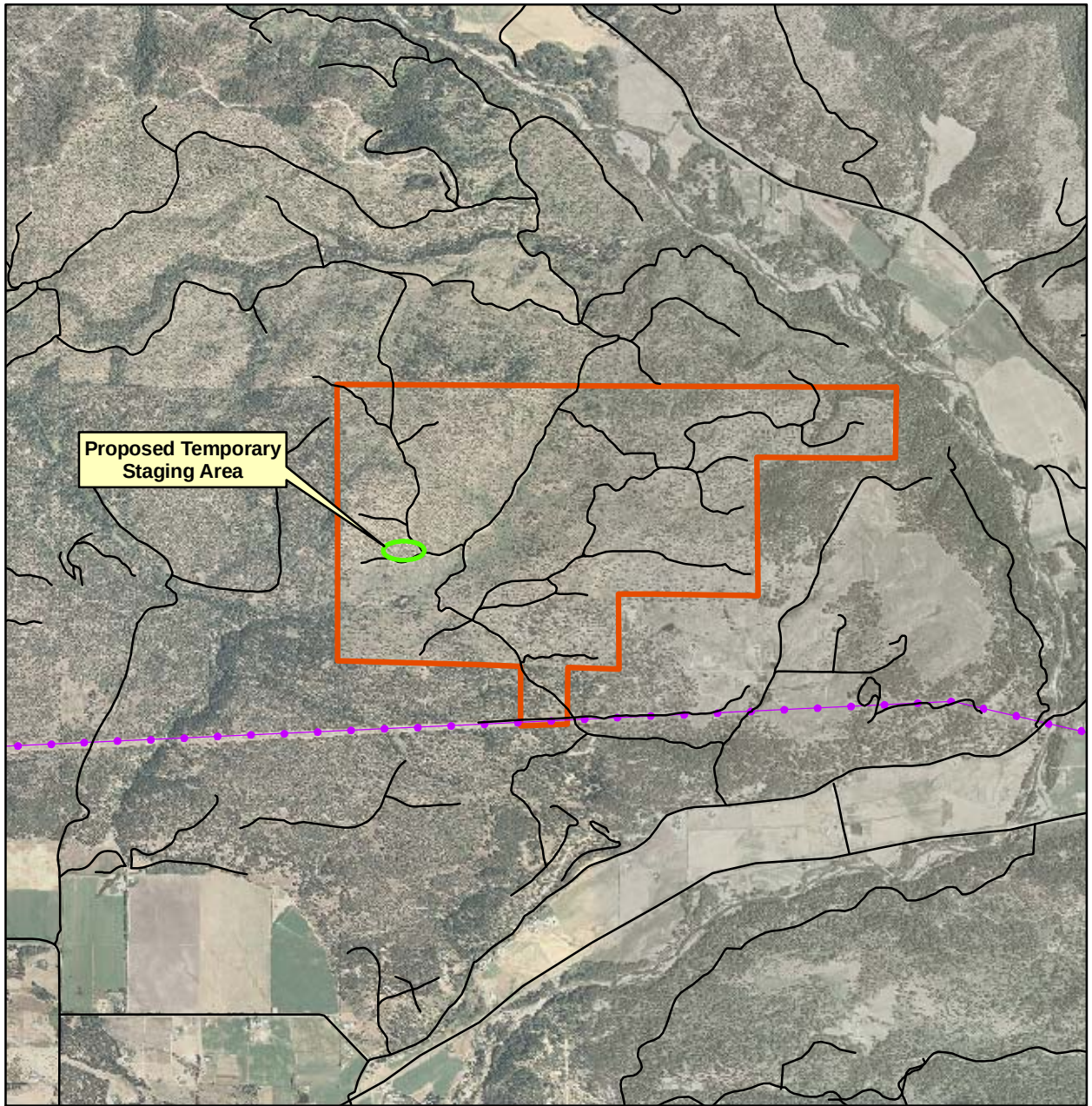


FIGURE 6
Land Use/Zoning Map
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  Proposed Temporary 5-Acre Staging Area
-  Road
-  Existing BPA Transmission Line

Note:

1. Aerial Imagery: 2006 1m NAIP.

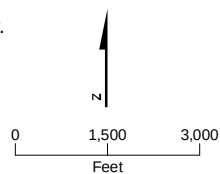


FIGURE 7
Staging Area Map
 Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT B

Photographs of Solar Facilities

ATTACHMENT B

Photo Plates

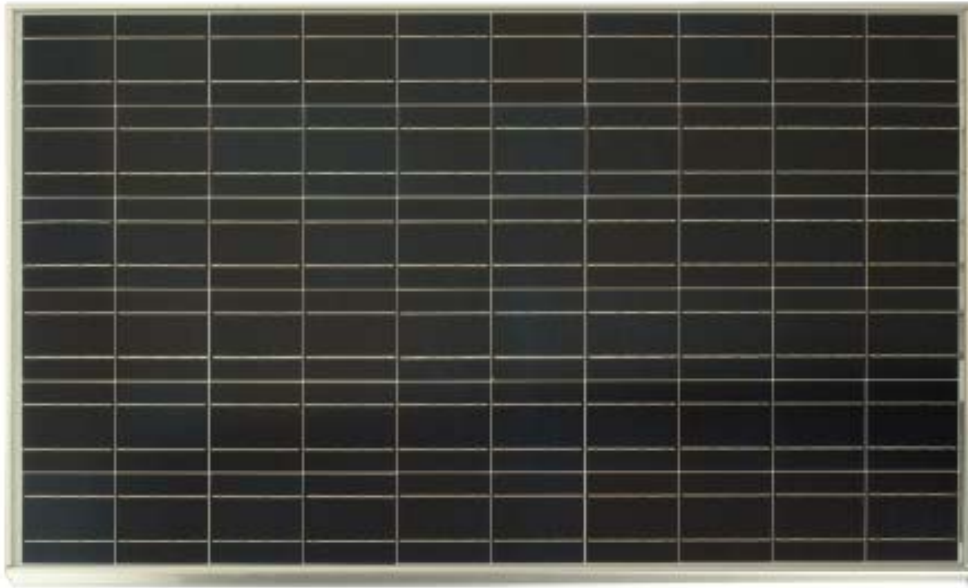


Photo Plate 1: Representative Solar Module (Source: Sharp Electronics Corporation)



Photo Plate 2: Single-Axis Tracking System by RayTracker



Photo Plate 3: Top of Pole-Mount Tracking System Holding Eight Solar Modules by Ignite Solar



Photo Plate 4: Proposed Fixed Tilt Mounting Structure (Source: Conergy)

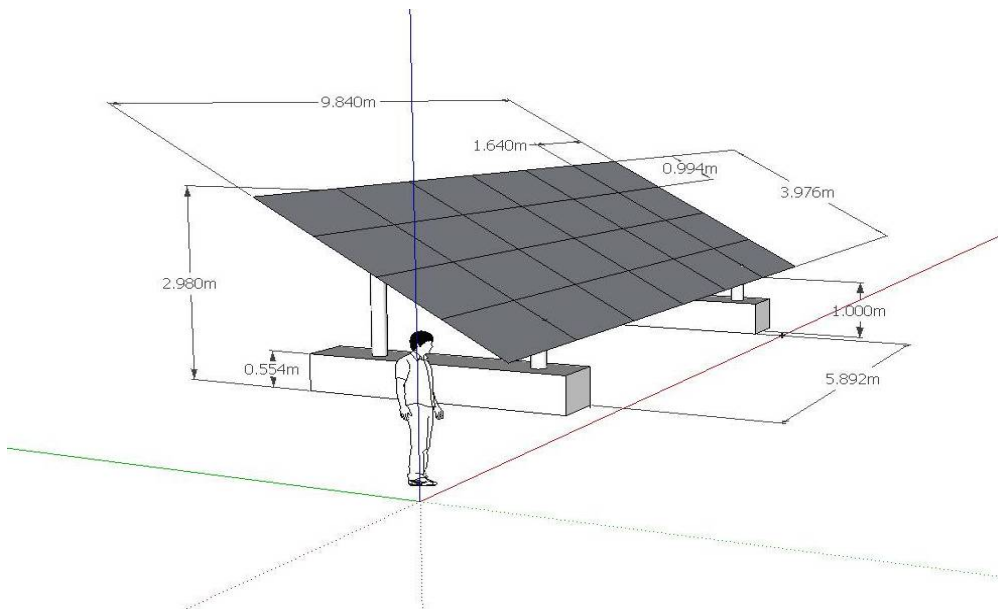


Photo Plate 5: Representative Mounting Structure with Dimensions



Photo Plate 6: Representative Mounting Structure, Cutaway View (Source: Conergy)



Photo Plate 7: Use of Timber Construction Materials in a Ground-Mounted Solar System



Photo Plate 8: Outdoor Compatible Commercial Inverters (Source: Xantrex)



Photo Plate 9: Example of 2-MW Inverter Building with Transformer (Source: Xantrex/Schneider Electric)



Photo Plate 10: Staging Area for a Solar Facility



Photo Plate 11: Example of Cabling Being Installed in Trenches for Interconnection to Grid



Photo Plate 12: Example of Cabling Being Installed in Trenches for Interconnection to Grid

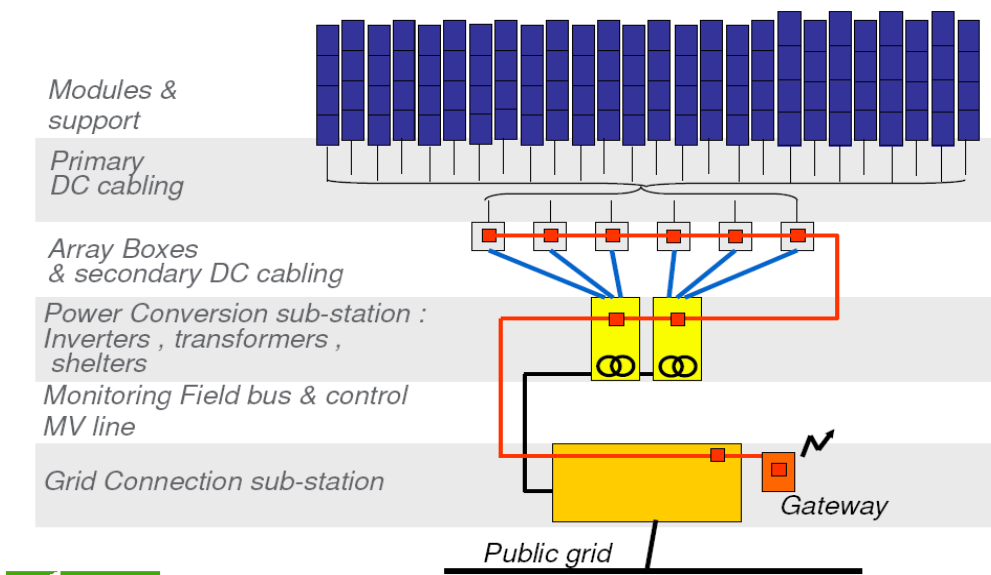


Photo Plate 13: Typical Cabling Diagram for a Photovoltaic System (Source: Xantrex/Schneider Electric)

ATTACHMENT C

Landowners Adjacent to Proposed Site Boundary

Attachment C**Landowners with Property within 500 feet of the Proposed Site Boundary**

Parcel ID	Tax Lot Number	Current Owner
344935	20-16-14000-0010	AMERICAN FOREST HOLDINGS LLC
364935	20-16-14000-0012	AMERICAN FOREST HOLDINGS LLC
424935	20-16-15000-0001	AMERICAN FOREST HOLDINGS LLC
104835	20-16-13000-0018	AMERICAN FOREST HOLDINGS LLC
715836	20-16-14000-0019	AMERICAN FOREST HOLDINGS LLC
18433	20-16-27000-0017	BLACKBURN, PENNY L
18434	20-16-27000-0018	BLACKBURN, PENNY L
18431	20-16-27000-0015	BROSE, JAMES B ETUX
694935	20-16-23000-0013	BROWN, RODNEY L JR ETUX
114935	20-16-27000-0001	DUNN, REAGAN B ETUX
14727	20-16-26000-0072	GOODWIN, BRADLEY & RANDY ETUX
14723	20-16-23000-0014	GOODWIN, BRADLEY & RANDY ETUX
14735	20-16-26000-0065	GOODWIN, BRADLEY J & WILLIAM M JR
14725	20-16-23000-0016	HANSEN, MICHAEL R ETUX
14726	20-16-23000-0017	KUOLT, MILT
949882	20-16-27050-0001	L T VENTURES LLC
949883	20-16-27050-0002	L T VENTURES LLC
949884	20-16-27050-0003	L T VENTURES LLC
949885	20-16-27050-0004	L T VENTURES LLC
494935	20-16-21000-0001	MASTERSON, HARRY J.
263236	20-16-21000-0004	MASTERSON, HARRY J.
124935	20-16-28000-0001	MASTERSON, HARRY J.
274935	20-16-27000-0002	MASTERSON, HARRY J.
554935	20-16-23000-0004	MAYBO, JOSEPH S. ETUX
674935	20-16-23000-0011	MAYBO, JOSEPH S. ETUX
544935	20-16-23000-0003	PINE HILLS RANCH PTNRSHIP
564935	20-16-23000-0006	PINE HILLS RANCH PTNRSHIP
664935	20-16-23000-0010	PINE HILLS RANCH PTNRSHIP
724935	20-16-24000-0007	PINE HILLS RANCH PTNRSHIP
744935	20-16-24000-0009	PINE HILLS RANCH PTNRSHIP
434935	20-16-16000-0001	STATE OF WASH (DNR)
524935	20-16-23000-0001	WILLIAM F COCKLE FAMILY TRUST

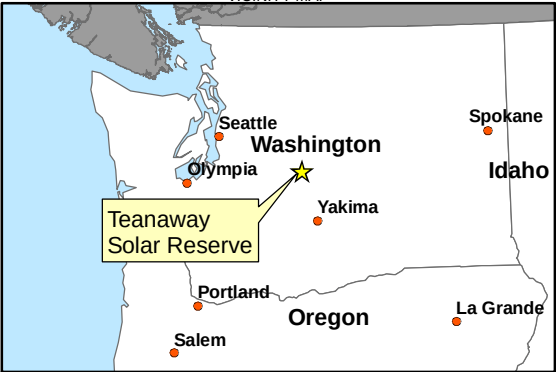
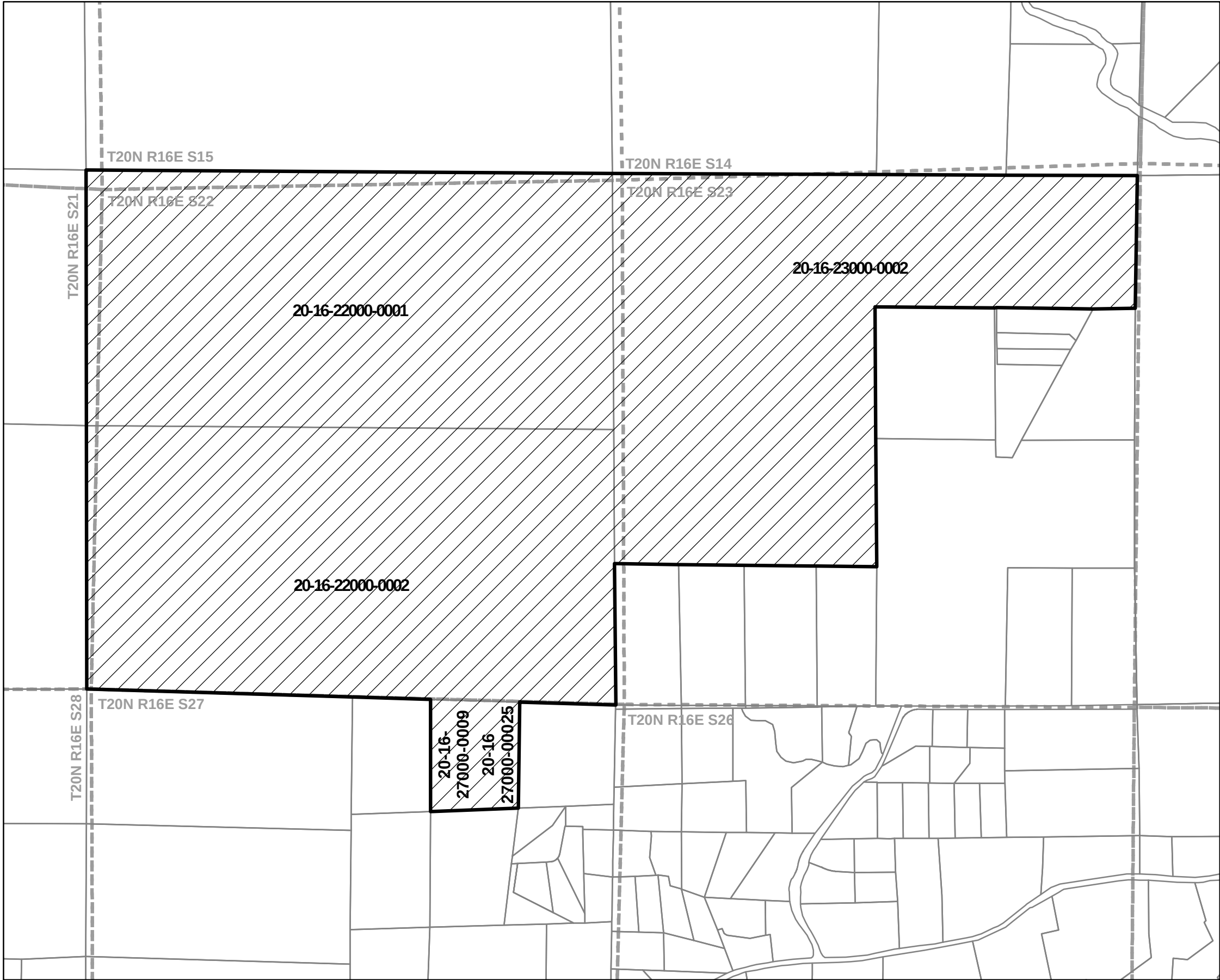
ATTACHMENT D

Legal Description

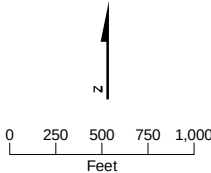
ATTACHMENT D

Legal Description

All of Section 22; the North Half of the Northeast Quarter, the Northwest Quarter and the North Half of the Southwest Quarter of Section 23; and Parcel 2 of that certain Survey as recorded May 6, 2003 in Book 28 of Surveys, pages 234, 235 and 236, under Auditor's File No. 200305060025, records of Kittitas County, Washington, being a portion of the Northeast Quarter of Section 27; All in Township 20 North, Range 16 East, W.M., in the County of Kittitas, State of Washington. A map illustrating this area is provided on the following page.



- LEGEND
- Proposed Project Area (982 Acres)
 - Lease Boundary
 - Tax Lot Boundary
 - Public Land Survey System Boundary
- Notes:
1. Tax Lot Boundary Data: Kittitas County Information Services.
 2. PLSS Data: WADNR.



Legal Description
Teanaway Solar Reserve
Kittitas County, Washington

ATTACHMENT E

Development Agreement

PROPOSED DRAFT

DEVELOPMENT AGREEMENT

Between

KITTITAS COUNTY WASHINGTON

and

TEANAWAY SOLAR RESERVE, LLC

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List of Attachments

Attachment A:	Project Description
Attachment B:	Project Area Legal Description
Attachment C:	Proposed Conditional Use Permit Application
Attachment D:	SEPA Checklist

DEVELOPMENT AGREEMENT

TEANAWAY SOLAR RESERVE PROJECT

THIS DEVELOPMENT AGREEMENT ("Agreement") is entered into and effective this ____ day of ____, 2009 by and between Kittitas County, a Washington municipal corporation ("County") and Teanaway Solar Reserve, LLC, a Wyoming limited liability company authorized to do business in the state of Washington ("Applicant") (collectively, the "Parties"). This Agreement is made pursuant to Revised Code of Washington ("RCW") 36.70B.170, Kittitas County Code ("KCC") Chapter 15A.11, and KCC Chapter 17.61, and relates to the Teanaway Solar Reserve Project.

RECITALS

A. RCW Chapter 36.70B, and KCC Chapter 15A.11 authorize the County to enter into an agreement regarding development of real property located within the County's jurisdiction with any person having an ownership interest in or control of such real property.

B. The Applicant desires and intends to develop a solar farm in Upper Kittitas County known as the Teanaway Solar Reserve Project (the "Project") located approximately four miles northeast of the town of Cle Elum. Key components and related appurtenant improvements of the Project include solar modules, inverter buildings, underground electrical conductors, substation, transmission line, maintenance and access roads, and Operations and Maintenance (O&M) building. A full description of the Project is contained in Attachment A: Project Description.

C. The Applicant's objective is to develop a commercially viable solar energy facility generating up to 75 megawatts (MWdc) of photovoltaic (PV) for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources through an interconnection point on the Pacific Northwest power grid.

D. The Project will be located on land referred to herein as the "Project Area". The Applicant entered into agreements with the owners of approximately 982 acres of real property comprising the Project Area, giving it requisite control of this land for the purpose of, and authority to, develop the Project. The Project Area is as more specifically described in Attachment B: Project Area Legal Description. A map showing the location of the Project Area is contained in Attachment A: Project Description.

E. The construction of the Project is currently scheduled for three consecutive seven to nine month construction seasons (generally between April 1 to October 31 as weather allows) between the years 2010 through 2012. As fully constructed, the Project is anticipated to require approximately 580 acres ("Project Site") within the overall Project Area. A map showing the location and layout of the Project is contained in Attachment A: Project Description.

F. A solar farm is defined by the County as a "major alternative energy facility". KCC 17.61.010(9) & (15). The transmission line and electrical substation may also be considered "special utilities." KCC 17.61.010(2). Major alternative energy facilities and special utilities may be authorized for the Project Site by the County's Board of Adjustment as conditional uses following a 15-day comment period and hearing, per KCC Chapter 15.61, KCC Title 15A, and KCC Chapter 17.60A.

G. In conjunction with this Agreement, the Applicant submitted a Conditional Use Permit ("CUP") Application as required by KCC 15.61.020(4)(b) & (6), attached hereto as Attachment C. One of the conditions of the CUP is that Applicant will obtain an approved development agreement with the County, and that it will be conditioned and governed by this Agreement.

H. The Applicant's submissions were deemed complete by the County on _____. As the State Environmental Policy Act ("SEPA") Lead Agency, Kittitas County issued a Mitigated Determination of Non-significance ("MDNS") for the Project on _____. Applicant agrees to abide by the CUP, the Proposed SEPA Mitigation Measures identified in the MDNS, and the Development Standards set forth in this Agreement to mitigate impacts to the environment.

I. The CUP was the subject of a 15-day comment period and a hearing before the Board of Adjustment as required by KCC Title 15A. On November ___, 2009, the Board of Adjustment approved the CUP.

J. This Agreement was the subject of a 30-day comment period and a hearing before the Kittitas County Board of County Commissioners ("BOCC") as required by KCC Title 15A and accompanying Table, and RCW 36.70B.200.

NOW, THEREFORE, in consideration of the recitals (which are incorporated into the Agreement by this reference) and for other good and valuable consideration, the receipt and

sufficiency of which are hereby acknowledged, the County and the Applicant agree as follows:

AGREEMENT

1. Effective Date, Termination and Modification.

1.1 Effective Date. The Effective Date of this Agreement is the last date upon which it was signed by the Parties hereto.

1.2 Termination. This Agreement may be terminated by mutual agreement of the Parties to this Agreement, or terminated by Applicant pursuant to Section 9 of this Agreement.

1.3 Modification. This Agreement shall govern and vest the development, use, and mitigation of the Project, and shall not be modified unless as provided in Section 8 below; *Provided* that nothing herein shall be construed to limit the County's reserved authority per KCC 15A.11.020(6) to impose new or different regulations to the extent required by a serious threat to public health and safety.

2. Definitions.

For purposes of this Agreement, the following terms, phrases, words, and their derivations shall have the meaning given herein where capitalized; words not defined herein shall have their ordinary and common meaning. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular number, words in the singular number include the plural number, and the use of any gender shall be applicable to all genders whenever the sense requires. The words "shall" and "will" are mandatory and the word "may" is permissive. References to governmental entities (whether persons or entities) refer to those entities or their successors in authority. If specific provisions of law referred to herein are renumbered, then the reference shall be read to refer to the renumbered provision. Unless otherwise specified herein, references to laws, ordinances or regulations shall be interpreted broadly to cover government actions, however nominated, and include laws, ordinances and regulations now in force.

2.1. Agreement. "Agreement" means this Development Agreement between Kittitas County, Washington and Teanaway Solar Reserve, LLC, approved by the Board of County Commissioners.

2.2. Applicant. "Applicant" means Teanaway Solar Reserve, LLC or any of its Transferee(s) as provided in Section 10 of this Agreement.

2.3. BOCC. "BOCC" means the Board of County Commissioners of Kittitas County, Washington.

2.4. BOJ. "BOJ" means Kittitas County Board of Adjustment.

2.5. County. "County" means Kittitas County, Washington.

2.6. Construction Buildout Period. "Construction Build out Period" has the meaning set forth in Section 5.10 of this Agreement.

2.7. CUP. "CUP" means the Conditional Use Permit approved by the County's BOJ for the Project, which shall be conditioned and governed by this Agreement.

2.8. Development Standards. "Development Standards" means the requirements stated in Section 5 of this Agreement.

2.9. Director. "Director" means the Director of the County Department of Community Development Services.

2.10. Effective Date. "Effective Date" has the meaning set forth in Section 1.1 of this Agreement.

2.11. Force Majeure Event. "Force Majeure Event" means any event that directly prevents or delays the performance by the Party affected of any obligation arising under this Agreement, including an event that is within one or more of the following categories: condemnation; expropriation; invasion; plague; drought; landslide; tornado; hurricane; tsunami; flood; lightning; earthquake; fire; explosion; epidemic; quarantine; war (declared or undeclared), terrorism or other armed conflict; material physical damage to the Project caused by third Parties; riot or similar civil disturbance or commotion; other acts of God; acts of the public enemy; blockade; insurrection, riot or revolution; sabotage or vandalism; embargoes; and, actions of a governmental authority other than EFSEC.

2.12. Liability. "Liability" means all loss, damage, cost, expense (including costs of investigation and attorneys' fees and expenses at arbitration, trial or appeal and without

institution of arbitration or suit), liability, claims and demands of whatever kind or nature (including those arising under the Federal Employers Liability Act), arising out of an occurrence relating to this Agreement or occurring on or relating to the Project described herein.

2.13 MDNS. "MDNS" means the Mitigated Determination of Non-significance" issued as a SEPA determination by Kittitas County for the Project on _____.

2.14. Parties. "Parties" means Kittitas County, Washington and the Applicant, Teanaway Solar Reserve, LLC, a Wyoming limited liability company.

2.15. Project. "Project" means the Teanaway Solar Reserve Project, a solar farm generating up to 75 megawatts (MWdc) of photovoltaic (PV) solar energy, together with any necessary Project components and related appurtenant improvements, including approximately 400,000 solar panels, inverter buildings, underground electrical conductors, substation, transmission line, maintenance and access roads and Operations and Maintenance (O&M) building. The Project and its components are more fully described in Attachment A: Project Description.

2.16 Project Area. "Project Area" means the overall land area in which the Project Site will be located. The Project Area covers approximately 982 acres. A map depicting the location of the Project Area is contained in Attachment A: Project Description. The land within the Project Area is as more specifically described in Attachment B: Project Area Legal Description.

2.17 Project Site. "Project Site" means the land area on which the Project will actually be sited. The Project Site covers approximately 580 acres. A map showing the approximate location of the Project Site is contained in Attachment A: Project Description.

2.18. SEPA. "SEPA" means the State Environmental Policy Act, Chapter 43.21C RCW.

2.19. Substantial Completion. "Substantial Completion" means the Project is constructed, installed, generating and delivering energy to the electric power grid.

2.20. Transferee. A party to which the Project is transferred or assigned in part or in whole under the provisions contained in Section 10.1 of this Agreement.

3. Protect Description

The Project is a proposed solar farm, along with other necessary components and related appurtenant improvements as described in Attachment A: Project Description, capable of generating up to 75 megawatts (MWdc) of photovoltaic (PV), modified as necessary in accordance with the Development Standards contained herein, the CUP, and the proposed SEPA MDNS mitigation measures.

4. Vesting.

Except as otherwise noted, this Agreement vests the Project, Project Site, and Project Area to the existing County land use plans, ordinances, and regulations effective as of the Effective Date of this Agreement.

5. Development Standards.

5.1. Location and Description of Project. The Project is as described in Attachment A: Project Description, and illustrated in Attachment A: Project Description, modified as necessary in accordance with this Agreement's Development Standards, CUP, and SEPA mitigation measures, see Attachments C and D. Figure 4 in Attachment A: Project Vicinity Map with Landowners and Residential Locations illustrates the location of the Project and its components in relation to existing structures in the vicinity of the Project.

5.2 Structures. As part of the Project, Applicant may require supporting structures for any related transmission line. Such structures shall not be subject to any applicable County height restriction, provided that any supporting structure taller than 175 feet will not be used without Applicant first obtaining an approved variance from the County.

5.3. Fire and Police Protection Measures. Applicant will create and maintain a firebreak of no less than 100 feet between all outer edges of the Project Site and adjacent property lines, as illustrated in Attachment A: Project Description. The Project Area is currently subject to the fire suppression services of the Washington Department of Natural Services. Should the construction of the Project require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression services are in place during the construction and on-going operations of the Project. Police protection of the Site Area is provided by the County's Sherriff's Office. The construction contractor will notify the fire protection and police services of staging and active

construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, the Applicant will contact fire protection and police services in the event of an emergency.

5.4. Setbacks. The Project may be located up to, but no less than, 100 feet from any bordering property as illustrated in Attachment A: Project Description.

5.5. Emergency Plans. An emergency preparedness and response plan shall be prepared and submitted to the County by the Applicant prior to construction.

5.6. Project Access and Maintenance Roads. The main Project access road entrance is from a private roadway generally known as Loping Lane extending from the Wehl Road, also a private road, through portions of sections 26 and 27, T. 20, 16 E, W.M., Kittitas County, to the Project Area as generally depicted in Attachment A: Project Description. The Applicant's road use shall be subject to any road use agreements in effect pertaining to Applicant's use of that roadway, including, without limitation, the Horseshoe Hills Ranch Declaration of Protective Covenants, Conditions and Easements (Kittitas County Auditor's Recoding No. 488155, dated June 5, 1985), Easement and Road Maintenance Agreement (Kittitas County Auditor's Recoding No. 200204020024 dated February 5, 2002), Declaration of Protective Covenants (Kittitas County Auditor's Recoding No. 200306060049 dated June 6, 2003), and Addendum To Protective Covenants (Kittitas County Auditor's Recoding No. 200308290105 dated August 28, 2003). The Applicant will additionally work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself.

The project will be served internally by a network of existing and/or new maintenance roads. The existing maintenance roads, along with Wehl Road and Loping Lane, generally consist of gravel and dirt and may need improvements in accordance with County requirements. The Applicant is responsible for any improvements to these roads, and will first submit a plan detailing any such improvement for review and approval by the Kittitas County Public Works Department, which shall not unreasonably be withheld.

5.7. The Relationship between this Agreement and the CUP. This Agreement incorporates by reference the terms and conditions of the CUP as approved by the BOJ, which shall be further conditioned and governed by this Agreement. In the event a conflict should occur between the CUP and this Agreement, the terms and provisions of this Agreement shall control.

5.8. Concrete batch plants. Concrete batch plants on the site, if any, shall be strictly for on-site use and shall be removed from the site when construction is complete.

5.9. Project Site Access. Public access to the Project Area is already restricted by the subject landowners and will continue to be restricted in accordance with easement agreements. Access to the Project Site shall be further controlled in the form of an electric gate with an associated keypad security code for entry. The Applicant shall be responsible for the installation and maintenance of the gate, and will work with applicable landowners to determine its appropriate location. Property owners who access their property from Loping Lane and require access through the gate will be provided the necessary and applicable access. Representatives of the Washington State Department of Natural Resources currently has access to and through the Project Site and will continue to be allowed access. The Applicant will also coordinate with local landowners to identify any necessary additional security measures, including an additional access restriction on Loping Lane near its intersection with Wehl Road. The Applicant does not have the authority to grant permission to third party recreationists, including hunters and campers, to access the Project, but may grant permission to such parties on a case-by-case basis provided such parties first secure written permission from all of the applicable landowners along Loping Lane.

5.10 Construction Buildout Period. Applicant shall be allowed to construct the Project such that Substantial Completion is achieved no later than 5 years from the date that all permits necessary to construct the Project are obtained, but in no event later than 6 years from the Effective Date of this Agreement (the "Construction Buildout Period") provided however, that such construction is not delayed by a Force Majeure Event.

6. Decommissioning and Reclamation.

The Applicant is under a contractual obligation with the landowner to return the site in pre-construction condition minus reasonable wear and tear and, at the landowner's request, to remove any or all of the Project's components. Applicant is also contractually bound to reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the Project Site, including the Project.

7. Consistency with Local Regulations.

The County hereby acknowledges that if the Project is developed consistent with this

Agreement and any Amendments thereto, the public health, safety, and welfare will be adequately protected within the bounds of the law; the Project will be considered essential and desirable to the public convenience; the Project will not be detrimental or injurious to the public health, peace, or safety, or to the character of the surrounding neighborhood; the Project will not be unreasonably detrimental to the economic welfare of the County; and the Project will not create excessive public cost for public facilities and services. Assuming the Applicant's objectives are met, the Project helps fills significant local needs in supplying electricity, creating local jobs and promoting economic development in rural areas, while also having the positive benefits of avoiding the external environmental costs associated with traditional electrical generation technologies.

The Project is located on property that is zoned as Forest & Range -20. Due to Project and equipment design and materials, the Project's O&M, the remoteness of the Project, and the surrounding vegetation, the Project poses no significant risks to residents from reflective glare, noise impacts, fire, or other disturbances from the construction, installation or use of the Project. The Project will deliver cost effective renewable energy to the electric grid and, as such, is essential and desirable to the public convenience. The Project will contribute significant tax revenues to the County which will far exceed the limited public service costs the Project will introduce.

8. Amendments and Revisions.

This Development Agreement may be amended by mutual agreement of the Parties only if the amendment is in writing and signed by Applicant and the County and is approved by the BOCC (an "Amendment"), whose approval shall not unreasonably be withheld. The following sections specify what Project actions and revisions can be undertaken without the need for amendment of the Development Agreement and what revisions require Amendment to the Agreement.

8.1 Project Facility Repair, Maintenance and Replacement. Applicant shall be permitted, without any further approval from the County or amendment to this Agreement, to repair, maintain and replace the Project and its components consistent with the terms of this Agreement.

8.2 Project and Project Area Expansion. If Applicant seeks to expand the generating capacity of the Project and the geographic scope of the Project Site or Project Area, Applicant

will seek an Amendment to this Agreement and amend the CUP, if and as necessary, in accordance with any applicable state and local regulations in effect at the time of such amendments.

9. Termination.

Applicant shall have the option, in its sole discretion, to terminate this Agreement prior to Substantial Completion of the Project, *Provided* such termination will not relieve the Applicant of any obligation owed the County under the terms of this Agreement and outstanding at the time of such termination. If it elects to terminate this Agreement, Applicant shall submit a Notice to this effect to Kittitas County at least thirty (30) days prior to such termination.

10. General Provisions.

10.1 Assignment. The County and Applicant acknowledge that development of the Project may involve the sale and/or assignment of all or substantially all of the assets or all or substantially all of the membership interests to third parties. In addition the County and Applicant acknowledge that Applicant and its permitted Transferees may obtain financing for all or a portion of the costs of the Project. Applicant shall have the right to assign or transfer all or any portion of its interest in the Project at any time, including rights, obligations and responsibilities arising hereunder, to third parties acquiring all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant (each such third party, a "Transferee"), provided such assignments or transfers are made in accordance with the following:

10.1.1 Assignments or Transfers Requiring the Consent of the County.

Applicant may at any time enter into a written agreement with a Transferee other than those described in Sections 10.1.2 and 10.1.3 to transfer all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant, including rights, obligations and responsibilities arising hereunder (such agreement, a "Transfer Agreement"); provided that Applicant obtains the prior written consent of the County as described in this section:

(a) Such Transfer Agreement shall not take effect unless and until the County has consented in writing to such transfer or assignment, which consent shall not be unreasonably withheld, conditioned, or delayed. Written notice of the proposed Transfer

Agreement shall be mailed, first-class, to the County at least thirty (30) days in advance of the proposed date of transfer or assignment. Failure by the County to respond within thirty (30) days after receipt of a request made by Applicant for such consent shall be deemed to be the County's approval of the Transfer Agreement.

(b) Any Transfer Agreement shall be binding on the Applicant, the County and the Transferee. Upon approval of a Transfer Agreement by the County, the Applicant shall be released from those obligations and responsibilities assumed by the Transferee therein.

(c) Applicant shall be free from any and all liabilities accruing on or after the date of any assignment or transfer with respect to those obligations assumed by a Transferee pursuant to an approved Transfer Agreement. No breach or default hereunder by any person that assumes any portion of Applicant's obligations under this Agreement pursuant to an approved transfer shall be attributed to Applicant, nor shall any of Applicant's remaining rights hereunder be cancelled or diminished in any way by any such breach or default.

(d) No breach or default hereunder by Applicant shall be attributed to any person succeeding to any portion of Applicant's rights or obligations under this Agreement, nor shall such Transferee's rights be cancelled or diminished in any way by any such breach or default.

(e) Upon any transfer made in accordance with this Section 10.1.1 for which the County has consented, the Transferee shall be entitled to all interests and rights and be subject to all obligations under this Agreement, and Applicant shall be automatically released of all liabilities and obligations under this Agreement as to that portion of its interest so transferred or assigned.

10.1.2 Collateral Assignments Without the Consent of the County.

Notwithstanding anything herein to the contrary, Applicant or any Transferee shall be permitted to collaterally assign its interest in the Project to a lender providing financing for the Project without the consent of the County, provided that Applicant or any Transferee delivers written notice to the County at least thirty (30) days prior to the date of such collateral assignment and identifies such lender.

10.1.3 Assignments or Transfers without the Consent of the County.

Applicant may transfer or assign all or any portion of its interest in the Project at

any time, including rights, obligations and responsibilities arising hereunder, to third parties acquiring all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant without the consent of the County provided that:

(a) Transferee is (i) an investor-owned electric utility, such as Puget Sound Energy, regulated by the Federal Regulatory Energy Commission ("FERC") and the Washington Utilities and Transportation Commission ("WUTC") or a wholly owned subsidiary of such an investor-owned electric utility, or; (ii) an entity having, at the time of transfer or assignment, a senior unsecured long term debt rating ("Credit Rating") of (1) if such entity has a Credit Rating from Standard and Poor's but not from Moody's, BBB- or better from Standard and Poor's or (2) if such entity has a Credit Rating from Moody's but not from Standard and Poor's, Baa3 or better from Moody's or (3) if such entity has a Credit Rating from both Standard and Poor's and Moody's, BBB- or better from Standard and Poor's and Baa3 or better from Moody's; and

(b) Transferee agrees to be bound by the rights, obligations and responsibilities of Applicant hereunder, on and after the date of such transfer or assignment. In the event that Applicant transfers or assigns all or any portion of its interest in and to the Project in accordance with this provision, Applicant shall be released from all obligations or liabilities under this Agreement on and after the date of such transfer or assignment as to that portion of Applicant's interest so transferred or assigned.

10.2 Binding Effect. This Agreement shall be binding upon, and inure to the benefit of, the Parties and their respective heirs, successors (by merger, consolidation or otherwise) and assigns, devisees, administrators, representatives, lessees and all other persons or entities acquiring all or any portion of the Project, any lot, parcel or any portion thereof within the Project Area, or any interest therein, whether by sale, operation of law, devise, or in any manner whatsoever.

10.3 Washington Law. This Agreement is entered into under the laws of the State of Washington, and the parties hereto intend that Washington law shall apply to the interpretation hereof.

10.4 Severability. If any provisions of this Agreement are determined to be unenforceable or invalid, this Agreement shall thereafter be modified, to implement the intent of the Parties to the maximum extent allowable under law and the remainder of this Agreement shall remain unaffected and in full force and effect.

10.5 Authority. Each Party represents and warrants that it has the respective power and authority, and is duly authorized, to enter into this Agreement on the terms and conditions herein stated, and to execute, deliver and perform its obligations under this Agreement.

10.6 No Third-Party Beneficiary. This Agreement is made and entered into for the sole protection and benefit of the Parties hereto and their successors and assigns. No other person shall have any right of action based upon any provision of this Agreement.

10.7 Duty to Act Reasonably and in Good Faith. Unless otherwise expressly provided, each party shall act reasonably in giving consent, approval, or taking any other action under this Agreement. The Parties agree that each of them shall at all times act in good faith in order to carry out the terms of this Agreement and each of them covenants that it will not at any time voluntarily engage in any actions which frustrate the purpose and intent of the Parties to develop the Project in conformity with the terms and conditions specified in this Agreement. The Parties understand and agree that the process described in this Agreement depends upon timely and open communication and cooperation between the Parties. The Parties agree to use best efforts to communicate regarding issues, changes, or problems that arise in the performance of the rights, duties and obligations hereunder as early as possible in the process, and not wait for explicit due dates or deadlines. Each party agrees to work cooperatively and in good faith toward resolution of any such issues.

10.8 Time of Essence. Time is of the essence in the performance of each and every obligation to be performed by the Parties hereto.

10.9 Staffing Agreement for County Project Costs. The Applicant will pay for County costs, including third party consultant costs, if necessary, incurred to support plan review and inspection of the Project during construction, in accordance with K.C.C. 14.04 et. al., under a County Staffing Agreement. The Staffing Agreement shall be approved by the County prior to construction, and such approval shall not be unreasonably withheld.

11. Notices

11.1 Written Notice. Any notice, demand, or other communication ("Notice") given under this Agreement shall be in writing and given personally or by registered or certified mail (return receipt requested). A courtesy copy of the Notice may be sent by facsimile transmission.

11.2 Addresses. Notices shall be given to the Parties at their addresses set forth

below.

If to the County:	Kittitas County Community Development Services 411 North Ruby, Suite 2 Ellensburg, Washington 98926 Attn: Director
CC:	Kittitas County Prosecuting Attorney's Office 205 West Fifth, Room 213 Ellensburg, Washington 98926 Attn: Neil Caulkins
If to Applicant:	Teanaway Solar Reserve, LLC 418 E. 1st, Suite B Cle Elum, WA 98922
CC:	Perkins Coie LLP Attention: Patrick W. Ryan 1201 Third Ave, Suite 4800 Seattle, WA 98109 Fax: 206-359-9662

11.3 Notice by hand delivery shall be effective upon receipt. If deposited in the mail, notice shall be deemed delivered forty-eight (48) hours after deposited. Any party at any time by Notice to the other party may designate a different address or person to which such notice or communication shall be given.

12. Default and Remedies.

No party shall be in default under this Agreement unless it has failed to perform as required under this Agreement for a period of thirty (30) days after written notice of default from the other party. Each notice of default shall specify the nature of the alleged default and the manner in which the default may be cured satisfactorily. If the nature of the alleged default is such that it cannot be reasonably cured within the thirty (30) day period, then commencement of the cure within such time period and the diligent prosecution to completion of the cure shall be deemed a cure of the alleged default.

12.1 Dispute Resolution Process.

12.1.1. In the event of any dispute relating to this Agreement, each Party, upon the request of the other Party, shall meet within seven (7) calendar days to confer and seek to resolve the dispute ("Conference"). The Conference shall be attended by the following parties:

(a) the County shall send department director(s) and County employees and contractors with information relating to the dispute, and (b) Applicant shall send an Applicant's representative and any Applicant's consultant(s) with technical information or expertise related to the dispute. The parties shall, in good faith, endeavor to resolve their disputes through the Conference.

12.1.2. Mediation. If this Conference process does not resolve the dispute within the 7 day Conference period, the Parties shall in good faith submit the matter to mediation, The Parties shall send the same types of representatives to mediation as specified for the "Conference" process. Additionally the Parties shall have representatives present at the mediation with full authority to make a settlement within the range of terms being discussed, should settlement be deemed prudent. The mediation shall take place within 45 days of the parties submitting the dispute to mediation.

In order to expedite the mediation, during the Conference process the Parties shall select the mediator. The mediator must be a neutral professional full time mediator with time available to meet with the parties within the 45 day mediation period following the 7 day Conference period.

To prepare for mediation, during the 7 day Conference period, the County will select three qualified mediators, as specified above, who are available in the following 45 days. At the end of the 7 day Conference period, if the matter has not been resolved, the Applicant shall, within the 24 hours of being given the three names select one of the three. The parties will in good faith attempt to resolve the dispute in the 45 day mediation period.

If the dispute is not able to be resolved through the mediation process in the 45 day period, the parties may pursue their legal remedies in accordance with Washington law.

13. Indemnity.

The Project owners shall indemnify and hold harmless the County and its elected officials and employees from and against any and all claims, actions, suits, liability, loss, costs, expenses, and damages of any nature whatsoever ("Claims") that are caused by or result from the negligent act or omission of Applicant's employees, officers, or agents in the operation of the Project; provided, however, that the total and cumulative obligation hereunder for all such Claims is limited to and shall not exceed five million dollars (\$5,000,000.00). In the event of concurrent negligence, Applicant shall indemnify and hold harmless the County only to the

extent of Applicant's negligence, subject to the foregoing five-million-dollar limitation for any and all Claims.

14. Entire Agreement.

This Agreement, together with all Attachments hereto, constitutes the entire agree between the Parties with respect to the subject matter of this Agreement. Agreement is specifically intended by the Parties to supersede all prior agreements whether written or oral.

APPROVED this _____ day of _____, 200__.

BOARD OF COUNTY COMMISSIONERS
Kittitas County, Washington

Chairman, Alan A. Crankovich

Vice Chairman, Paul Jewell

Clerk of the Board, Julie Kjorsvik

Commissioner, Mark McClain

Approved by:

Kittitas County Prosecuting Attorney, Deputy
Neil Caulkins

TEANAWAY SOLAR RESERVE, LLC,
a Wyoming limited liability company

By: _____

Name: _____

Title: _____

ATTACHMENT A

Project Description

Project Description

Teanaway Solar Reserve, LLC (Applicant) proposes to construct and operate the Teanaway Solar Reserve (project), a solar farm capable of generating up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy. The proposed project area consists of 982 acres within the County's Forest and Range (F-R) zoning district. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area.

Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy the power from the project could change over time.

The Applicant proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors will be analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of environmentally sensitive areas
- Limited visibility from offsite locations

Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (Figure 1). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (Figure 3), and private roads such as Loping Lane and Weihl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line runs east to west along the southern site boundary (Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line. An interconnection substation with an approximate footprint of 10 acres will be located either on the project site, or within the BPA line right-of-way (ROW) (Figure 2).

Some structural and residential development has taken place in the southern portion of the proposed project area. Figure 4 shows the identified structures within the vicinity of the project area. The closest identified residence is approximately 200 feet southeast of the project area, and approximately 300 feet from the project site. Figure 5 shows the conceptual site layout.

The site is currently zoned Forest and Range (F-R) (Figure 6). The site was most recently selectively logged in 2001 and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species.

Key Components

The proposed project will consist of the following key components:

- Solar modules
- Inverter Buildings
- Underground Electrical Conductors
- Substation
- Transmission Line
- Access and Maintenance Roads
- Operations and Maintenance (O&M) Building

Key components are described in the following subsections.

Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. The module measures 1.0 by 1.6 meters (3.3 feet by 5.3 feet) and is rated at 216 watts (Sharp Electronics, 2009). The solar modules are mounted in a fashion that orients the modules toward the sun.

Several mounting types will be considered to best address the slope of land at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure or a pole-mounted tracking system.

A representative single-axis tracking system foundations could consist of precast foundations or embedded posts or poles. The embedment could be done by driving a ground screw, or by boring the ground to a depth of approximately 4 to 6 feet and width of approximately 8 to 10 inches, then backfilling with concrete. For one type of support approach, one post is needed for every five to six solar modules. If the entire 75 MWdc were to be installed with this mounting system, then approximately 70,000 posts would need to be set. About 70 percent of the solar modules for the proposed site will likely use this mounting type, meaning that about 50,000 posts would need to be set (primarily on lands with a south-facing slope). The excavated earth would not be removed from the site.

Another mounting method is to place the solar modules on top of a single pole. The “top of pole mount” system could be installed in areas with a slope facing the southeast. This system consists of a large steel pole that supports the solar module. The pole would attach to a post buried into the ground to a depth of 10 to 15 feet, with a width of 10 to 24 inches. The most likely configuration is to have between 12 to 20 solar modules mounted on one pole. It is estimated that about 10 percent of the solar installation will be installed using this method, and approximately 3,000 posts will need to be set.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt. It is estimated that 20 percent of the solar installation will be installed using this mounting method.

Inverter Buildings

Up to 40 inverter buildings will be needed for the project. The inverters can be placed outdoors. While the inverter enclosures are rated for outdoor use, the manufacturer recommends an enclosure to protect the inverters from the elements and extreme temperature changes. An example inverter building includes a concrete pad, and prefabricated facilities are available such as the 2-MW enclosed system offered by Xantrex. Systems similar to the offering from Xantrex enclose four 500-kilowatt (kW) inverters and a 2-MW transformer in a weather-resistant structure measuring 40 feet by 9 feet by 8 feet 6 inches tall.

Underground Electrical Conductors

Underground electrical conductors will be installed in trenches at a depth in compliance with the Kittitas County (36 inches or greater). Conductors either will be direct burial or in a polyvinylchloride (PVC) conduit.

Substation

The Applicant proposes to construct an electrical substation that will interconnect with the 345-kV BPA transmission line. The substation will require a level, fenced area of approximately 10 acres. The 10-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel

support structures, and overhead electrical bus work. Its appearance will be similar to that of many other substations throughout the Pacific Northwest.

Transmission Line

A new 345-kV transmission line will be needed to connect the new substation to the existing BPA line. If the substation is located at the BPA ROW, this line would be very short. The line would have two circuits, one into the substation and one out of the substation. The construction could be similar to the existing lattice towers, and require a ROW of up to 300 feet in width.

Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Weihl Road and Loping Lane are private roads over which the Applicant has easement rights. Loping Lane is subject to several road use and cost-sharing agreements, and the Applicant will be subject to those agreements. Additionally, the Applicant will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads will be improved pursuant to County requirements. As set forth in the Draft DA, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department. Figure 3 shows the location of the access and maintenance roads in relation to the project site.

Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where driveways and modular construction will be undertaken, grading, and establishing temporary staging areas (including stockpile and laydown areas). Site preparation will be limited to staging areas, maintenance roads, O&M facilities, and some extreme portions of the larger site as needed to accommodate a level field for the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter equipment pads, and substation foundation can begin.

Site Clearing and Grading

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as provided below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating the next construction phase of the project (Draft DA, Attachment D, Table 1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. The Applicant will obtain a permit from WDNR and contract with a professional forester to harvest these trees in accordance with the permit. Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules. Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation

from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

Staging Areas

A temporary staging area of approximately 5 acres will be used as a laydown area for parts and materials such as solar crates, electric cable, structural supports, and perhaps a concrete batching facility. The staging area could be located at the intersection of logging roads on the property, as illustrated on Figure 7. Mobilization of the site will consist of fencing off a 5 acre section of land that will be needed to store materials. Mobilization will also include a temporary facility and staging area for solar module deliveries, and metal racking. Mobilization will last approximately 1 month.

Foundations, Trackers, and Modules

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structure used. One foundation type consists of boring a hole approximately 12 inches wide and 48 inches deep to hold a steel support pipe. The hole is then filled with concrete. A support pier will be required for every 45 square feet of land area, or approximately 1,000 piers per installed MW of solar capacity. Approximately 145 acres of modules will be installed within the 982-acre proposed project area.

A second type of foundation consists of an abovegrade concrete ballast used to support the uplift forces of the solar mounting structure. These ballasts will contain .25 to .35 cubic yards of concrete per block, and two concrete ballasts will support a small array of solar modules.

Pending final design, the solar module foundations will require site work, potential boring, trucking of materials, and concrete. The number of foundations could be as high as 70,000, and require approximately four thousand truck deliveries.

Installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction seasons (between April and October or April and December).

Inverter Equipment Pads and Substation Foundation

Electrical equipment will be located onsite in multiple locations. There will be one inverter building (that houses two inverters and one associated transformer) for every approximately 7 acres of solar field. One inverter building will house (2) 500-kW inverters, so there will be one inverter building for every 1 MW of solar field. Approximately 7 acres are needed for a 1-MW solar array. Approximately 145 acres of modules will be installed within the 982-acre proposed project area.

Up to 75 inverter buildings will be needed. The inverter stations will require a concrete pad of approximately 40 by 10 feet. The inverter buildings will be approximately 10 feet tall.

Wiring connecting module arrays to the inverters and the inverters to the substation will need to be run in underground cables. Trenching is required for the conductors from the inverter buildings to the main substation. Trenching requires removing earth in a section of several feet wide by approximately 2 to 3 feet deep.

The substation will require an area of approximately 10 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small control building, approximately 20 feet wide by 20 feet long, that is enclosed with air conditioning.

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Poles supporting the overhead lines will be required approximately every 750 feet.

Installation of inverter equipment pads and other foundations will occur over a period of approximately 5 to 6 months.

Construction Materials and Equipment

If the project uses aboveground mounting methods with ballasted (concrete) blocks, the amount of concrete required is subject to wind loading and engineering analysis. An estimated 33,000 cubic yards of concrete could be used to create the ballasted footings, equivalent to approximately 3,500 truckloads of concrete. The concrete is expected to be premixed. If a concrete batch plant is necessary for the site, it will only be used for onsite purposes and will be removed when construction is completed. The structural supports and other mounting materials will require an estimated 800 trucks to deliver materials to the site based on vendor estimates. Thus, a total number of truck deliveries to the site will be in the range of 4,300 for deliveries of goods and materials.

The 75 MWdc anticipated to be generated from this project equates to 75,000,000 watts-dc, or 347,222 solar modules of 216 watts-dc each. It is estimated that the project will require up to 450 shipping containers of solar modules.

Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible.

Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 (I-90) and access Highway 970 by way of County roads such as Red Bridge Road (see Figure 3), and private roads such as Loping Lane and Weihl Road. Road service within the project area will be provided by an existing network of maintenance roads, although new maintenance roads or segments may be necessary. Road improvements will be conducted as required by the County. Road improvements are further addressed in the DA with Kittitas County. For further discussion of traffic impacts, see the Transportation section of this checklist.

Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers, during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in fabricating the concrete forms and placing the concrete ballasts in the field. When the solar installation begins, the

workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (three 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers are not typically housed onsite, but this is subject to the cost of transportation to the site. Subject to the needs of any security personnel for the project, it is not expected that a significant number of workers will remain onsite outside and require temporary housing. Security crews will likely consist of up to eight onsite workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire Protection District #7. Further, the project will be bordered by a firebreak no less than 100 feet wide. Should the construction of the project require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression services are in place during the construction and ongoing operations of the project. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise.

Water Use

Water will be needed for activities such as dust control and module cleaning. The Applicant proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or the Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

Summary of Operations and Maintenance Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with dimensions of roughly 20 feet by 20 feet.

Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required.

Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed onsite. A staff of 2 to 4 technicians will perform system monitoring. The staff will work out of the O&M building and make frequent trips to the facility by way of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. The project is also anticipated to require the need for personnel to monitor and secure the site.

Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. The Applicant will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. During the operational phase, the Applicant will contact fire protection and police services in the event of an emergency.

Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other

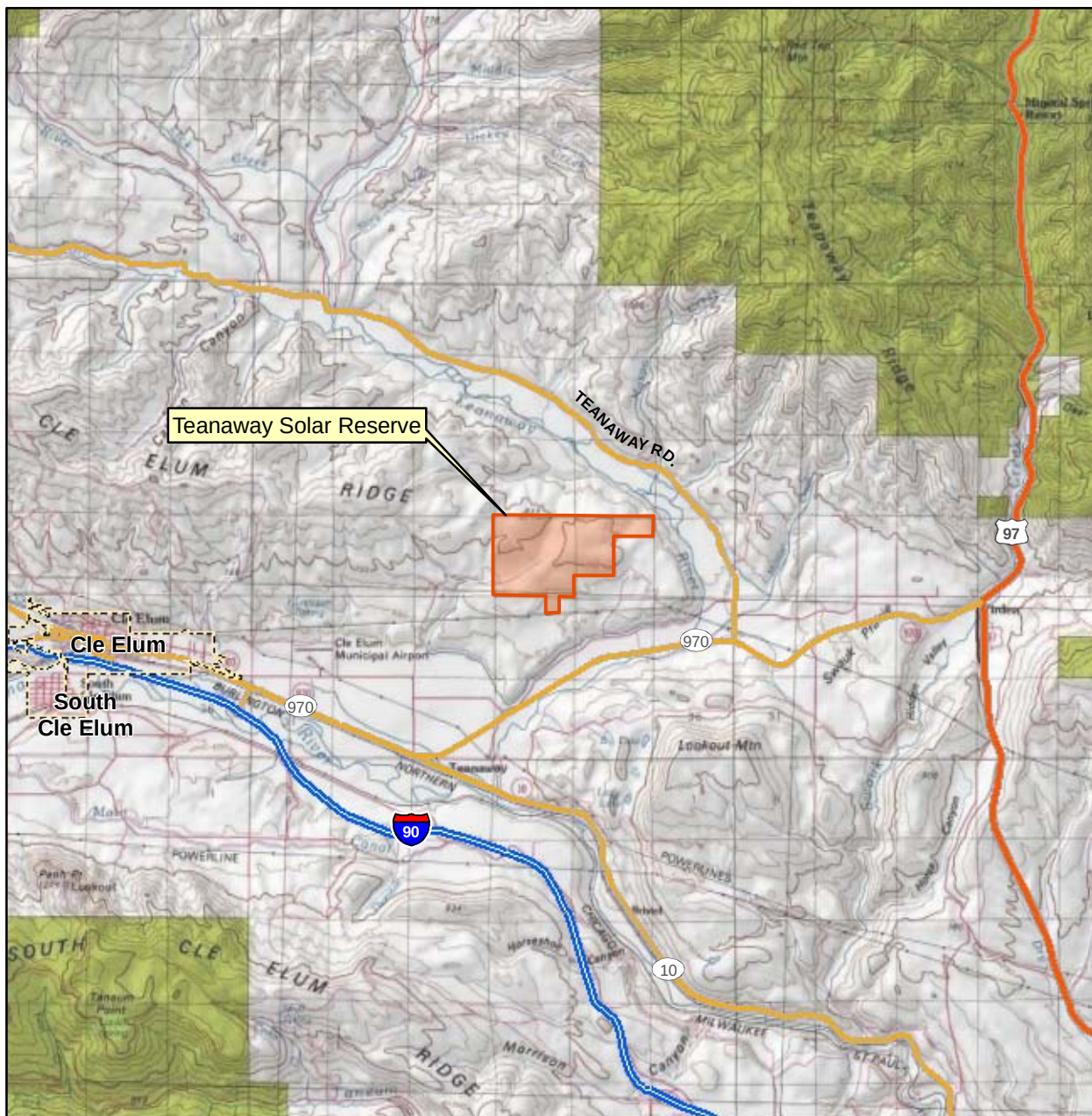
purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

Weed Control and Site Reclamation

Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. The Applicant is under a contractual obligation with the landowner to return the site in good condition and, at the landowner's request, to remove any or all of the project's components. Applicant is also contractually bound to reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the site, including the project.



VICINITY MAP

LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

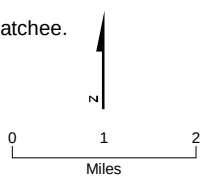
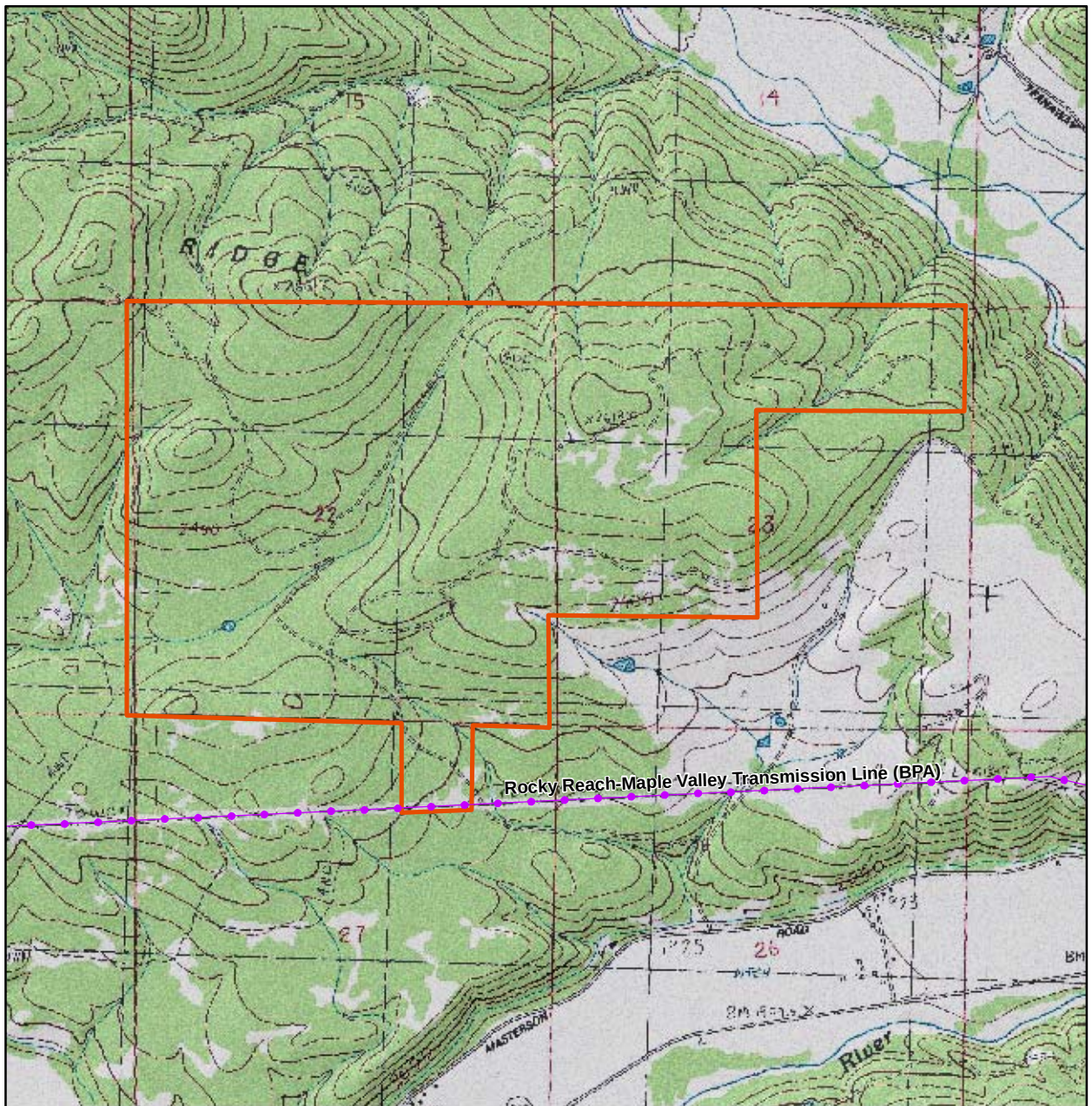


FIGURE 1
Vicinity Map
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Existing BPA Transmission Line
- Proposed Project Area

Note:

1. USGS 24K Quadrangle: Teanaway.

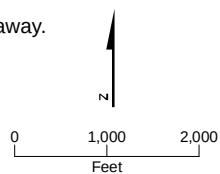
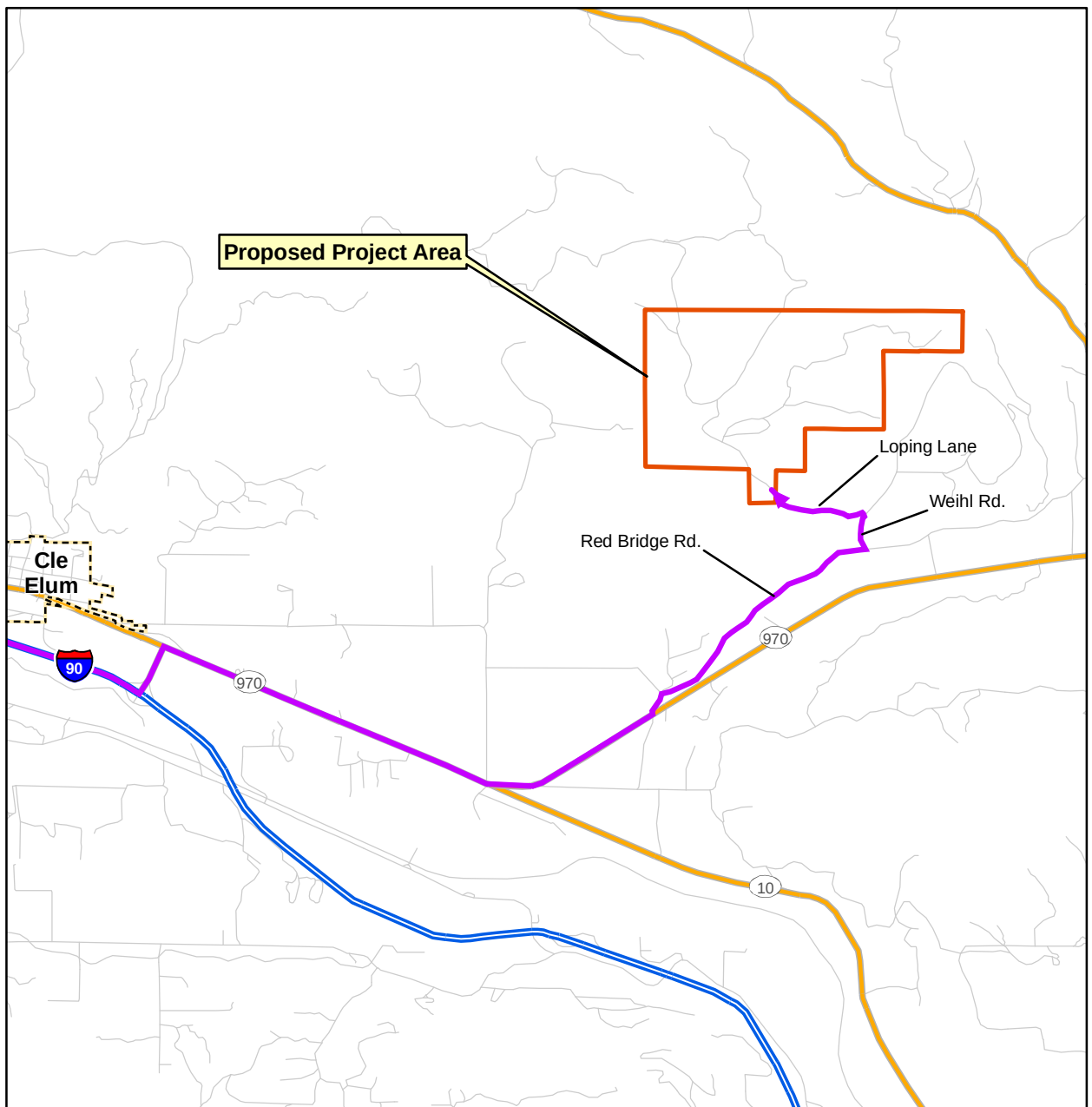


FIGURE 2
U.S. Geological Survey Topographic Map
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

- Proposed Project Area
- Site Access Route
- City Boundary
- Interstate
- Highway
- Major Road
- Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

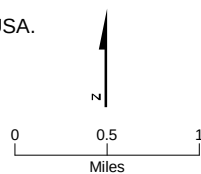
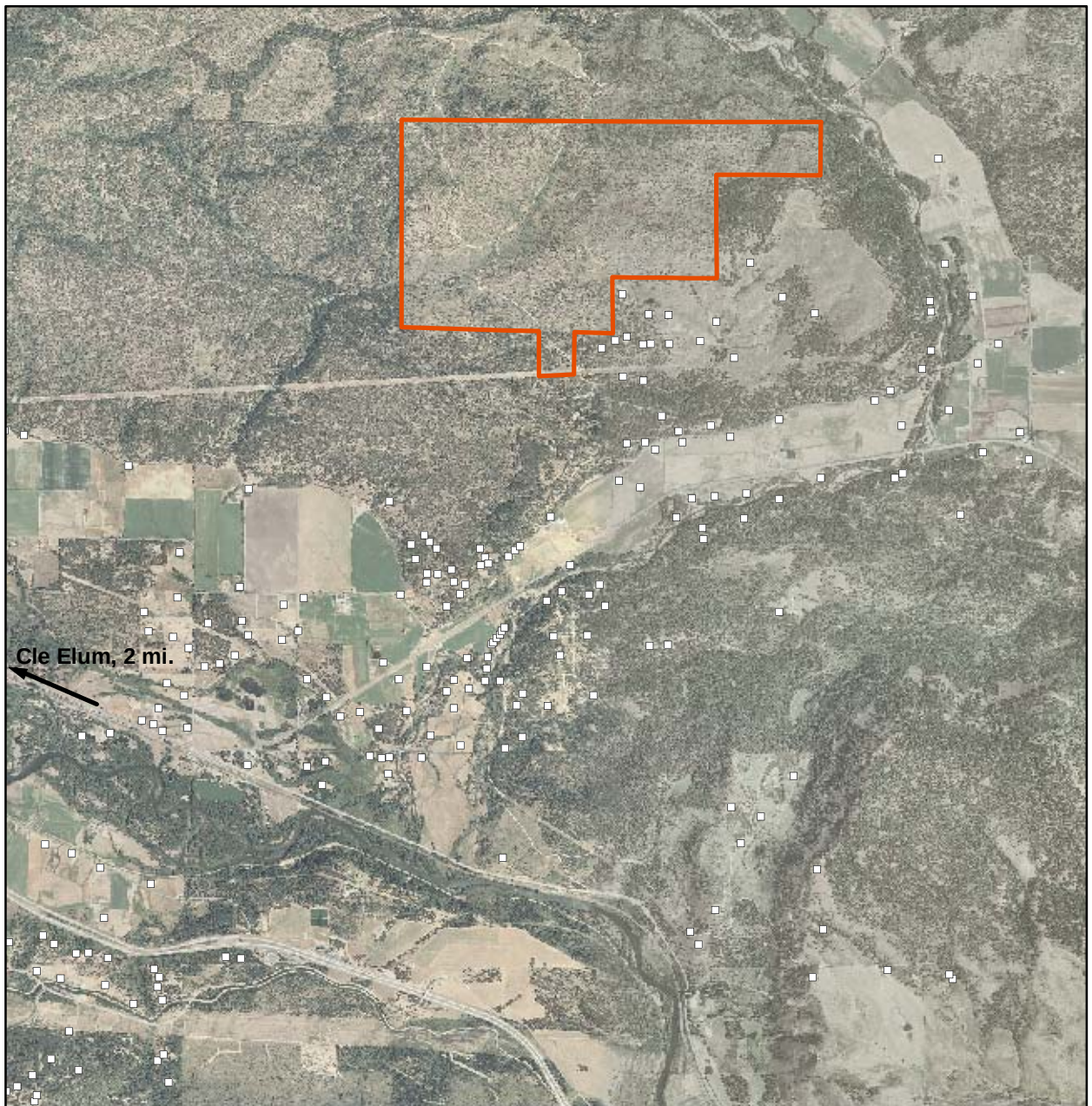


FIGURE 3
Site Access Map
 Teanaway Solar Reserve
 Kittitas County, Washington

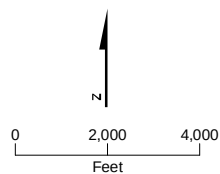


LEGEND

-  Proposed Project Area
-  Identified Structure

Notes:

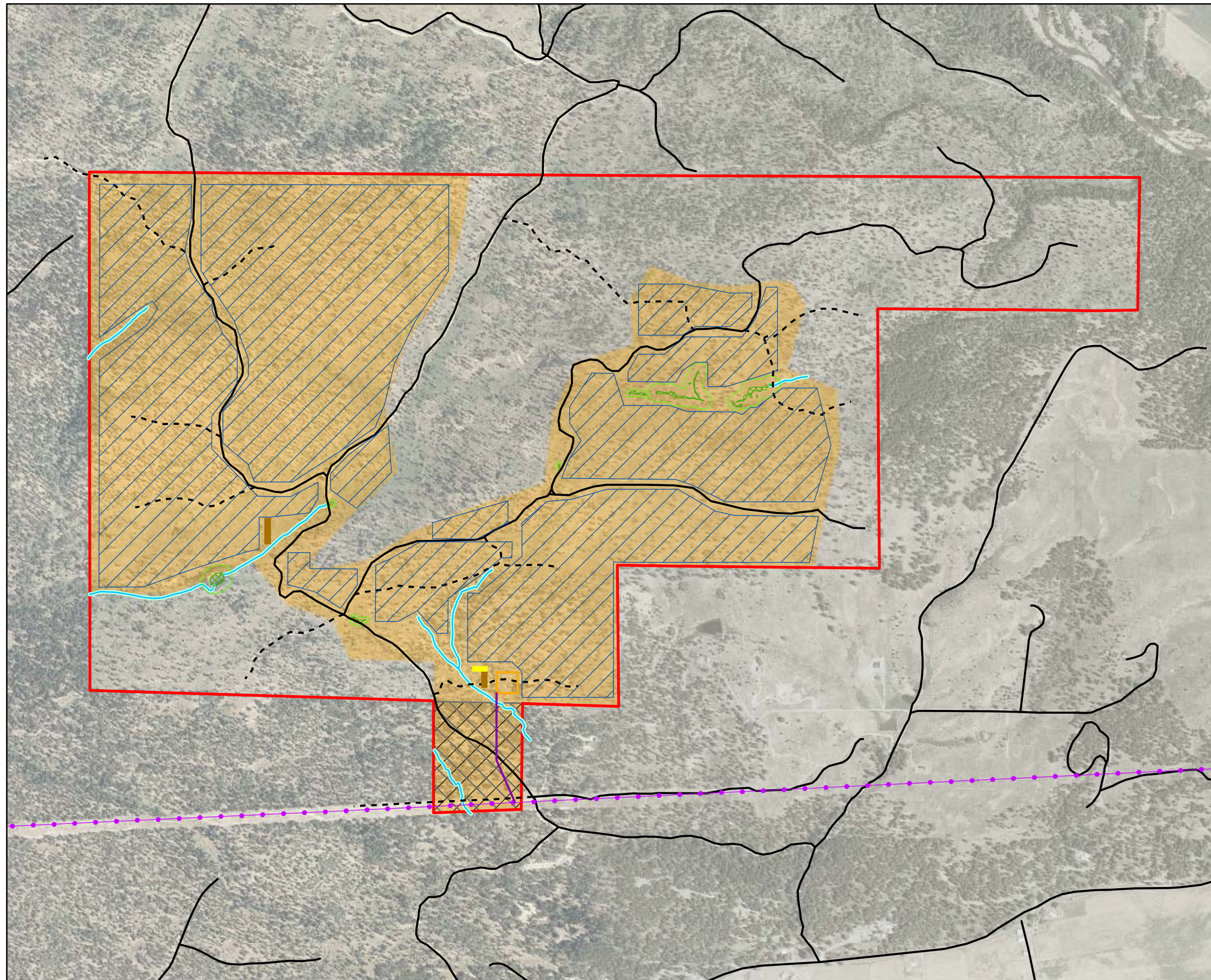
1. Aerial Imagery: 2006 1m NAIP.
2. Structures identified from aerial, not ground verified.



VICINITY MAP



FIGURE 4
Identified Structure Map
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

- Proposed Project Area
- Proposed Project Site (580 acres)
- Proposed Powerline Route to Grid
- Potential Module Placement Area
- Proposed O&M Facility
- Proposed Substation
- Proposed Switchgear
- Transmission and Access Corridor
- Existing Transmission Line
- Road
- Minor Dirt Road
- Wetland
- Wetland Buffer
- Stream
- Stream Buffer

Note:
1. Aerial Imagery: 2006 1m NAIP.

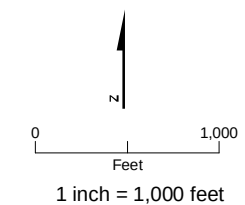
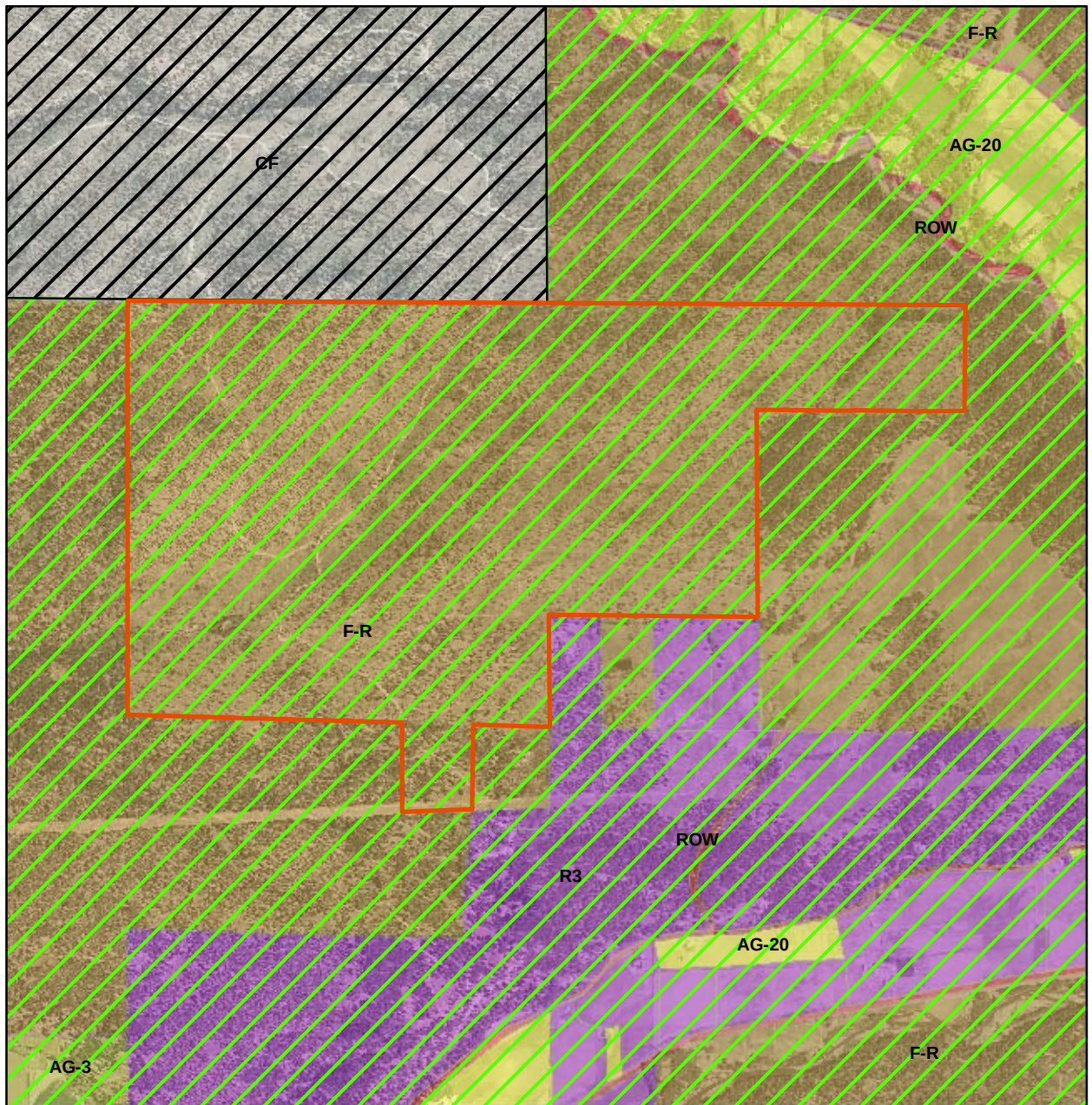


FIGURE 5
Conceptual Site Layout
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

 Proposed Project Area

Land Use

 COMMERCIAL FOREST

 RURAL

Zoning

 AG-20, Agricultural 20

 AG-3, Agricultural 3

 CF, Commercial Forest

 F-R, Forest & Range

 R3, Rural 3

 ROW, Right-of-Way

Note:

1. Aerial Imagery: 2006 1m NAIP.

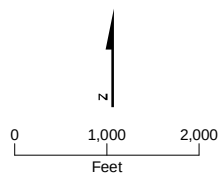
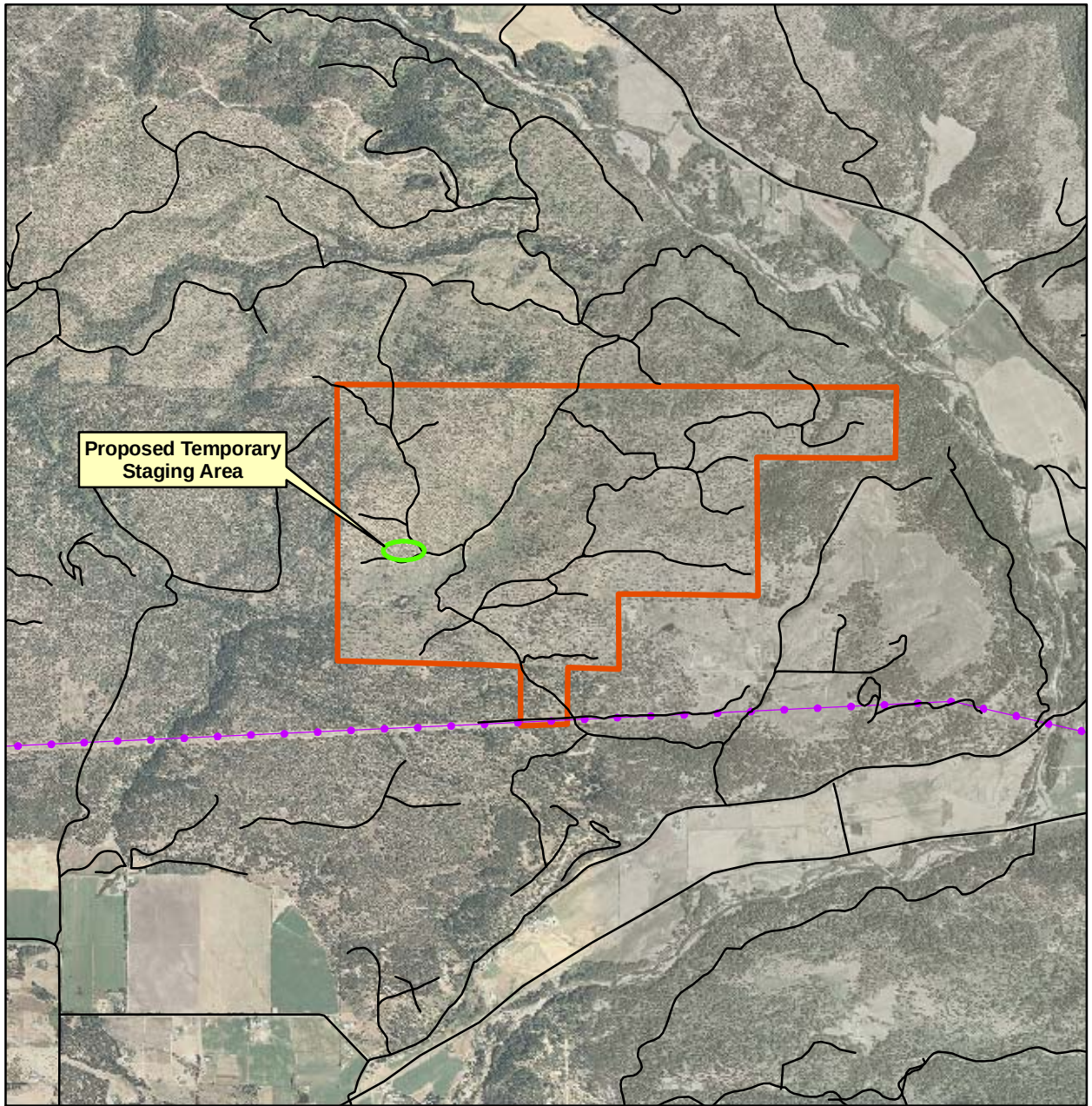


FIGURE 6
Land Use/Zoning Map
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  Proposed Temporary 5-Acre Staging Area
-  Road
-  Existing BPA Transmission Line

Note:

1. Aerial Imagery: 2006 1m NAIP.

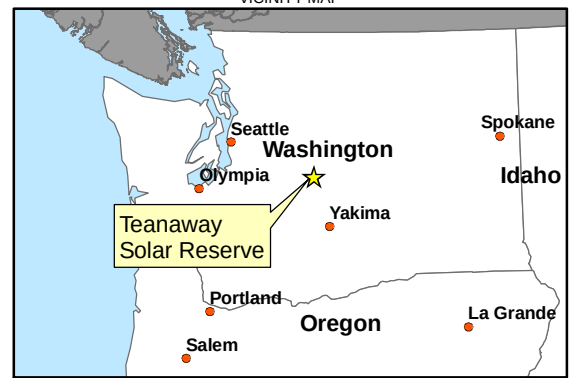
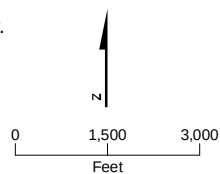


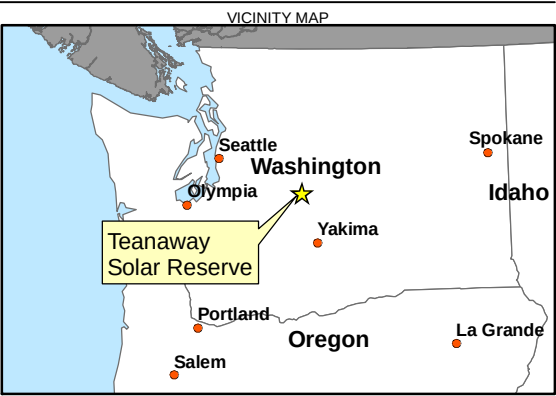
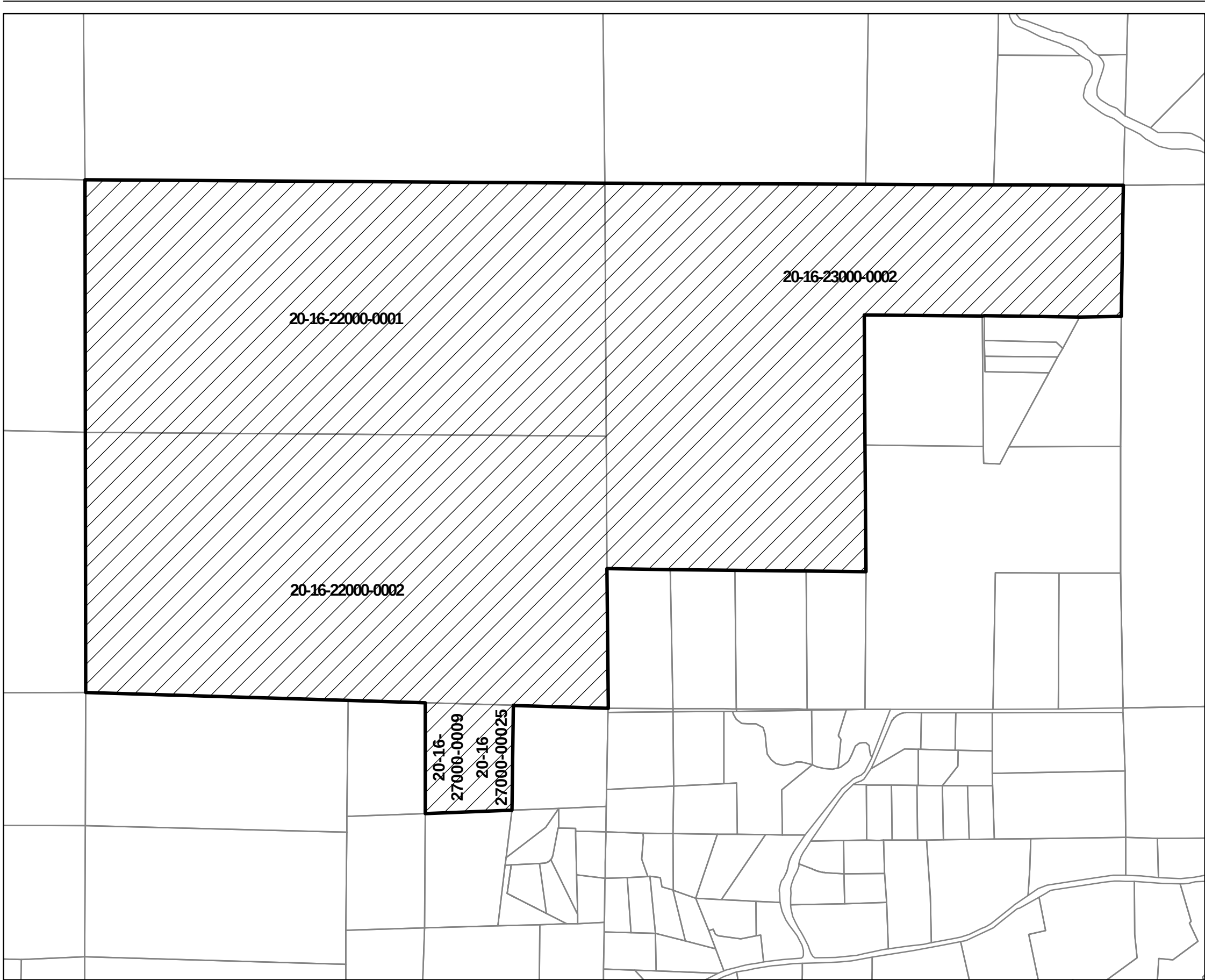
FIGURE 7
Staging Area Map
 Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT B

Legal Description

Legal Description

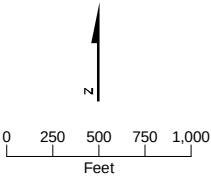
All of Section 22; the North Half of the Northeast Quarter, the Northwest Quarter and the North Half of the Southwest Quarter of Section 23; and Parcel 2 of that certain Survey as recorded May 6, 2003 in Book 28 of Surveys, pages 234, 235 and 236, under Auditor's File No. 200305060025, records of Kittitas County, Washington, being a portion of the Northeast Quarter of Section 27; All in Township 20 North, Range 16 East, W.M., in the County of Kittitas, State of Washington. A map illustrating this area is provided on the following page.



LEGEND

- Proposed Project Area (982 Acres)
- Lease Boundary
- Tax Lot Boundary

Note:
1. Tax Lot Boundary Data: Kittitas County Information Services.



Legal Description
Teanaway Solar Reserve
Kittitas County, Washington

ATTACHMENT C

Proposed Conditional Use Permit Application

See CUP Application tab

ATTACHMENT D

SEPA Checklist

See SEPA Checklist tab

*Privileged and Confidential Report
Restricted Distribution*

Teanaway Solar Reserve Cultural Resources Report Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

August 2009

Prepared by
CH2MHILL



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Paper**

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1.0 Introduction

CH2M HILL conducted an archaeological study in June and July 2009 for the proposed Teanaway Solar Reserve project (project), a solar facility on private land in an unincorporated area of Kittitas County, Washington.

Teanaway Solar Reserve, LLC (Applicant) proposes to develop the project site to maximize its solar energy potential, based on a commitment to providing renewable energy and becoming a leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors will be analyzed to determine optimal location within the site:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of environmentally sensitive areas
- Limited visibility from offsite locations

The archaeological study described in this report consisted of background research and a pedestrian survey. No subsurface excavations were carried out as part of this project. The initial survey of ca. 443 acres was conducted by Robin McClintock, B.S., Raena DeMaris, B.A., Michael Ni, and Jim Sharpe, M.S., on June 22 and 23, 2009. Additional survey covering ca. 137 acres was carried out by Julie Wilt, M.S., Humphrey Calicher, and Raena DeMaris on July 16, 2009. Jim Sharpe served as Principal Investigator during all aspects of the project.

Subsequent sections of this report are organized as follows:

- 2.0—Project Area Description
- 3.0—Environmental, Archaeological, and Ethnographic Background
- 4.0—Field Methods
- 5.0—Results of the Archaeological Study
- 6.0—Recommendations
- 7.0—References

2.0 Project Area Description

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1-1 in Appendix A for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road, and private roads such as Loping Lane and Weihl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after

appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line runs east to west along the southern site boundary (Figure 1-2). The proposed project is expected to interconnect to the regional transmission grid using this line. An interconnection substation with an approximate footprint of 10 acres will be located either on the project site, or within the BPA line right-of-way.

Project lands are situated on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (ft). Slopes are generally low to moderate in the project area (Figure 1-3). The Teanaway River is approximately 1 mile to the northeast from the part of the project area in Section 23, while the Yakima River is located approximately 1.4 miles southeast of the part of the project area in Section 27. Several seasonal drainages cross project lands, all of which were dry at the time of the survey (Figure 1-4). A small earthen dam that retained standing water across one such drainage was noted at the southern margin of the project area in Section 22 (Figure 1-2). Improved and unimproved two-track roads are present throughout the project area.

The parcel is managed as an active industrial timberland and multiple episodes of logging have occurred in the project area, the most recent of which was in 2001, when project lands were selectively logged. Currently, vegetation consists of dense low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees as well as a few Douglas firs. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*), kinnikinnick (*Arctostaphylos uva-ursi*), and Rose (*Rosa* spp.) bushes. Herbaceous plant communities include Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), and arrowleaf balsamroot (*Balsamorhiza sagittata*) (Figure 1-5).

Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species.

3.0 Environmental, Archaeological, and Ethnographic Background

3.1 Environmental Overview

The proposed TSR is situated in a transitional area between the Southern Cascade and Columbia Basin physiographic provinces at the east end of Cle Elum Ridge (Franklin and Dyrness 1973: figure 2, p. 6). Cle Elum Ridge is underlain by Middle and Lower Tertiary sedimentary and volcanic rocks. During the last period of glaciation, the project area and vicinity were covered with glacial outwash and till from alpine glaciers in the Cascade Mountains. These glaciers descended to elevations of ca. 2,700 to 3,000 ft in the Yakima and Naches River basins. Near Snoqualmie Pass, glaciers expanded east through the upper Yakima River basin to ca. seven miles east of Cle Elum (State of Washington Energy Facility Site Evaluation Council EIS 2009). The southeasternmost part of Cle Elum Ridge, including the project area, is part of a late Pleistocene glacial end moraine (Easterbrook and Rahm 1970:31).

The project area is part of the Ponderosa Pine Forests and Woodland zone (Crawford and Kagan 2001:36). This vegetation zone is associated with more arid parts of the eastern slopes of the Cascade Mountains and is part of a transition zone between the grand fir and alpine forests of the central Cascades and the sagebrush grasslands of the Columbia Basin. Forests in this zone are typically woodland or savanna with ca. 10 to 60 percent tree canopy that in general consists of widely spaced large conifers (Crawford and Kagan 2001:36). The understory is usually dominated by grasses, sedges, or forbes. Ponderosa pine and Douglas fir are the most common tree species, although grand fir may also occur. Shrubs, if present, consist of snowberry, pinemat manzanita, and kinnikinnick. At the western edge of the Columbia Basin, big sagebrush and rabbitbrush may be present. Other species include Idaho fescue, bluebunch wheatgrass, or needlegrasses as well as exotic species such as cheatgrass. Prior to Euroamerican settlement the project area and vicinity was maintained by frequent low-intensity fires that provided the savanna-like conditions. Modern suppression of naturally occurring fires in conjunction with heavy grazing has resulted in invasion by conifers, with smaller tree size and increased tree density (Crawford and Kagan 2001:37). The current parkland appearance of project lands, which is the result of logging, resemble the landscape as it would have appeared before Euroamerican settlement.

Soils in the project area are mapped as Teanaway loam, 3 to 10 percent slopes across most of the western part of the project area (USDA 2009a), and Teanaway loam 25 to 50 percent slopes across the eastern part (USDA 2009b). Teanaway loam is a moderately well drained soil found on terraces or on the sides of valleys. It formed in loess deposited over glacial till or outwash. Volcanic ash comprises some of the surface sediments.

3.2 Prehistoric Overview

The project area falls within the southern part of the Plateau culture area as it is defined by archaeologists, specifically the south-central sub-area (Ames et al. 1998:103-104). The Southern Plateau is bounded on the north by the Okanogan Highlands, on the east by the Bitterroot Mountains, on the west by the crest of the Cascade Mountains, and on the south by the uplands bordering the Deschutes and John Day river drainages. Ames et al. (1998) provide an overview of the prehistory of the Southern Plateau, a summary of which is presented below.

The peoples of the Southern Plateau have occupied the project area and surrounding lands for at least the last 11,000 years. Artifacts considered diagnostic of the earliest of these people include the distinctive Windust stemmed and Cascade leaf-shaped lanceolate projectile points. These early people were organized into small, mobile groups that moved seasonally across the region to acquire resources. By ca. 6,000 years ago populations were growing, and in conjunction with larger populations is the first evidence of a food-storage technology. This enabled more permanent settlements as indicated by the presence of semi-subterranean housepits by about 4,500 years ago. At this time root crops such as camas and balsamroot, and anadromous fish, particularly salmon, became some of the region's most important economic resources.

During the last ca. 4,000 years of prehistory, permanent winter villages, development of complex food storage systems and of logistically organized resource acquisition strategies became established behaviors that can be discerned in the archaeological record. Basecamp sites, located away from the main village centers, also become more common. These types of

camps were used by task groups that left the villages to seek out seasonally available plant and animal resources. Upland areas saw increasing use as part of the yearly subsistence round as areas where root crops were procured. Roots and other vegetal resources became staples in the diets of the aboriginal inhabitants and were harvested in large quantities, processed, and stored for winter use. By ca. 2,400 and 2,100 years ago, bow and arrow technology had spread across the Southern Plateau (Chatters and Pokotylo 1998:78). Expanded trade networks are reflected in an increase in the amount of exotic materials recovered from archaeological sites. Anadromous fish became increasingly important in local economies and an increased efficiency in the exploitation of all food resources is suggested.

The horse was introduced to the Columbia Plateau at about 1700 and transformed Indian cultures on the Southern Plateau. With horses, greater mobility and an expanded range in which to acquire resources and interact socially altered subsistence practices and probably settlement patterns as well. Horses allowed greater frequency and range of fall and winter hunting (and concomitantly, less dependence on winter stores). Undoubtedly, the increased mobility linked to the acquisition of the horse factored into the increasing complexity of regional societies into the historic period.

3.3 Ethnographic Overview

The project area is located within the ethnographic territory of the Sahaptin-speaking Kittitas and Yakama, two “closely related but independent bands and villages of families, who once occupied contiguous territories in the south-central part of the state of Washington” (Schuster 1998:327).

The Yakama and Kittitas engaged in a seasonal round of subsistence activities, beginning in late February or early March when the winter snows were melting. At this time the first salmon usually became available, as did balsamroot and yarrow, which were, and are, an important food and medicine source for indigenous people, and one of the first plants to become available after the long winter (Schuster 1998:331). In late April the salmon runs diminished, and family groups moved to upland as well as lowland areas that were especially productive of root crops such as camas and bitterroot. These items were gathered and processed for storage. Family task groups moved in June to their fishing stations to take advantage of the second and most prolific salmon run of the year. Following this run, during the hottest summer months, groups relocated to the higher elevations of the mountains. Men at this season hunted while women and children gathered roots and other plant products such as huckleberries, which were available by late August. During the autumn months, the people returned to their fishing stations for the final runs of salmon and other anadromous fish and made preparations for storing foods for winter consumption. By mid-November families had returned to their winter villages, which were generally located along rivers and streams. The foods that had been gathered and processed during the summer months were consumed during the course of the winter, supplemented by occasional hunting expeditions (Schuster 1998:331).

Two ethnographically documented Kittitas villages sites have been reported on the Yakima River near its confluence with Teanaway River, ca. 2.5 miles southwest of the project area. Additionally, the mouth of Cle Elum Lake, ca. 7.5 miles west of the project area, was an

important fishery where as many as 1,000 people would gather each summer for salmon fishing (Schuster 1998:328).

3.4 Euroamerican Contact

Shortly after most of the Plateau Indians acquired the horse, Euroamerican contact became increasingly frequent. Spanish traders visited the coast of Washington in 1775, and the first of a series of smallpox epidemics quickly swept the Plateau. Plateau groups were devastated by these outbreaks, and suffered a severe decline in population. Subsequent outbreaks of this disease, as well as measles, influenza, whooping cough, and malaria, continued sporadically throughout the early and mid-1800s (Boyd 1998:473).

The first British and American exploration and trading expeditions arrived in the region during the early 1800s. The initial effect of the Euroamerican presence in the region was not immediately injurious. The Northwest Company built Fort Walla Walla in 1818, which, like others of its kind in the early 1800s, was a multicultural institution composed of Indians, Euroamericans, and Metis. Indians were allowed to store roots here over the winter, and used the Fort as a nexus for trade and news (Stern 1998:413). Although several other forts were established on the Plateau, the region failed to achieve the status of a major center of the fur trade.

Yakama and Kittitas traders brought the first cattle to the Yakima River valley region around 1840 (Schuster 1998:343). Catholic missions followed shortly thereafter and in 1853 the first Euroamerican settlers arrived in the Plateau. In 1855 Governor Stevens of Washington Territory convened a treaty council at Walla Walla to establish reservations in order to remove native peoples in advance of encroaching Euroamerican settlement. The Yakima Treaty was signed on June 9, 1855, resulting in the relinquishment of some 11 million acres of Indian lands to Washington Territory. Fourteen groups, including the Kittitas, became the members of the confederated Tribes and Bands of the Yakima Nation.

With the increase in Euroamerican settlement came increased conflict with native peoples, many of whom resisted the appropriation of their lands. Hostilities broke out in 1855 following the crossing of Yakama lands by gold miners traveling to northeastern Washington. In that same year what came to be known as the Yakama Wars began after the Yakama were joined by other tribes in attempting to drive out the newcomers. The U. S. Army subdued the native forces and built Fort Simcoe to simultaneously keep settlers out of Yakima territory, and keep the Indians subdued. The Fort's mission failed, however, when miners again crossed the region in 1858, prompting a renewal of the war. Defeated by the Army in that same year, the Yakama and their allies retreated to the reservation following the ratification of the Yakama treaty in early 1859 (Schuster 1998:344-345).

3.5 Historical and Cartographic Overview

The first white settlers began arriving in the Kittitas Valley around the 1860s and engaged in raising livestock, crop farming, dairying, logging, lumber processing, and mining. The early pioneers who began farming did so primarily to sustain their families rather than to provide income. Early crops included grains such as wheat, vegetables such as corn and peas, and fruits such as apples, cherries, pears, plums, prunes, and peaches. Notable growth in the

farm sector came in the wake of railroad expansion and the Homestead Act of 1862, both of which encouraged heavy Euroamerican migration into the county (Wilt and Roulette 2001).

Logging and lumber industries were established in the early 1870s to serve the needs of newly arrived settlers and of railroads. Settlers needed lumber to build their homes, and the railroads required wood ties in order to lay track. Coal and other minerals were mined in the early 1880s in the Cle Elum River Valley and the surrounding mountains after homesteaders discovered coal seams in the area. Early miners extracted the coal by hand (with picks), raised it from shafts by basket and rope, and shoveled it onto wagons for transportation. In 1886 the Northern Pacific Company began to actively develop the region's coal deposits. By the end of that year a rail line had been laid to Cle Elum and Roslyn, and the first shipment of coal soon made its way to market. Although the town of Cle Elum was settled in 1883 as the result of a gold claim, it later attracted settlers with its coal mines, which remained operational until 1963 (Wilt and Roulette 2001).

As part the historical background research, a General Land Office (GLO) map dating to 1880 of Township 20 North, Range 16 East, WM, was examined to determine whether unrecorded historical structures or features are located within the project area (GLO 1880). These types of GLO maps were created following cadastral surveys, which established internal divisions within townships. Natural and cultural features that were noted by the surveyors as they established section lines are depicted on the maps. The 1880 map, the only one available for the project area and vicinity, did not depict Donation Land Claims, roads, structures, or other improvements in or near the project area.

3.6 Archaeological Overview

Background research was conducted at the Department of Archaeology and Historic Preservation (DAHP) in Olympia, Washington, to identify previously recorded prehistoric and historical sites within the project area. The background research indicated that no previous archaeological surveys had been conducted in the project area and that the property contained no previously recorded historical or archaeological resources.

The records indicate that seven archaeological investigations have been carried out within ca. one mile of the project area. Four of the previous investigations (Miller 1997, Fonville and Stinson 2007, Stilson 2003, and Powell 1997) were pedestrian surveys carried out for impending timber sales. Other archaeological investigations include a site damage assessment and survey conducted across Washington state following the installation of small seismometers, one of which was located in Kittitas County (Boersema et al. 2008). The two remaining surveys were carried out for Bonneville Power Administration projects (Middleton and Hackenberger 2002 and Regan 1999).

Three of the surveys resulted in the recordation of cultural resources. A historic-era cabin and associated road (site 45KT2282), a blazed tree, and part of a railroad grade (site 45KT2283) were identified and recorded as part of Stinson's 2003 survey. An isolated piece of lithic debitage (isolate 45KT1359) and a culturally modified tree were recorded by Miller (1997), and an isolated biface tool fragment (45KT1358) was recorded by Powell (1997). The other cultural resource surveys did not identify any cultural resources.

4.0 Field Methods

In total, CH2M HILL archaeologists surveyed ca. 580 acres of the project area. The survey entailed three to four archaeologists walking meandering parallel transects spaced ca. 30 meters (100 feet) apart (Figure 3-1). Resumes for the lead archaeologists are included as Appendix B. All exposures of mineral soil, including two-track roads, deflated areas, and rodent backdirt piles were carefully examined for the presence of archaeological materials. Overall, less than 10 percent of the project area featured exposed mineral soils due to vegetational ground cover. Digital photographs and field records are on file at the CH2M HILL office in Portland, Oregon.

5.0 Results of the Archaeological Investigation

Sediments observed in dirt roads and other exposures largely conformed to the description of Teanaway loam, 3 to 10 percent slopes, and Teanaway loam 25 to 50 percent slopes. Soils exposed at the surface were light to medium brownish gray fine grained silt and silt loam. Glacial till consisting of large to small subrounded to subangular pebbles and cobbles was exposed in many locations. Also observed, although less frequently, were large to very large basalt boulders and outcrop. Logging disturbances include access roads, berms, borrow pits, and numerous stumps. One large slash pile as well as scattered downed tree limbs occurred throughout the project area, as did several charred snags and stumps.

No archaeological resources were identified as a result of the field investigation although opportunities to do so were limited by the dense ground cover across nearly the entire project area.

6.0 Recommendations

Ethnographic literature indicates that a winter village site was located ca. 2.5 miles southwest from the project area along the Yakima River (Schuster 1998:328). The south-facing slopes of the project area would have been easily accessed from this and other ethnographic settlements and would have provided the first balsamroot and yarrow in early spring, as well as deer, elk, and other resources throughout the year. It is possible that prehistoric peoples used the project area as a hinterland to their winter villages where they harvested balsamroot, yarrow, and other plants, and hunted large and small game. Archaeological remains of such uses are likely to consist of small base camps where such resources were taken to be consumed and processed for later use. Such camps were likely situated in relatively flat meadows and on the crest of hills and knolls rather than on steep side slopes. These camps would likely be most visible archaeologically as sparse and scattered lithic scatters. Dense, stratified cultural deposits like those associated with winter village sites are unlikely to be present.

Because the project area may contain buried archaeological sites associated with seasonal base camps, CH2M HILL recommends that limited shovel testing be carried out in areas deemed likely to contain cultural materials related to resource acquisition. Such areas would be centered on flat, open meadows as shown in Figure 5-1. As indicated in this figure, approximately 85 acres of the proposed TSR are suitable for limited shovel testing.

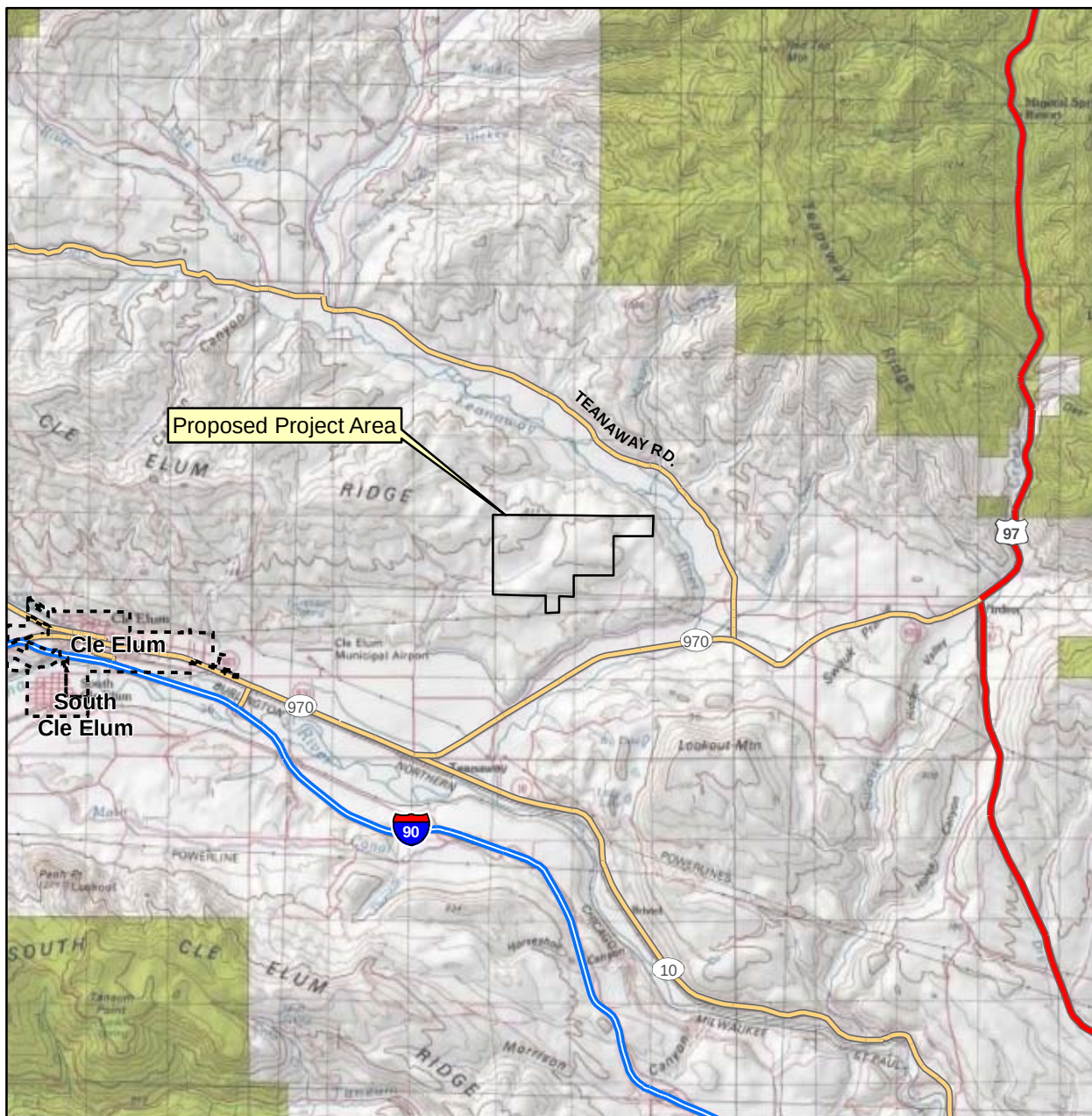
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APPENDIX A

Figures



VICINITY MAP

LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee, 1982 30x60-minute series.

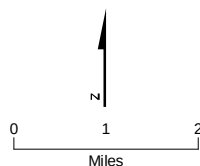
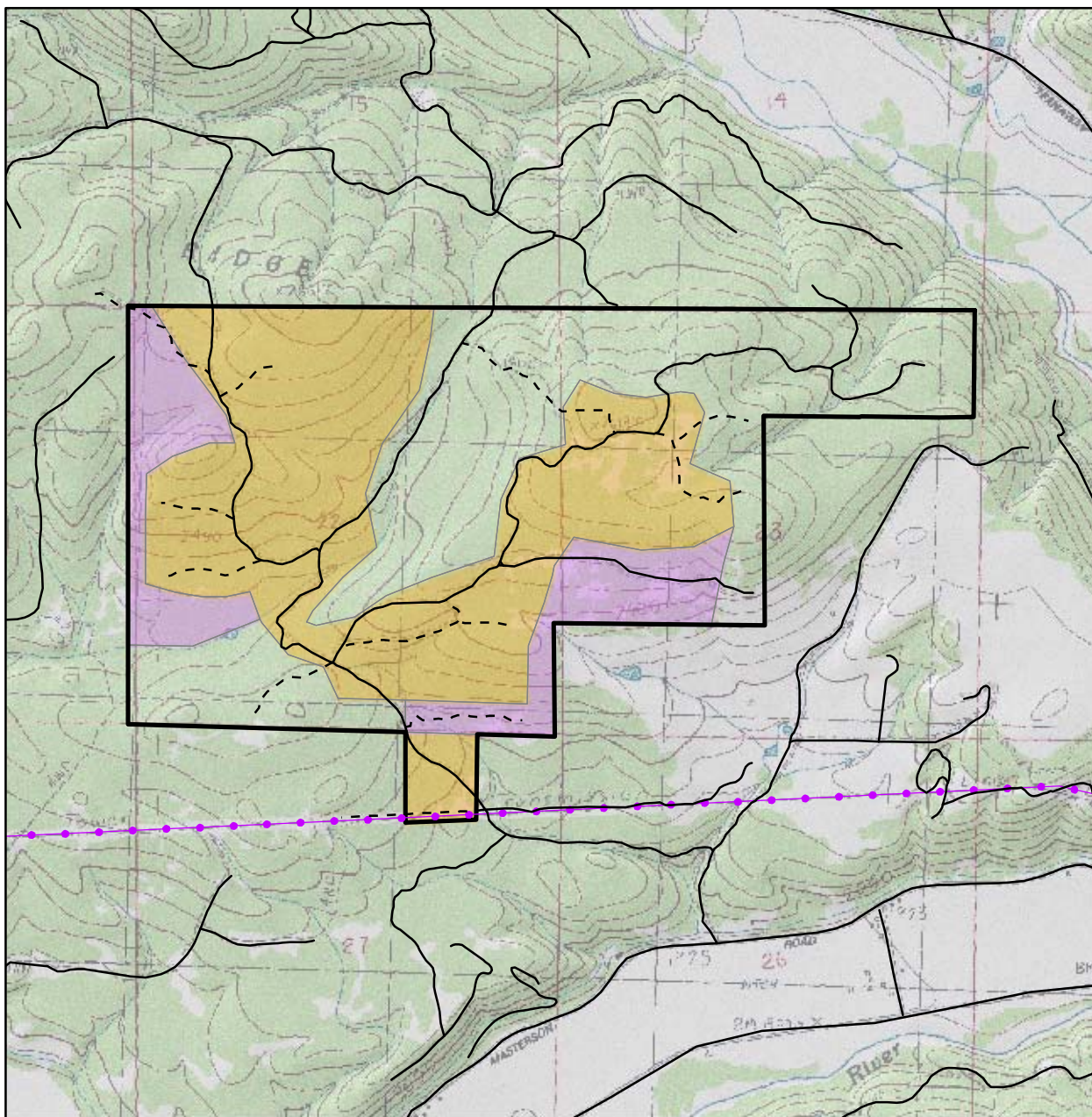


FIGURE 1-1
Vicinity Map

Cultural Resources Report
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  July 2009 Survey Area
-  June 2009 Survey Area
-  Road
-  Minor Dirt Road
-  Existing Transmission Line (BPA)

Note:

1. USGS 24K Quadrangle: Teanaway, 1985 7.5-minute series.

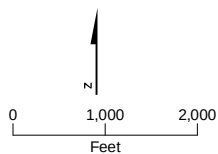


FIGURE 1-2
Survey Area Map
 Cultural Resources Report
 Teanaway Solar Reserve
 Kittitas County, Washington



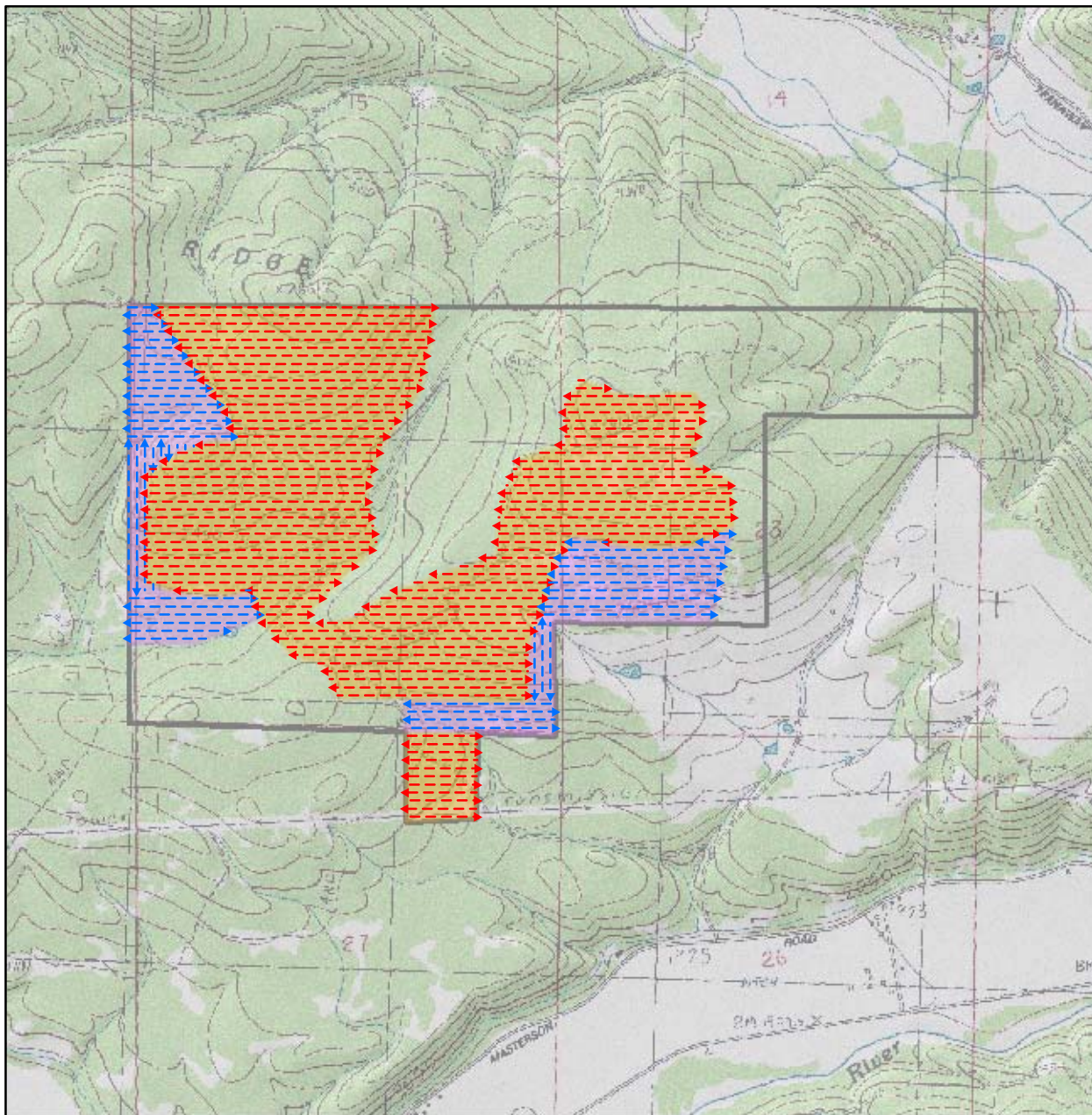
Figure 1-3
 Photograph of Southern Part of Project Area.
Yakima River Valley is in background. View is to the southwest.



Figure 1-4
 Photograph of Shallow Drainage or Swale.
View is to the northwest.



Figure 1-5
Photograph of Balsamroot Stand.
Yellow flowers. View is to the southeast.



LEGEND

-  Proposed Project Area
-  July 2009 Survey Area
-  June 2009 Survey Area

Cultural Survey Transects (100-foot Spacing)

-  July 2009
-  June 2009

Note:

1. USGS 24K Quadrangle: Teanaway, 1985 7.5-minute series.

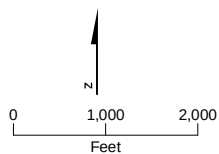
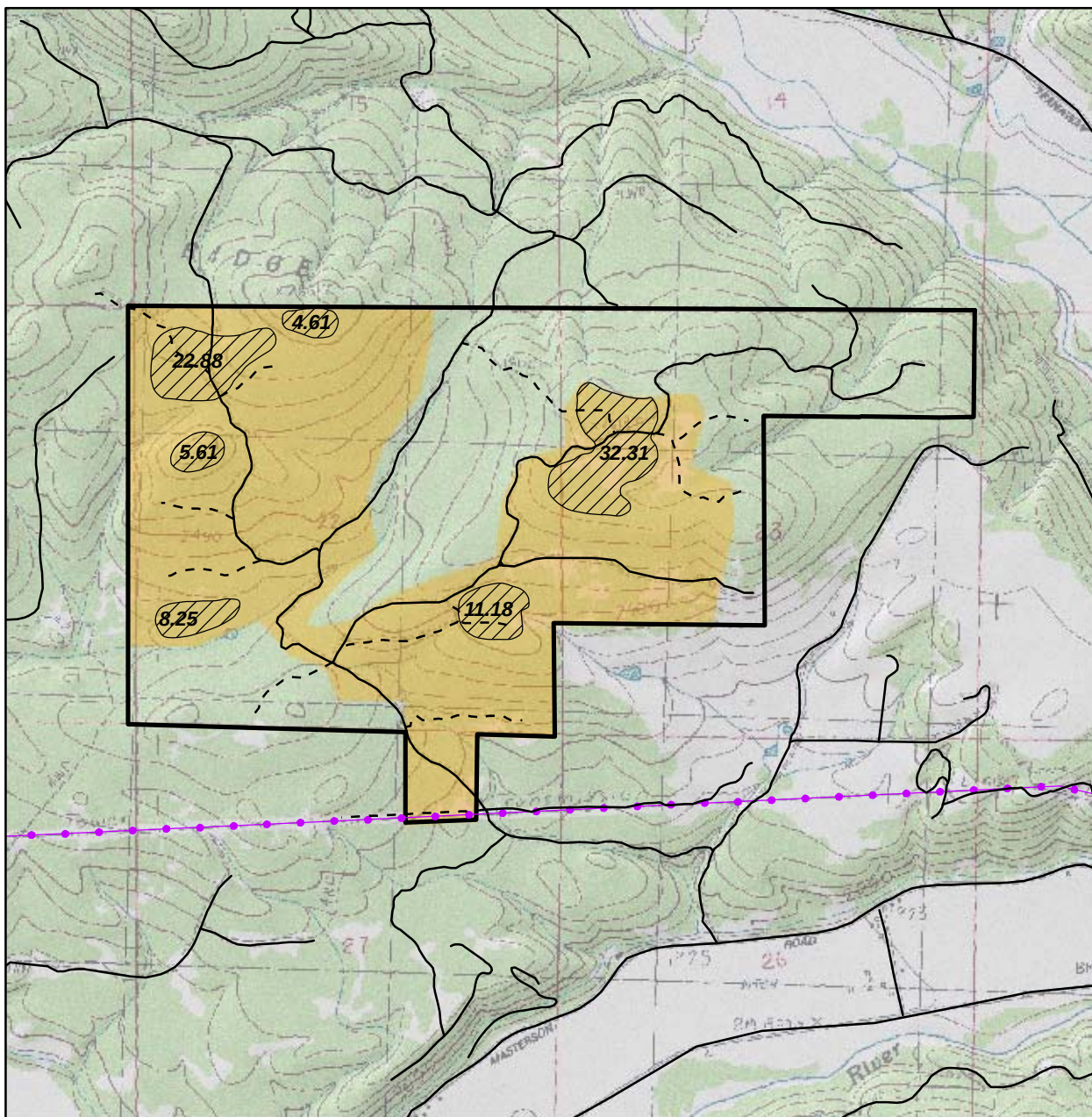


FIGURE 3-1
Survey Transect Map

Cultural Resources Report
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Proposed Project Area
- Cultural Survey Area
- Proposed Shovel Test Area (acres)
- Road
- Minor Dirt Road
- Existing Transmission Line (BPA)

Note:

1. USGS 24K Quadrangle: Teanaway, 1985 7.5-minute series.

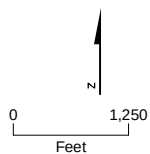


FIGURE 5-1
Areas Proposed for Shovel Testing
 Cultural Resources Report
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B

Archaeologist Resumes

Jim Sharpe

Archaeologist

Education

M.S., Resource Management, Central Washington University, 1997

B.S., Anthropology, Central Washington University, 1994

Distinguishing Qualifications

- Archaeological experience in Washington, Oregon, California, Colorado, Idaho, Alaska, and Nevada
- Extensive experience building trust as a liaison to numerous Native American tribal groups in the Pacific Northwest
- Expertise in archaeological survey, excavation methods, historical research, technical report writing and National Register of Historic Places eligibility assessments

Relevant Experience

Mr. Sharpe has 14 years of cultural resources experience in Washington, Oregon, California, Idaho, Nevada, Colorado, and Alaska. He has extensive and unique experience with prehistoric and historic sites. His experience includes cultural resource support at the Department of Energy's Hanford Site and several states. This experience includes completion of cultural resource reviews for compliance of Section 106 of the National Historic Preservation Act, historical research, site inspection, archaeological survey, site monitoring, research designs, subsurface testing, excavation, site evaluations, laboratory analysis, technical report writing, and tribal liaison with numerous Native American tribes.

As a cultural resource specialist for CH2M HILL, Mr. Sharpe has extensive experience with the prehistoric and historic cultural resources from his work in several states. His primary experience is in the Columbia Plateau. He has extensive experience with historic agriculture and has authored numerous articles and technical reports on archaeological and historical topics.

Representative Projects

Archaeological survey for a solar farm in Cle Elum, Washington, 2009.

Archaeological survey for the Commercial Avenue Extension Project, Pasco, Washington, 2009.

Archaeological survey for the Powerline Road Project, Pasco, Washington, 2009.

Archaeological survey for the Leaning Juniper Wind Farm, Arlington, Oregon, 2009.

Archaeological survey for three locations for Detla Petroleum for natural gas exploration, eastern Washington 2009.

Archaeological survey for the Juniper Canyon Electrical Transmission Line, Bickleton, Washington, 2009.

Archaeological survey for the Belfair Wastewater and Water Reclamation Facilities, Belfair, Washington, 2009.

Archaeological survey, backhoe testing, shovel probes, and sonicoring and report preparation for the Washington State Department of Transportation (WSDOT) Tacoma HOV Road Improvement Project, Tacoma and Fife, Washington, 2008 and 2009.

Archaeological survey and shovel probes for the Federal Way Road Improvement Project, Federal Way, Washington, 2008.

Archaeological survey and shovel probes for the Venco Inc. for four gas wells near Skamokawa, Washington, 2008.

Archaeological survey for the Bremerton National Airport Rehabilitation Project, Bremerton, Washington, 2008.

Archaeological survey for the PacifiCorp Electrical Transmission line from Walla Walla to McNary Oregon. Umatilla, Oregon, 2008

Archaeological survey for the Stone Pond Water Detention Pond, Seattle, Washington, 2008.

Archaeological survey for the Bighorn Wind Project, Bickleton, Washington, 2008.

Archaeological survey for the Belfair Water Project, Belfair, Washington, 2008.

Archaeological survey for the Starpoint Wind Farm Project for PPM Energy, Wasco, Oregon, 2008.

Archaeological survey for the Biglow Wind Farm Project for PGE, Wasco, Oregon, 2008.

Archaeological survey for the Helix Wind Farm Project for PPM Energy, Helix, Oregon, 2008.

Archaeological survey for the Juniper Canyon Wind Farm Project for PPM Energy, Roosevelt, Washington, 2008.

Archaeological excavation for the KR4 Pump and Treat Project at the U.S. Department of Energy's Hanford Site for Pacific Northwest National Laboratories (PNNL), Richland, Washington, 2007.

Archaeological excavation near the H-Reactor Area at the U.S. Department of Energy's Hanford Site for Pacific Northwest National Laboratories (PNNL), Richland, Washington, 2007.

Archaeological survey for Delta Petroleum for a natural gas project, Alderdale, Washington, 2007.

Archaeological survey for the Palisades to Goshen Electrical Transmission line for BPA, Idaho Falls, Idaho, 2007.

Archaeological survey for Soda Springs Electrical Transmission line for BPA, Soda Springs, Idaho, 2007.

Archaeological shovel probes and technical report for the Eagle Island Project for the Parks Service, Eagle Idaho, 2007.

Archaeological survey for the Pebble Springs Wind Farm Project for PPM Energy, Arlington, Oregon, 2007.

Archaeological excavation at waste site 128-B-3 at the U.S. Department of Energy's Hanford Site, Richland, Washington, 2006.

Archaeological excavation for the Sandpoint Byway Project for the Idaho Department of Transportation, Sandpoint, Idaho, 2005-2008.

Archaeological survey and report for four boat docks along the shoreline of the Columbia River, Franklin County, Pasco, Washington, 2006.

Archaeological survey and site recording for the runway expansion project for the Durango, Colorado Airport, Durango, Co, 2006.

Archaeological survey and site recording for the EnCana Natural Gas Project, Sunnyside, WA, 2005.

Shovel probes, site form, and Determination of Eligibility for a historic site discovered during construction for the U.S. 95 Setters to Bellgrove to Stangel project for the Idaho Transportation Department, Coeur d'Alene, ID, 2005.

Archaeological survey and report preparation for the Sienna West, West Richland, WA. Project. West Richland, WA for the BLM, 2005.

Archaeological survey and report preparation for the Sundance Ridge Feeder Corridor, Richland, WA. Richland, WA for the BLM, 2005.

Archaeological Survey for the West End of Lattin Road, Benton County, West Richland, Washington. Survey of BLM land for granting an easement to West Richland, 2005.

Presence/absence testing for the North Ontario Interchange Bridge Project, Ontario, Oregon for the Oregon Department of Transportation, 2004.

Archaeological excavation on Decator Island, San Juan Islands for Century-Tel, Anacortes, Washington, 2004.

Archaeological survey for the White Creek Wind Project, Bickleton, Washington, 2004.

Presence/absence testing along I-5 between 13th Avenue and Rush Road, Chehalis, Washington, 2004.

Presence/absence testing near Waste Sites 128-F-2 and 1607-F5, Hanford Site, Richland, Washington, 2004.

Presence/absence testing near Waste Sites 128-B-2 and 128-B-3, Hanford Site, Richland, Washington, 2004.

Archaeological survey for the Bighorn Wind Project, Bickleton, Washington, 2004.

Archaeological survey for the North Ontario Interchange Bridge Project, Ontario, Oregon for the Oregon Department of Transportation, 2004.

Subsurface shovel testing for the railroad tie treatment facility, Wyeth, Oregon, 2004,

Subsurface shovel testing for the New Seward Highway Project, Anchorage, Alaska, 2004.

Archaeological survey for the Hyampom Road Project, Hyampom, California, 2003.

Archaeological survey for the Saddleback Wind Farm Project, White Salmon, Washington, 2003.

Archaeological survey for the Hopkins Ridge Wind Farm Project, Dayton, Washington, 2003.

Backhoe testing for CA-SAC-02, and three remote sensing locations for the Sacramento Municipal Utility Project, (SMUD), Galt, California, 2003.

Archaeological survey, Oxnard California Water Project, Oxnard, California, 2003.

Archaeological survey, SR-79 Road Improvement Project, Winchester, California. Conducted archaeological survey for the SR-79 Road Improvement Project, Winchester, California, 2003.

Archaeological survey, Obsidian Butte, California. Conducted archaeological survey for the Unit 6 Project, Obsidian Butte, California, 2003.

Archaeological survey, Translake Highway Project, Seattle, Washington. Conducted archaeological survey and photo documentation for the proposed highway project, Seattle, Washington, 2002.

Archaeological survey, Ripon, California. Conducted archaeological survey of preferred and alternative locations for a proposed gas fired power plant at Ripon, California, 2002.

Archaeological survey, Pacific Corp, Klamath Falls, Oregon. Conducted archaeological survey as part of the re licensing requirements for the dams on the Klamath River, 2002.

Archaeological Survey, Northwest Wind Project, Goldendale, Washington. Conducted archaeological survey for wind turbines and access roads for a wind farm in eastern Washington, 2002.

Archaeological Survey, Mountain Home Air Force Base, Juniper Butte Range in southwest Idaho, Conducted archaeological survey for a 3 mile access road, 2002.

Archaeological Survey, Pacific Gas and Electric Company, Fresno, California. Conducted archaeological survey for an 8 mile electrical transmission line, 2002.

Archaeological Survey, Calpine Corporation, Rio Vista, California. Conducted archaeological survey for an 11-mile gas pipeline, 2002.

Archaeological Site Record, Sacramento Municipal Utility District, Galt, California. Relocated an archaeological site and updated site record, 2002.

Archaeological Survey, Sacramento Municipal Utility District, California. Archaeological survey of about 70 acres for laydown areas and an access road. Attended a meeting with project personnel and representatives from the Miwok tribe to address issues associated with a gas pipeline, 2002.

Archaeological Site Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Archaeological excavation of a prehistoric site at UPR-100-F-2 near the F-Reactor area on the Hanford nuclear waste site administered by the DOE. Coordinated with representatives from the Wanapum tribe, 2001.

Archaeological Survey, San Joaquin, California. Archaeological survey for the reconfiguration of a 25-mile electrical transmission line, 2001.

Archaeological Survey and Site Recording, Starbuck Power Plant, Eastern Washington. Conducted an archaeological survey and site recording along 18 miles of electrical transmission line corridor near the Snake River. Coordinated with representatives from the Nez Perce, Umatilla, and Wanapum tribes, 2001.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Performed an archaeological excavation for an extraction well C3662 in support of the KR4 pump and treat groundwater remediation project. The excavation revealed a 10,000-year-old basalt projectile point on a Holocene terrace above the Columbia River, 2001.

Archaeological Survey and Site Recording, Maiden Springs Wind Farm Project near Prosser, Washington. Conducted an archaeological survey on Rattlesnake Hills for the wind farm. Coordinated with representatives from the Wanapum tribe, 2001.

Multiple Pipeline Archaeological Surveys, California. Conducted archaeological survey for water and gas pipeline routes near Fresno, California. Performed surveys for four individual pipeline projects near Modesto, Tracy, San Jose, and Sacramento, California, 2001.

Archaeological Survey, Calpine Corporation, Palm Springs, California. Conducted archaeological survey and relocated previously recorded sites for an electrical transmission line project. Coordinated with a Native American from the Torres Martinez tribe, 2001.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Excavation at prehistoric site HT-2001-007, D-Area Hanford Site. Coordinated with Wanapum tribal members, 2001.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Excavation at the prehistoric site 45-BN-606 at Lewis Canal, Hanford Site. Worked with Wanapum tribal members, 2001.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Subsurface testing at a prehistoric site 45-BN-606 at Lewis Canal, Hanford Site. Coordinated with Nez Perce and Wanapum tribal members, 2000.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Archaeological excavation of historic Wanapum tribal caches near H-Reactor Area of the Hanford Site. Coordinated with Wanapum tribal members, 2000.

Archaeological Surveys, Calpine Corporation, Palm Springs, California. Two archaeological surveys of various proposed gas line routes. Coordinated with Native Americans from the Torres Martinez tribe, 2000.

Vernita Block Survey, Pacific Northwest National Laboratory, Richland, Washington. Archaeological survey for the laboratory, which is associated with the Hanford nuclear waste site. Coordinated with tribal members from the Wanapum, Nez Perce, and Yakama tribes, 1999.

Archaeological Data Recovery, Hoover Dam, Boulder, Nevada. Data collection at three prehistoric sites near Hoover Dam, performed in conjunction with a proposed highway bypass project. Information was collected to determine site eligibility for the National Register of Historic Places, 1999.

Archaeological Survey, Hanford Site, U.S. Department of Energy, Richland, Washington. Archaeological survey in the 1100 area of the Hanford Site to support activities of Pacific Northwest National Laboratory, 1999.

Archaeological Excavation, Hanford Site, U.S. Department of Energy, Richland, Washington. Archaeological excavation for the installation of an extraction well for the KR4 Pump and Treat Project. Coordinated with a Native American from the Wanapum tribe, 1999.

Archaeological Survey, Owens Dry Lake Dust Mitigation Program, City of Los Angeles Department of Water and Power. Archaeological survey at Owens Valley, California, on the Owens Lake dry lakebed in support of a dust mitigation project, 1999.

Archaeological Excavation, U.S. Fish and Wildlife Service, Sherwood, Oregon. Conducted excavation to support a federal highway project. The need for the project was determined through previous subsurface testing, during which the site was demonstrated to be significant, 1998.

Archaeological Monitoring, Pacific Northwest National Laboratory, Richland, Washington. Archaeological monitoring of 81 selected cutbanks along the Hanford Reach of the Columbia River to support activities by the laboratory, 1998.

Archaeological Survey, Richland, Washington. Performed survey for well decommissioning project near Washington Public Power Supply System. Coordinated with tribal members from the Wanapum tribe, 1997.

Archaeological Survey, Wenatchee National Forest, Washington. Conducted archaeological survey near Mission Ridge, Washington, for a land exchange, 1994.

Archaeological Survey, Priest Rapids and Wanapum Reservoirs, Grant County Public Utility District, Washington. Conducted survey along reservoirs in the Columbia River. Coordinated with Wanapum tribal members, 1992, 1993 and 1994.

Publicly Released Documents

Sharpe, Jim, J.

2006, Sodium Dichromate Investigation for the D/DR Reactor Area. Richland, Washington.

Sharpe Jim J. and Marceau, Thomas E.

Archaeological Subsurface Testing Report: Remediation of Waste Sites 128-B-2 and 128-B-3 on the Hanford Site, Benton County, Washington.

Sharpe Jim J. and Marceau, Thomas E.

2004, Archaeological Subsurface Testing Report: Remediation of Waste Sites 128-F-2 and 1607-F-5 on the Hanford Site, Benton County, Washington.

Marceau, Thomas E. and Jim J. Sharpe,

2002, Report of Archaeological Excavations Conducted at UPR-100-F-2 on the Hanford Site, Washington, BHI-01649, Richland, Washington.

Marceau, Thomas E. and Jim J. Sharpe,

2002, Excavation Report for Archaeological Sites 45-BN-888 and 45-BN-606 on the Hanford Site, Richland, Washington.

Sharpe, Jim, J.

2001. History of River Transportation on the Hanford Reach. BHI-01561, Richland, Washington.

Sharpe, Jim, J.

2001. *Phase III of the Pre-Hanford Agricultural Period: 1900-1943*, BHI-01566, Richland, Washington.

Sharpe, Jim, J. and Thomas E. Marceau

2001. *Archaeological Excavation Report for Extraction Well C3662 in Support of the 100-KR-4 Pump-and-Treat Project*. BHI-01556, Richland, Washington.

Sharpe, Jim, J., J. K. Linville, C. Trice

2001. *100-F Reactor Area Underground Pipeline Historical Information Summary*. BHI-01504, Richland, Washington.

Sharpe, Jim and Thomas Marceau

2000. *Archaeological Excavations at the Wanapum Cache Site*. BHI-01375, Richland, Washington.

Sharpe, Jim

2000. *Phase II of the Pre-Hanford Agricultural Period: 1900-1943*. BHI-01422, Richland, Washington.

Sharpe, Jim

2000. *Chinese Gold Miners of the Mid-Columbia Region: Phase II and Phase III*. BHI-01421, Richland, Washington.

Sharpe, Jim and Jennifer Linville

2000. *100-B/C Reactor Area Underground Pipeline Historical Information Summary*. BHI-01453, Richland, Washington.

Sharpe, Jim

1999. *Archaeological Survey of 56 Preselected Parcels on the Arid Lands Ecology Reserve*. BHI-01268, Richland, Washington.

Sharpe, Jim

1999. *Chinese Gold Miners of the Mid-Columbia Region*. BHI-01316, Richland, Washington.

Sharpe, Jim

1999. *Pre-Hanford Agricultural History: 1900-1943*. BHI-01326, Richland, Washington.

Griffin Paul, and Jim Sharpe

1999. *Hanford B Reactor Building Hazard Assessment Report*. BHI-01282, Richland, Washington.

Sharpe, Jim

1997. Masters Thesis: *Issues and Conflicts in the Management of the Public Domain of the Saddle Mountains in Eastern Washington: A Case Study*.

Technical Reports

Sharpe, J. James and Lori Durio 2009, *M Street SE Grade Separation Project Historic, Cultural and Archaeological Resources Discipline Report*. Bellevue, Washington.

Sharpe, J. James, 2009, *Archaeological Survey for the Powerline Road Project*, Pasco, Washington, 2009

Sharpe, J. James, 2009, *Archaeological Survey for the Commercial Avenue Extension Project*, Pasco, Washington.

Sharpe, J, Jim and J.C. Bard, 2008, *Archaeological Survey Report for the Juniper Canyon Wind Farm Project*, Klickitat County, Washington.

Sharpe, Jim, James C. Bard and Ranea Ballantyne, 2008, *Cultural Resources Investigation for the PacifiCorp Electrical Transmission Line from Walla Walla, Washington to McNary, Oregon*.

Sharpe, Jim, 2008, *Cultural Resource Investigation of Four Gas Well Locations in Wahkiakum County near Skamokawa, Washington*.

Sharpe, Jim and Jim Bard, 2008, *Archaeological Survey and Testing Methodology for the Fife Segment, Tacoma/Pierce County HOV Program*, Seattle, Washington.

Sharpe, Jim, Jim Bard and Robin McClintock, 2008, *Cultural Resources Inventory for the Helix Wind Project Umatilla County, Oregon*.

Sharpe, Jim, 2008, *Addendum: Big Horn Wind Project Layout Revisions, Archaeological Survey Report May 2008*.

Sharpe, Jim, 2007, *Archaeological and Historical Survey Report for Eagle Island State Park*, Eagle, Idaho.

Bard, Jim, Sharpe, Jim, 2005, *North Ontario Interchange Bridge #08635, Malheur County, Key No. 11887-Phase 1 Archaeological Investigation Report*.

Sharpe, Jim, 2003, *Lead Sheathed Telephone Cable at the Hanford Site*. CCN 112849.

Sharpe, Jim and Jim Bard, 2003, *Backhoe Testing for CA-SAC-2 and Three Remote Sensing Locations Cosumnes Power Plant, Sacramento County, California*.

Bard, Jim and Jim Sharpe, 2003, *Cultural Resource Management/Treatment Plan Cosumnes Power Plant, Sacramento, County, Sacramento, California*.

Ground Disturbance History for the 107 KE and KW Retention Basins, Richland, Washington, 2003.

Cultural Resource Survey of Selected Locations for the Consumnes Power Plant Project Rancho Seco, California, 2002.

Subsurface testing report for Lewis Canal, 2000.

100-D-DR Reactor Area Pipeline Evaluations, 1999.

History of the 1100 Area. History of the pre-Hanford era for the 1100 area in support of Pacific Northwest National Laboratory. Richland, Washington, 1999.

The Geologic Setting, Surface and Subsurface Disturbance History, and the Cultural Resources of the Hanford F Reactor Area, 1998.

The Geologic Setting, Surface and Subsurface Disturbance History, and the Cultural Resources of the Hanford D/DR Reactor Area, 1998.

The Geologic Setting, Surface and Subsurface Disturbance History, and the Cultural Resources of the Hanford B/C Reactor Area, 1997.

Survey Report for the Decommissioning of Listed Wells in the Area East of the Washington Public Power Supply System. 1997.

Cultural Resources Activities Conducted in Support of the 100-KR4 Pump and Treat Project, 1996.

Presentations

Pre-Hanford History 7,000 B.C. to 1943, CH2M HILL employee brown bag, Richland, Washington, 2001.

History of Chinese Gold Miners of the Mid-Columbia Region, Lakeside Gem and Mineral Club, Richland, Washington, 2001.

Pre-Hanford History, Columbia River Exhibition of History, Science, and Technology (CREHST) Museum, Richland, Washington, 1999.

History of Pre-Hanford Irrigation, Washington State University Cooperative Education, Richland, Washington, 1999.

Cultural Resource Management for the Environmental Restoration Project, CREHST Museum, Richland, Washington, 1998.

Specialized Training

Workshop for new section 106 regulations 11/29-11/30/99

40-hour Hazardous Waste Training

First Aid Training

Archaeological field school, Eastern Washington University, 1994

Archaeological field school, Central Washington University, 1994

Archaeological field school, Central Washington University, 1993

Six-week archaeological field school, Central Washington University, 1993

Robin D. McClintock

Archaeologist/Cultural Resource Specialist

Education

B.S., Anthropology, Oregon State University, 1981

Distinguishing Qualifications

- 20 years experience designing and conducting cultural resource assessments, surveys, site evaluations, and Section 106 compliance
- Expertise in compliance with the National Environmental Policy Act (NEPA), Washington State Environmental Policy Act (SEPA), and the National Historic Preservation Act and Executive Order 11593
- Has prepared cultural resource mitigation and site management plans, and Section 106 documentation (DOEs, LOEs)

Professional Organizations

- Association of Oregon Archaeologists
- Association of Washington Archaeologists

Relevant Experience

Mr. McClintock is responsible for directing and conducting cultural resource projects for CH2M HILL. He has experience in prehistoric archaeology, cultural anthropology, historic research, and historic preservation in Oregon, California, Washington, and Idaho. He has designed, led, and coordinated cultural resource assessments, surveys, and data recovery excavations, and prepared site evaluation reports in compliance with the National Environmental Policy Act, Section 106 and 110 of the National Historic Preservation Act and Executive Order 11593, and the Washington State Environmental Policy Act. As Cultural Resources Task Leader, Mr. McClintock has consulted directly with State Historic Preservation Offices (SHPOs) in Oregon, Washington, Idaho, and California. In addition, he has held direct consultation with numerous Native American tribes including the Confederated Tribes of the Umatilla, the Confederated Tribes of the Yakama, the Confederated Tribes of the Grand Ronde, the Nez Perce Indian Nation, The Confederated Tribes of the Warm Springs, the Confederated Tribes of the Siletz and the Klamath Tribe.

Mr. McClintock has prepared Environmental Assessments, cultural resource mitigation and site management plans, Section 106 determinations of National Register eligibility and Findings of Effect. He has recorded and evaluated a wide range of historic and prehistoric resources, including Native American, mining, ranching, transportation, and governmental properties.

Prior to his 15 years with CH2M HILL, Mr. McClintock worked for the USDA Forest Service as staff archaeologist in Hells Canyon National Recreation Area (Wallowa-Whitman National Forest) for 2 years and in Mount St. Helens National Volcanic Monument (Gifford Pinchot National Forest) for 3 years.

Representative Projects

Sellwood Bridge Project, Portland, Oregon. 2007- ongoing. Currently task lead for Cultural Resources for the Sellwood Bridge Replacement Project. The task requires coordinating historic built environment research and evaluation and archaeological research and evaluation. Direct consultations with Oregon Department of Transportation, and Multnomah County.

Gibbs Street Pedestrian Bridge Project, Portland, Oregon. 2008- ongoing. Cultural Resources task lead coordinating historic built environment and archaeological research and evaluation. Direct consultations with Oregon Department of Transportation.

Salem Willamette River Crossing, Salem, Oregon. 2008- ongoing. Cultural Resources task lead for historic built environment and archaeology for construction of new bridge over the Willamette River. Consulting directly with Oregon Department of Transportation.

Council Creek - Quince (Highway 47 Bypass) Project, Washington County, Oregon. Prepared NEPA Environmental Assessment for all resource disciplines, successfully guiding the document through multiple iterations of Oregon Department of Transportation review and concurrence. Cultural Resources task lead conducting consultations with Oregon Department of Transportation and FHWA.

Cultural Resource Survey, Scenic Evergreen Trail, Vancouver, Washington. Conducted cultural resource survey of trail, which is adjacent to the Evergreen Highway east of Vancouver. Extensive consultations with staff of the DAHP were conducted regarding potential significance of historic features along the highway. Sought and developed opportunities for historic interpretation along the trail route.

Cultural Resource Survey, Union Pacific Railroad, Oregon. Conducted a cultural resource survey and literature review of approximately 50 miles of Union Pacific Railroad right-of-way from Pendleton to Huntington, Oregon. Conducted consultations with the Confederated Tribes of the Umatilla Reservation and negotiated tribal sub-consulting for ongoing ethnographic studies on tribal lands crossed by the railroad.

Olex at Rock Creek Road Improvement Project, Olex, Oregon. Principle Investigator for cultural resources investigations at Olex for road improvement project. Prepared Section 106 Determination of Eligibility documents and Findings of Effect for Historic Properties in the project APE. Consulted directly with Oregon Department of Transportation.

Archaeological Excavations at 35WN43 (Beef Bend/Elsner/Scholls-Sherwood Roadway Project, Washington County, Oregon). Principle Investigator for data recovery excavations for Washington County road improvement project. In consultation and cooperation with USFW and Washington County.

Cultural Resources Survey, Glendale-Hyperion Historic Bridge, City of Los Angeles, California. Conducted archaeological survey of Area of Potential Effect for improvements to the historic bridge.

LNG Pipeline Project. 2007 – Ongoing. Field Director for cultural resources investigations for 120 mile liquid natural gas pipeline from Warrenton, Oregon to Molalla, Oregon. Project requires ongoing consultations with Oregon SHPO, Tribal Representatives from the Confederated Tribes of the Grand Ronde and the Confederated Tribes of the Siletz.

Peoples Energy COB Project. Principal Investigator for cultural investigations for development of a gas-fired power facility near Klamath Falls, Oregon. More than 20 miles of combined transmission line and road routes were examined. Extensive consultations with the Klamath Tribe, EFSC, and the Oregon SHPO regarding treatment and avoidance of significant cultural resources in the project area.

Ross Island Sand and Gravel's Dallespot Project. Served as principal investigator and field director for archaeological investigations for Ross Island Sand and Gravel's Dallesport, Washington mining project. The investigation included archaeological and rock art surveys as well as extensive and long term consultation and negotiations with the Confederated Tribes of the Yakama Indian Nation.

Cultural Resource Investigations at Leaning Juniper Wind Project, Gilliam County, Oregon. Principle Investigator for cultural resource investigations in support of state and county permitting for wind project.

Mt. Hood Parkway Cultural Resource Survey, Oregon Department of Transportation (ODOT). Conducted a cultural resource investigation of approximately 15 miles of ODOT's proposed Mt. Hood Parkway through rural lands between Troutdale, Oregon, and State Highway 26.

Cultural Resource Survey, California Department of Transportation, Lathrop, California. Conducted a cultural resource survey for the California Department of Transportation proposed Interstate 5 highway construction and improvement project in Lathrop, California. Worked closely with Central California Information Center regarding file and literature searches.

Cultural Resource Investigation, U.S. West Communications, Oregon. Conducted cultural resource investigation for the installation of 18 electrical splice boxes along a 20-mile corridor on U. S. Forest Service land. Extensive consultations with U.S. Forest Service were conducted.

I-5/OSO Parkway Interchange Project. Conducted Archaeological survey of APE for transportation improvements for Caltrans, District 12, Orange County, California.

Cultural Resources Investigations, Hoover Dam Bypass project. Conducted cultural resource investigations for the Federal Highway Administrations (FHWA). Conducted consultations with U.S. Bureau of Reclamation, Arizona and Nevada State Historic Preservation Offices, and concerned Native American tribes.

Clinton Keith Road Extension Project: Antelope Road to State Route 79, Riverside County, California. Conducted archaeological survey investigations for the Riverside County Transportation Department.

East Altamont Energy Center. Field Director for cultural resource investigations for the East Altamont Energy Center Project, near Tracy, California, for Calpine Corporation. Survey included transmission lines, plant site, and water and gas lines.

Teayawa Engery Center. Field Director for the Teayawa Energy Center Project, an 800-MW power plant in the Coachilla Valley, near Mecca, California, for Calpine Corporation. Survey included plant site, transmission lines, and gas and water lines.

Owens Lake Dust Control Project, Cultural Resource Compliance Program, for Los Angeles Department of Water and Power, Inyo County, California. Field director for archaeological surveys in Owens Valley, Inyo California.

Pacific Gas and Electric Topock Pump and Treat Project, Needles, Ca./Topock, Az. Principle Investigator for a pump and treat groundwater project that has impacts to Historic Route 66, and the Topock Maze.

Bighorn Wind Wind Project, Bickleton, Wa. Principle Investigator for cultural resources studies in support of permitting for Wind Power facility in Klickitat County, Wa. for PPM Energy.

Pacificorp's North Umpqua Archaeological Data Recovery, Douglas, County, Or. Co-Principle Investigator for Data Recovery Excavations in support of permitting for electrical transmission line power pole replacement.

SEPA Checklist

**Teanaway Solar Reserve
Expanded SEPA Checklist
Kittitas County, Washington**

Submitted to
Kittitas County, Washington

by
Teanaway Solar Reserve, LLC

August 2009



**Printed on
Recycled and
Recyclable
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Attachments

A	Sensitive Species Report
B	Wetland Delineation Report
C	Cultural Resources Report (<i>privileged and confidential: restricted distribution</i>)
D	Figures Referenced in Text
E	Photographs of Solar Equipment
F	Zone of Visual Influence Technical Memorandum

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Acronyms and Abbreviations

ADT	average daily traffic
Applicant	Teanaway Solar Reserve, LLC
BMP	best management practice
BPA	Bonneville Power Administration
CAO	Critical Areas Ordinance
CF	Commercial Forest
Checklist	Expanded SEPA Checklist
CO	carbon monoxide
CUP	conditional use permit
cy	cubic yards
DA	Development Agreement
dBA	decibels on an A-weighted scale
Ecology	Washington Department of Ecology
F&R	Forest and Range
FAA	Federal Aviation Administration
FDCP	Fugitive Dust Control Plan
FPA	Forest Practices Act
GIS	geographic information system
I-90	Interstate 90
JARPA	Joint Aquatic Resources Permit Application
KCC	Kittitas County Code
kV	kilovolt(s)
MP	milepost
mph	miles per hour
MW	megawatt
MWdc	direct current megawatt

N/A	Information not available
NEC	National Electrical Code
NHP	Natural Heritage Program
NO _x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPDES 1200-C	National Pollutant Discharge Elimination System and State Wastewater Discharge General Permit for stormwater discharges associated with construction activities
O&M	operations and maintenance
PEM	palustrine emergent
PHS	Priority Habitats and Species
PM ₁₀	particulate matter less than 10 micrometers in aerodynamic diameter
PV	photovoltaic
PVC	polyvinyl chloride
RCW	Revised Code of Washington
ROW	right-of-way
SEPA	State Environmental Policy Act
SR	State Route
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSDOT	Washington State Department of Transportation

Environmental Checklist

State Environmental Policy Act (SEPA)

WAC 197-11-960

Background

1. *Name of proposed project:*

Teanaway Solar Reserve

2. *Name of Applicant:*

Teanaway Solar Reserve, LLC

3. *Address and phone number of applicant and contact person:*

Applicant

Howard Trott
Teanaway Solar Reserve, LLC
218 E. First Street, Suite B
Cle Elum, WA 98922
(206) 972-3800

Contact Person

Nichole Seidell
CH2M HILL
2020 SW Fourth Ave., Suite 300
Portland, OR 97201
(503) 872-4803

4. *Date checklist prepared:*

August 14, 2009

5. *Agency requesting checklist:*

Kittitas County Planning Department

6. *Proposed timing or schedule:*

Project construction will occur over a period of 2 to 3 years, with 7- to 9-month construction periods (weather dependent) in each year. Table 1 presents the start and finish dates for major tasks and key milestones. The schedule will depend on time of year, ability to obtain permits, and weather and ground conditions.

Timber harvesting will be done only as necessary to facilitate construction and will be performed pursuant to the terms and conditions of a Washington Department of Natural Resources (WDNR) Forest Practices Act (FPA) permit.

The proposed project schedule is outlined in Table 1.

TABLE 1
Proposed Project Schedule

Task/Milestone	Start	Finish
Obtain Necessary Permits	June 2009	April 1, 2010
Engineering	June 2009	October 2010
Construction	April 1, 2010	As early as October 2011 or as late as December 2012
Initial Operation	Fall 2010	Not applicable

Note: Two or three 7- to 9-month construction seasons are anticipated, from April 1 to October 31 in 2010, 2011, and 2012.

7. *Do you have any plans for future additions, expansion, or further activity related to this proposal?*

Future additions, expansion, or further activities are not known at this time.

8. *List any environmental information that has/will be prepared related to this proposal.*

Contractors conducted the following supplemental environmental studies in preparation for this project:

- Sensitive Species surveys were conducted in June and July 2009 (Attachment A)
- Wetlands and waters of the U.S. and State were delineated in June and July 2009 (Attachment B)
- Cultural resource surveys were conducted in June and July 2009 (Attachment C [restricted distribution])

9. *Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal?*

The Applicant is not aware of pending approvals for any other projects directly affecting the properties involved in this application.

10. *Government approvals or permits needed:*

Table 2 outlines the permits and authorizations required to construct the proposed project.

TABLE 2
Required Permits and Authorizations

Act/Law	Permit/Authorization	Agency/Contact
Section 404 Clean Water Act Compliance	Section 404—Nationwide Permit	U.S. Army Corps of Engineers
Historic Preservation Act Compliance	Section 106 Review	State Historic Preservation Office
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Kittitas County Planning Department
Hydraulic Project Approval/Joint Aquatic Resources Permit Application	Chapter 77.55 Revised Code of Washington/Hydraulic Code of Washington	Washington Department of Fish and Wildlife
Clean Water Act—Section 401 Compliance	Water Quality Certification	Washington Department of Ecology
Forest Practices Act	Forest Practices Permit	Washington Department of Natural Resources
Land Use Review	Conditional Use Permit	Kittitas County
Land Use Review	Cultural Resources	Kittitas County
Land Use Review	Stormwater	Kittitas County
Land Use Review	Critical Areas Ordinance	Kittitas County
Land Use Review	Development Agreement	Kittitas County

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site.

Project Description

The Applicant proposes to construct and operate the project on approximately 982 acres of private land within the Forest and Range (F&R) zoning district in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy utilizing approximately 580 acres of land within the proposed project area.

Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a

requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy the power from the project could change over time.

The Applicant proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors will be analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of environmentally sensitive areas
- Limited visibility from offsite locations

Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (Attachment D, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (Attachment D, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (Attachment D, Figure 3), and private roads such as Loping Lane and Wehl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line runs east to west along the southern site boundary (Attachment D, Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line. An interconnection substation with an approximate footprint of 10 acres will be located either on the project site, or within the BPA line right-of-way (ROW) (Attachment D, Figure 2).

Some structural and residential development has taken place in the southern portion of the proposed project area. Attachment D, Figure 4 shows the identified structures within the vicinity of the project area. The closest identified residence is approximately 200 feet southeast of the project area. Attachment D, Figure 5 shows the conceptual site layout.

The site is currently zoned Forest and Range (F&R) (Attachment D, Figure 6). The site was most recently selectively logged in 2001 and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species.

Key Components

The proposed project will consist of the following key components:

- Solar modules
- Inverter Buildings
- Underground Electrical Conductors
- Substation
- Transmission Line
- Access and Maintenance Roads
- Operations and Maintenance (O&M) Building

Key components are described in the following subsections.

Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. A representative module from Sharp Electronics Corporation is shown in Attachment E, Photo 1. The module measures 1.0 by 1.6 meters (3.3 feet by 5.3 feet) and is rated at 216 watts (Sharp Electronics, 2009). The solar modules are mounted in a fashion that orients the modules toward the sun.

Several mounting types will be considered to best address the slope of land at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure or a pole-mounted tracking system.

A representative single-axis tracking system is presented in Attachment E, Photo 2. The mounting system foundations could consist of precast foundations or embedded posts or poles. The embedment could be done by driving a ground screw, or by boring the ground to a depth of approximately 4 to 6 feet and width of approximately 8 to 10 inches, then backfilling with concrete. For one type of support approach, one post is needed for every five to six solar modules. If the entire 75 MWdc were to be installed with this mounting system, then approximately 70,000 posts would need to be set. About 70 percent of the solar modules for the proposed site will likely use this mounting type, meaning that about 50,000 posts would need to be set (primarily on lands with a south-facing slope). The excavated earth would not be removed from the site.

Another mounting method is to place the solar modules on top of a single pole. The “top of pole mount” system could be installed in areas with a slope facing the southeast. This system consists of a large steel pole that supports the solar module. The pole would attach to a post buried into the ground to a depth of 10 to 15 feet, with a width of 10 to 24 inches. A representative top of pole mount system is shown in Attachment E, Photo 3. The system shown attaches eight solar modules. The most likely configuration is to have between 12 to 20 solar modules mounted on one pole. It is estimated that about 10 percent of the solar installation will be installed using this method, and approximately 3,000 posts will need to be set.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in Attachment E, Photo 4. A dimensioned view is shown in Attachment E, Photo 5, and a cutaway view is shown in Attachment E, Photo 6. It is estimated that 20 percent of the solar installation will be installed using this mounting method.

Inverter Buildings

Up to 40 inverter buildings will be needed for the project. The inverters can be placed outdoors, as shown in Attachment E, Photo 8. While the inverter enclosures are rated for outdoor use, the manufacturer recommends an enclosure to protect the inverters from the elements and extreme temperature changes. An example inverter building includes a concrete pad, and prefabricated facilities are available such as the 2-MW enclosed system offered by Xantrex. Systems similar to the offering from Xantrex enclose four 500-kilowatt (kW) inverters and a 2-MW transformer in a weather-resistant structure measuring 40 feet by 9 feet by 8 feet 6 inches tall. The 2-MW structure shown in Attachment E, Photo 9, is representative of an inverter building that will be used onsite.

Underground Electrical Conductors

Underground electrical conductors will be installed in trenches at a depth in compliance with the Kittitas County (36 inches or greater). Conductors either will be direct burial or in a polyvinylchloride (PVC) conduit.

Substation

The Applicant proposes to construct an electrical substation that will interconnect with the 345-kV BPA transmission line. The substation will require a level, fenced area of approximately 10 acres. The 10-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, and overhead electrical bus work. Its appearance will be similar to that of many other substations throughout the Pacific Northwest.

Transmission Line

A new 345-kV transmission line will be needed to connect the new substation to the existing BPA line. If the substation is located at the BPA ROW, this line would be very short. The line would have two circuits, one into the substation and one out of the substation. The construction could be similar to the existing lattice towers, and require a ROW of up to 300 feet in width.

Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Weihl Road and Loping Lane are private roads over which the Applicant has easement rights. Loping Lane is subject to several road use and cost-sharing agreements, and the Applicant will be subject to those agreements. Additionally, the Applicant will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads will be improved pursuant to County requirements. As set forth in the Draft DA, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department. Attachment D, Figure 3 shows the location of the access and maintenance roads in relation to the project site.

Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where driveways and modular construction will be undertaken, grading, and establishing temporary staging areas (including stockpile and laydown areas). Site preparation will be limited to staging areas, maintenance roads, O&M facilities, and some extreme portions of the larger site as needed to accommodate a level field for the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter equipment pads, and substation foundation can begin.

Site Clearing and Grading

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as provided below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating the next construction phase of the project (Table 1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. The Applicant will obtain a permit from WDNR and contract with a professional forester to harvest these trees in accordance with the permit. Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

Staging Areas

A temporary staging area of approximately 5 acres will be used as a laydown area for parts and materials such as solar crates, electric cable, structural supports, and perhaps a concrete batching facility. The staging area could be located at the intersection of logging roads on

the property, as illustrated on Figure 7. Attachment E, Photo 10, shows a typical staging area for a 10-MW solar project. Mobilization of the site will consist of fencing off a 5-acre section of land that will be needed to store materials. Mobilization will also include a temporary facility and staging area for solar module deliveries, and metal racking. Mobilization will last approximately 1 month.

Foundations, Trackers, and Modules

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structure used. One foundation type consists of boring a hole approximately 12 inches wide and 48 inches deep to hold a steel support pipe. The hole is then filled with concrete. A support pier will be required for every 45 square feet of land area, or approximately 1,000 piers per installed MW of solar capacity. Approximately 145 acres of modules will be installed within the 982-acre proposed project area.

A second type of foundation consists of an above-grade concrete ballast used to support the uplift forces of the solar mounting structure. These ballasts will contain .25 to .35 cubic yards of concrete per block, and two concrete ballasts will support a small array of solar modules.

Pending final design, the solar module foundations will require site work, potential boring, trucking of materials, and concrete. The number of foundations could be as high as 70,000, and require approximately four thousand truck deliveries.

Installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction seasons (between April and October or April and December).

Inverter Equipment Pads and Substation Foundation

Electrical equipment will be located onsite in multiple locations. There will be one inverter building (that houses two inverters and one associated transformer) for every approximately 7 acres of solar field. One inverter building will house (2) 500-kW inverters, so there will be one inverter building for every 1 MW of solar field. Approximately 7 acres are needed for a 1-MW solar array. Approximately 145 acres of modules will be installed within the 982-acre proposed project area.

Up to 75 inverter buildings will be needed. The inverter stations will require a concrete pad of approximately 40 by 10 feet. The inverter buildings will be approximately 10 feet tall.

Wiring connecting module arrays to the inverters and the inverters to the substation will need to be run in underground cables (Attachment E, Photos 11, 12, and 13). Trenching is required for the conductors from the inverter buildings to the main substation. Trenching requires removing earth in a section of several feet wide by approximately 2 to 3 feet deep.

The substation will require an area of approximately 10 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small control building, approximately 20 feet wide by 20 feet long, that is enclosed with air conditioning.

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Poles supporting the overhead lines will be required approximately every 750 feet.

Installation of inverter equipment pads and other foundations will occur over a period of approximately 5 to 6 months.

Construction Materials and Equipment

If the project uses aboveground mounting methods with ballasted (concrete) blocks, the amount of concrete required is subject to wind loading and engineering analysis. An estimated 33,000 cubic yards of concrete could be used to create the ballasted footings, equivalent to approximately 3,500 truckloads of concrete. The concrete is expected to be premixed. If a concrete batch plant is necessary for the site, it will only be used for onsite purposes and will be removed when construction is completed. The structural supports and other mounting materials will require an estimated 800 trucks to deliver materials to the site based on vendor estimates. Thus, a total number of truck deliveries to the site will be in the range of 4,300 for deliveries of goods and materials.

The 75 MWdc anticipated to be generated from this project equates to 75,000,000 watts-dc, or 347,222 solar modules of 216 watts-dc each. It is estimated that the project will require up to 450 shipping containers of solar modules.

Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible.

Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 (I-90) and access Highway 970 by way of County roads such as Red Bridge Road (see Figure 3), and private roads such as Loping Lane and Weihl Road. Road service within the project area will be provided by an existing network of maintenance roads, although new maintenance roads or segments may be necessary. Road improvements will be conducted as needed, and are anticipated to include upgrades to local gravel and dirt roads as discussed above. Road improvements are further addressed in the DA with Kittitas County. For further discussion of traffic impacts, see the Transportation section of this checklist.

Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers, during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in fabricating the concrete forms and placing the concrete ballasts in the field. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (three 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers are not typically housed onsite, but this is subject to the cost of transportation to the site. Subject to the needs of any security personnel for the project, , it is

not expected that a significant number of workers will remain onsite outside and require temporary housing. Security crews will likely consist of up to eight onsite workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire Protection District #7. Further, the project will be bordered by a firebreak no less than 100 feet wide. Should the construction of the project require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression services are in place during the construction and ongoing operations of the project. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise.

Water Use

Water will be needed for activities such as dust control and module cleaning. The Applicant proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or the Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

Summary of Operations and Maintenance Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with dimensions of roughly 20 feet by 20 feet.

Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required. Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed onsite. A staff of 2 to 4 technicians will perform system monitoring. The staff will work out of the O&M building and make frequent trips to the facility by way of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. The project is also anticipated to require the need for personnel to monitor and secure the site.

Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. The Applicant will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. During the operational phase, the Applicant will contact fire protection and police services in the event of an emergency.

Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

Weed Control and Site Reclamation

Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. The Applicant is under a contractual obligation with the landowner to return the site in good condition and, at the landowner's request, to remove any or all of the project's components. Applicant is also contractually bound to reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the site, including the project.

Environmental Elements

Earth

a. General description of the site:

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Attachment D, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (Attachment D, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (Attachment D, Figure 3), and private roads such as Loping Lane and Weihl Road. The project is located on approximately 580 acres of land within the 982-acre proposed project area.

The solar facility components and other related appurtenant improvements are described in detail in the project description above.

The ground surface elevation for the solar facility is at approximately elevation 2,600 feet. The elevation along the potential transmission line varies from approximately 2,200 feet (near the location of the existing BPA transmission line) to approximately 2,600 feet (near the substation).

b. What is the steepest slope on the site and the approximate percentage of the slope?

The proposed solar facility will be installed on the eastern slopes of the Cascade Mountains on Cle Elum Ridge. The Cle Elum Ridge area has an estimated maximum slope of 50 percent, although the majority of the area has slopes with a gradient of less than 25 percent. The area does not contain steep slopes. During the initial corridor selection process, the Applicant selected a corridor that minimized the need to site the facility components and other related appurtenant improvements in steep-slope areas. The design phase will fully address the exact locations and how the slopes will be spanned or traversed.

The elevation in the proposed project area of Cle Elum Ridge changes from approximately 2,200 feet to about 2,600 feet, with an approximate slope ratio of about 6 horizontal to 1 vertical (6H:1V), or 9.5 percent.

Other, less significant slopes in the Cle Elum Ridge area that have a lower elevation differential may also have lower slope ratios. Prior to construction, the Applicant will perform a more detailed slope evaluation prior to construction.

- c. What general types of soils are found on the site (e.g., clay, sand, gravel, peat, muck)? Please specify the classification of agricultural soils and note any prime farmland.*

Prior to construction, the Applicant or its contractor(s) will complete geotechnical surveys along the route to determine soil types at a more detailed level.

It is expected that the majority of the soils encountered along the Cle Elum Ridge will consist of clayey-, silty-, sandy-loam of the Teanaway series. The loam is grayish-brown, well-drained soil derived from glacial drift and old alluvium deposits. These soils occur at both the lower and higher elevations. Some volcanic ash influence exists near the surface at higher elevations.

Two different soil types occur in the proposed project area. The first is Nard ashy loam, which is used for timber production, livestock grazing, recreation, wildlife habitat and watershed. These soils are not traditionally used for agriculture and do not constitute prime farmland. The Nard series consists of deep and very deep, moderately well-drained soils formed in residuum and colluvium from sandstone and old alluvium with an influence of volcanic ash and loess in the surface. Nard soils are on foothills, dipslopes, and terraces and have slopes of 0 to 65 percent (NRCS, 2009).

The second type of soil present is Teanaway loam, which is used for timber production, cropland, livestock grazing, wildlife habitat, recreation, and watershed. This soil type is not traditionally used for agriculture and do not constitute prime farmland. The native vegetation is ponderosa pine and Douglals-fir. The Teanaway series consists of very deep, moderately well-drained soils formed in loess over glacial till with a minor influence of volcanic ash in the surface. Teanaway soils are on terraces, terrace escarpments, and foothills. Slopes are 0 to 50 percent (NRCS, 2009).

- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, please describe.*

There is no indication of unstable soils in the immediate vicinity of the project. If, during geotechnical surveying and engineering design efforts, unstable soils are found, the Applicant will locate the project to avoid those areas. Areas with a slope of 0 to 25 percent are considered to have a low risk of erosion and landslides.

- e. Describe the purpose, type, and approximate quantities of any filling or proposed grading. Also, indicate the source of fill.*

The construction contract may use imported gravel from a quarry located in West Cle Elum to fill the 10-acre area level-ground substation. The substation will contain a 6-inch-thick layer of gravel, and no vegetation will be present. The overall estimated amount of gravel fill required for the substation will be 8,100 cubic yards (cy).

The construction contractor may use imported gravels or crushed rock as backfill for the transmission line-pole auger holes, if required. If imported gravel is not required, the construction contractor will use native materials, removed when the auger holes are made, for backfill. If imported materials are used, the construction contractor will spread the native materials, resulting in a level area in the vicinity. The approximate quantity of fill material is 4.2 cy per pole. The project will include approximately up to four (4) transmission line poles, which will require a total of 500 cy of fill. The construction contractor may also grade some areas for construction access and to create level areas for the pole-structure locations.

The estimated transmission line-pole-related fill is no more than 500 cy. The amount of grading for access roads is estimated to be 4,000 cy.

f. Could erosion occur as a result of clearing, construction, or use? If so, please describe.

While erosion could occur, none is expected. The construction contractor will use best management practices (BMPs) to minimize erosion. Existing vegetation helps to resist erosion. Clearing of the vegetation for construction roads will expose the soil to a higher risk of erosion during rainfall.

g. What percentage of the site will be covered with impervious surfaces after the project construction (e.g., asphalt or buildings)?

Project construction will not result in impervious areas within the project corridor, except at the bases of the transmission line-pole structures. The adjacent soils will absorb stormwater runoff. No buildings are proposed, and the new, nongraveled access roads will be pervious.

h. Proposed measures to reduce or control erosion, or other impacts to the earth include:

The construction contractor will implement erosion-control measures during construction, including the following from the required Ecology National Pollutant Discharge Elimination System (NPDES) construction stormwater permits:

1. Maintenance of vegetative buffer strips between the areas affected by construction activities and any receiving waters
2. Installation of sediment fence and straw bale barriers
3. Straw mulching at locations that have suffered impacts
4. Provision of temporary sediment traps downstream of intermittent stream crossings
5. Provision of sediment-type mats downstream of perennial stream crossings
6. Planting of designated seed mixes at affected areas
7. Installation of a sediment fence along the downslope side of pulling and tensioning areas, as appropriate

The construction contractor will reseed all areas affected by the construction, as agreed upon with landowners. Where installed, sediment fences and check dams will remain in place until the affected areas are well vegetated and the risk of erosion has been eliminated. The construction contractor may remove the sediment fence at that time.

The construction contractor will construct roadways so that natural surface drainage is maintained.

If project structures are to be located on steep slopes, the construction contractor will locate them to avoid potential landslide or rockfall hazards.

Air

- a. *What types of emissions to the air would result from this proposal (e.g., dust, automobile, odors, industrial wood smoke) during construction and after completion? Please describe and give approximate quantities.*

Construction activities will produce dust and heavy-duty-vehicle emissions. These emissions, which will include nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter less than 10 micrometers in aerodynamic diameter (PM₁₀; dust), will be temporary in nature. Although the quantity of these emissions is unknown at this time, the small number of vehicles to be used (see the Transportation section of this checklist) and the relatively short duration of the construction period will limit such emissions. The potential for dust generation will be greatest during dry, windy weather.

When the project is operational, no emissions from any source are expected.

Burning of woody debris from land clearing will produce combustion emissions, including NO_x, CO, and PM₁₀. To the extent possible, however, woody debris will be directed towards beneficial reuse.

- b. *Are there any offsite sources of emissions or odor that may affect your proposal? If so, please describe.*

None. No offsite sources of emissions will affect the proposed project.

- c. *Proposed measures to reduce or control emissions or other impacts to air:*

A Fugitive Dust Control Plan (FDCP), to minimize air emissions from construction-related ground disturbance and traffic, will be developed before this project begins. The FDCP will include the following BMPs:

- Vehicles and equipment will comply with applicable state and federal emissions standards.
- Vehicles and equipment used during construction will be properly maintained to minimize exhaust emissions.
- Operational measures such as limiting engine idling time, minimizing driving speeds and shutting down equipment when not in use will be implemented.
- Open soil areas and road surfaces will be watered. The Applicant expects to have one water truck onsite during construction to minimize fugitive dust.
- Carpooling among construction workers will be encouraged to minimize construction-related traffic and associated emissions.

- Disturbed sites will be revegetated in a timely manner with a seed mixture consistent with local vegetation.

Because the construction equipment and vehicles will be dispersed across a large, sparsely populated area, no impacts to surrounding residences are anticipated. Because the construction is of limited duration (up to 9 months for two or three construction seasons), total construction emissions will be relatively minor.

Water

a. Surface

1. *Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, and wetlands)? If yes, describe the type and provide names and into which stream or river it flows.*

Biologists identified and delineated a total of 12 wetlands and six ephemeral streams within the site survey area (Attachment D, Figure 5). The wetlands cover 0.97 acre within the survey area.

Wetland boundaries were determined using procedures found in *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and in *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valley and Coast* (U.S. Army Corps of Engineers [USACE], 2008). Some wetlands extend outside the proposed project area.

Eleven of the wetlands (W1 through W11) are classified as palustrine emergent (PEM) (Cowardin), depressional (HGM) wetlands. Wetlands W1 through W6 are located in the northwest portion of the project area, and W7 through W11 are located adjacent to roads. W12 is a pond and is classified as a PEM, depressional wetland. W12 is located near the southwest corner of the project area (Attachment D, Figure 5).

Six streams within the Teanaway River and Yakima River watersheds flow within the survey area (Attachment D, Figure 5). One NWI-mapped wetland is in the southwest corner of section 22. It is labeled as *palustrine emergent, semi-permanently flooded*. Five streams were mapped by WDNR. All five are classified as *non-fish, seasonal*. All of the streams flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices may eventually flow into the Yakima River several miles to the south with the following exception. One unnamed tributary (S6) flows directly into the Teanaway River, which flows into the Yakima River.

Table 3 shows the waterbody name, width, type, and eventual hydrologic connection for each drainage of the potentially jurisdictional waters.

TABLE 3
Streams Summary Table

Waterbody Name	Width (feet)	Type	Hydrologic Connection
S1	2-5	Ephemeral	Yakima River
S2	2-6	Ephemeral	Yakima River
S3	2-5	Ephemeral	Yakima River
S4	2-4	Intermittent	Yakima River
S5	2-5	Ephemeral	Yakima River
S6	1-2	Ephemeral	Yakima River

The biologists presume that all of the investigated wetlands and waterbodies are potentially jurisdictional under federal regulations for wetlands and waters of the United States. A final determination will be made by USACE.

The *Wetland Delineation Report* (Attachment B) provides additional discussion of wetlands and drainages within the project corridor.

2. *Will the project require any work within 200 feet of the described waters? If yes, please describe and attach available plans.*
3. The Applicant will work within 200 feet of described waters but will avoid siting solar modules directly within potentially jurisdictional waters (Attachment D, Figure 5). Impacts to potentially jurisdictional wetlands and waters were avoided where possible during project conceptual design. Where impacts could not be avoided, the design was tailored to minimize impacts (Attachment D, Figure 5).
4. *Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of the fill material.*

Road widening associated with construction activities may affect four wetlands (W8-W11) and one waterbody (S4). The expected impact to wetlands and waterbodies as a result of road widening will be less than 0.1 acre. Total fill could be up to 59 cy of road material.

A USACE Section 404 Wetland Permit Application will be submitted using the Joint Aquatic Resources Permit Application (JARPA) as part of this project proposal.

5. *Will the proposal require surface water withdrawals or diversions? Please provide description, purpose, and approximate quantities:*

The proposed project will not require new surface water withdrawals or diversions.

6. *Does the proposal lie within a 100-year floodplain? If so, please note the location on the site plan.*

The proposed project does not lie within a 100-year floodplain (Attachment D, Figure 8).

7. *Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.*

The proposed project does not involve any discharge of waste materials to surface waters.

b. Ground

1. *Will ground water be withdrawn, or will water be discharged to ground water? Please give description, purpose, and approximate quantities.*

The construction contractor will neither withdraw groundwater nor discharge water to groundwater during project construction. Construction of the project may involve water use for dust control. If so, the construction contractor would arrange for delivery of water to the active construction site using water trucks from a source with an existing water right. The Applicant will neither withdraw groundwater nor discharge to groundwater during project operations.

2. *Describe waste material that will be discharged into the ground from septic tanks or other sources (e.g., domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the size and number of the systems, houses to be served; or, the number of animals or humans the systems are expected to serve.*

The Applicant does not anticipate discharge of waste materials into the ground during construction or operation. The construction contractor will use onsite portable toilets during construction.

c. Water Runoff (Including Stormwater):

1. *Describe the source of runoff (including storm water) and method of collection and disposal. Include quantities, if known. Describe where the water will flow, and whether it will flow into other water.*

The proposed project will maintain the local surface drainage system and patterns. The Applicant will not collect or treat stormwater runoff.

Construction of the access roads, staging areas, and installed solar modules could result in stormwater runoff into surrounding soils. No additional stormwater will run off into waterbodies.

2. *Could waste materials enter ground or surface waters? If so, please describe.*

Waste materials will not enter ground or surface waters. Waste materials stored at the staging areas will have secondary containment to prevent entrance into ground or surface waters. The construction contractor will establish buffers to prevent waste materials from entering surface waters. The construction contractor will also remove waste materials from the project area upon completion of construction activities. The construction contractor will implement the following BMPs to minimize the release of waste materials into ground or surface waters:

- During project construction, vehicle servicing and refueling will occur offsite in a temporary staging area equipped for fuel or oil spills.
- Onsite vehicles will be monitored for petroleum leaks. Spills will be cleaned up immediately upon recovery and reported to the appropriate agency.

- Few hazardous materials will be used during project construction or operation — primarily small amounts of lubricants and cleaning solutions. Any hazardous waste material generated by project construction or operation will be disposed of in a manner specified by local and state regulations or by the manufacturer.
- Cleanup materials will be kept readily available onsite, either at the equipment storage area, O&M building or on the construction contractor's trucks.

d. Proposed Measures to Reduce or Control Surface, Ground, and Runoff Water Impacts, If Any:

In Washington, a Washington Construction Stormwater General Permit (1200-C) administered by Ecology will regulate construction activities. This permit requires BMPs to minimize possible impacts from erosion or other impacts to soil and waterways. As required by the conditions outlined in the permit authorization, any permanent erosion-control measures will be implemented with final design of the project.

Plants

a. Check or circle types of vegetation found on the site:

The following sections describe the vegetation categories found in the survey area. Detailed plant descriptions are included in Attachment A.

Results indicated a total of five natural habitat types within the survey area. Most of these can be named by using the Chappel et al. (2001) system of vegetation classification. Project area natural vegetation types are as follows:

- Ponderosa Pine Forest and Woodlands
- Open Water — Lakes, Rivers, and Streams
- Herbaceous Wetlands
- Riparian
- Upland Aspen Forest

These habitat types are described below.

Ponderosa Pine Forest and Woodlands

The Ponderosa Pine Forest and Woodlands habitat type has the greatest coverage of the five habitat types in the survey area. The survey area has been actively managed as commercial timberlands for the past 100 years. The area was last logged in 2001-2002, leaving relatively few trees per acre and open stands of predominantly ponderosa pine (see Attachment A, *Sensitive Species Surveys* report). The ponderosa pine stands located at the proposed project site are dominated by an overstory of 50-year-old ponderosa pine (*Pinus ponderosa*) trees with a subcomponent of Douglas-fir (*Pseudotsuga menziesii*) trees. Saplings of both species are present in the understory. The herbaceous understory is composed of mixed co-dominants, including arrowleaf balsamroot (*Balsamorhiza sagittata*), yarrow (*Achillea millefolium*), bulbous bluegrass (*Poa bulbosa*), ventenata (*Ventenata dubia*), and several species of fescue (*Festuca* spp.), wheatgrass (*Agropyron* spp.), and lupine (*Lupinus* spp.). Several populations of Oregon check-mallow (*Sidalcea oregana* var. *procera*) and sticky purple geranium (*Geranium viscosissimum*) are present.

Open Water—Lakes, Rivers, and Streams

Several intermittent streams and one artificially ponded area are found within or crossing the survey area. All of the streams were dry at the time of the field visits and all were vegetated to varying extents. Typical vegetation within most channels includes herbaceous grass and forb species, including Brewer's navarretia (*Navarretia brewerii*), poverty oatgrass (*Danthoia spicata*), and small tarweed (*Madia exigua*). Other channels were dominated by dense shrub and herb species including wild rose (*Rosa woodsii*), snowberry (*Symphoricarpos albus*), cinquefoil (*Potentilla* spp.), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

Herbaceous Wetlands

Herbaceous Wetland habitats within the survey area consist of depressional wetlands dominated by herbaceous vegetation (see Attachment A for *Sensitive Species Surveys* report). Exposed soils were cracked, evidence of altering drying and wetting periods. These systems are not hydrologically connected to any stream or drainage ditch. Water arrives as either snowmelt or precipitation. These wetlands support hydrophytic herbaceous vegetation, and met the criteria for hydric soils and wetland hydrology. Common plant species within these wetlands were creeping spikerush (*Eleocharis palustris*) and ventenata.

Riparian

The Riparian habitat is found adjacent to some of the intermittent stream channels in the survey area. It generally consists of a dense shrub layer immediately adjacent to the stream gradually transitioning to ponderosa pine forest. Typical species include oceanspray (*Holodiscus discolor*), mountain spiraea (*Spiraea betulifolia*), Oregon checkermallow (*Sidalcea oregana* var. *procera*), Wood's rose (*Rosa woodsii*), and ponderosa pine.

Upland Aspen Forest

A small patch of aspen (*Populus tremuloides*) forest occurs along a drainage and around an artificially impounded pond in the southwestern portion of the survey area. Associated species include ponderosa pine, snowberry, and wild rose.

b. What kind and amount of vegetation will be removed or altered?

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as provided below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating the next construction phase of the project. Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. The Applicant will obtain a permit from WDNr and contract with a professional forester to harvest these trees in accordance with the permit. Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

The project will not affect any listed Washington Department of Fish and Wildlife (WDFW) Priority Habitat or habitats listed under the WDNr Natural Heritage Program (NHP)

database. No high-value or Category I or II habitats will be affected (Attachment A). Any impacts to Category III habitats will be mitigated and minimized and described below.

c. *List threatened or endangered species known to be on or near the site.*

No threatened or endangered plant species were identified within the survey area.

d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

The following measures are proposed:

- Vegetation removal and disturbance during construction will be restricted to the area designated for solar modules and related facilities, and vegetation adjacent to the access roads. Areas for assembly of the solar modules (structure laydown areas) will also be required at each module location. Soil disturbances will be reduced by seeding with an approved native seed mix once project construction is complete.
- Vegetation clearing will occur along some existing ROWs for road widening and improvement. Vegetation along existing ROWs is primarily herbaceous plant species. Some shrubs and trees may be removed for the widening of access roads; however, the Applicant proposes to minimize the removal of these species when possible.
- Herbaceous vegetation taller than 3 feet will be temporarily cleared for the placement of the solar modules. After construction, vegetation inspections will be performed and herbaceous vegetation growth will be allowed up to a height of 3 feet, at which time the vegetation will be trimmed. Noxious weeds such as spotted knapweed (*Centaurea stoebe*) will be controlled within the project area.
- The solar modules will contain nonvegetated buffers. These buffers will be maintained as a firebreak and wind break. To prevent shading, soiling, and damage from windthrow, no trees will be permitted within the buffer. The site will be maintained to prevent the regrowth and reestablishment of saplings or trees.
- The proposed project is designed to avoid impacts to wetlands and streams. Thus, no wetland or stream vegetation will be cleared during project development or maintenance.
- Vehicles will avoid riparian areas, areas within wetlands, or areas within wetland buffers by driving only on access roads. Some access road improvements may affect wetlands; these impacts will be mitigated. Sediment will be prevented from entering streams and wetlands through the use of BMPs. For further discussion of the BMPs that will be implemented to prevent soil erosion and stream sedimentation, please see the Earth section of this SEPA.
- It is expected that staging areas will be existing yard areas that have fencing, lighting, and security. The construction contractor will make these arrangements. No permanent impacts to vegetation are expected from this use. These areas will be seeded with an approved native seed mix once construction is complete.

- Vegetation will be cleared for the proposed powerline route to grid interconnection. Areas cleared of vegetation will be reseeded with an approved native seed mix, and maintained for noxious weed control and to prevent woody seedling growth.
- Where appropriate, development will be located in already disturbed areas, including previously logged lands, existing transmission corridors, and ROWs. However, when impacts are unavoidable, alternative means of compensation mitigation will be considered.

WDFW Wind Power Guidelines

In 2003 and 2009, WDFW adopted guidelines to address fish and wildlife habitat protection, conservation and mitigation related to the development of wind energy facilities. The purpose of the WDFW Wind Power Guidelines is to provide consistent statewide guidance for the development of land-based wind energy projects that avoid, minimize and mitigate impacts to fish and wildlife habitats in Washington State. Specifically, the guidelines were largely designed to address concerns due to the unique nature of wind turbines and wind power projects, including avian and bat strikes, liability under the Migratory Bird Treaty Act, avian behavioral modification and migration displacement through the installation of tall wind turbines, and lack of research regarding avian migration and response to FAA-approved lighting configurations. Because the concerns over high wind turbines largely do not apply to solar farms, the Guidelines are not applicable to the Teanaway Solar Reserve project. Nonetheless, the Applicant has used the same approach to species and habitat identification, and will implement the following additional measures to minimize and mitigate any impacts that may occur.

Best Management Practices

BMPs will be implemented during construction to avoid and reduce temporary and permanent impacts to the extent practicable. In the event that a state or federally listed threatened or endangered plant or wildlife species is observed during project development, work will be halted immediately and a qualified biologist notified.

BMPS will be implemented wherever surface disturbances occur. These measures include, but are not limited to, the following:

- Protect all trees, shrubbery, and other vegetation not designated for removal will from damage caused by the project construction.
- Seed areas of temporary soil disturbance with the specified temporary seed mix.
- Install filter bags, sediment fences, sediment filter fabric traps, graveled construction accesses as necessary for erosion control.
- Cover stockpiles with impervious materials when unattended or during rainfall.
- Locate construction staging areas for storage, maintenance, and fueling of construction equipment minimum of 150 feet from creeks or wetlands. Show staging areas on the construction plans.
- Take care to prevent petroleum products and other harmful material from entering wetland or waterways.

- Upon completion of construction, seed or plant all areas of disturbance with native plants.

Mitigation

In the course of preparing this checklist and accompanying technical reports, all recommended surveys have been completed. It is still possible, however, that individuals or populations of rare plant species may be encountered during project construction. In the event of such a discovery, a qualified botanist will be retained to verify identity of the plant(s) and make recommendations for addressing the situation. All efforts will be made to avoid disturbance to such species. If disturbance cannot be avoided, efforts will be employed to minimize disturbance to the maximum extent practicable. If such efforts are not possible, mitigation for impacts to the plant(s) will be required. Mitigation measures will be specific to each plant species.

Possible avoidance and mitigation measures may include the following:

- Implement micrositeing: slight relocations of project facilities to avoid rare plant populations.
- Remove and conserve plants; replant following construction.
- Replant disturbed area with seed obtained from a qualified cultivator of rare plants.
- Mitigate by seeding an approved offsite area with the same species.

Mitigation will require approval of the agencies, as well as monitoring for a defined period of time.

Animals

No federal- or state-listed threatened or endangered species were found during field surveys. CH2M HILL biologists conducted reconnaissance-level field surveys on June 16 through 19 and July 9, 2009. Surveys were conducted by walking transects spaced 30 meters apart. Both audible and visual observations of avian and mammal species were recorded. Attachment A, *Sensitive Species Surveys* report, further discusses the results of the wildlife field survey. Measures designed to avoid, minimize, or mitigate impacts to wildlife are as provided above.

- Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:*

Birds – hawks, heron, eagle, songbirds, other

The Priority Habitat and Species (PHS) database identifies three species that are *candidates* for federal or state listing with some, however unlikely, potential to occur within the proposed project area (see *Sensitive Species Technical Report*, Tables 3 and 4). The database includes potential occurrences of both black-backed woodpecker and mountain quail approximately 1.0 mile from the project area. In addition, several occurrences of northern goshawk are documented approximately 1.5 to 1.8 miles from the northern edge of the proposed project area. The black-backed woodpecker occurrence is approximately 1 mile from the project area's southernmost boundary.

Field biologists did not observe any federal- or state-listed threatened or endangered wildlife species within the survey area. A state candidate species, the white-headed woodpecker (*Picoides albolarvatus*), was observed in the northwest portion of the survey area. Biologists observed both male and female woodpeckers close to the main access road. The male was observed foraging in a stand of adult ponderosa pine, while the female was located excavating a nest in a snag approximately 10 feet from the road.

It is unlikely that any black-backed woodpeckers will be affected by project development because activities relating to this project will not involve the documented area. Black-backed woodpeckers require habitat with stands of mature conifers that have experienced a burn event within the last 5 years. No stands of burned, mature conifer trees exist in the project area. In addition, the proposed project is unlikely to affect any mountain quail or northern goshawk habitat, as no activities related to this project will occur near the PHS listing.

Mammals – deer, bear, elk, beaver, other

The PHS database was queried for elk and mule deer habitat regions. Priority habitats for these large mammals do not occur within the proposed project area. According to the PHS database, the closest elk wintering habitat is along the Teanaway River, approximately 0.8 to 1.5 miles from the proposed project area. These areas provide winter forage habitat for elk and mule deer and will not be disturbed during construction because they are outside the proposed project boundary.

During the course of field surveys, a small herd of roughly six elk cows and two mule deer with fawns was identified in the northwest portion of the proposed project area. This area is used as a calving and fawning area during spring and summer. During fall, the herds travel east to the PHS regions located along the Teanaway River.

In order to avoid disturbances to elk and mule deer, the Applicant will coordinate with WDFW and the U.S. Fish and Wildlife Service (USFWS) on construction timing and activities to avoid impacts to elk and deer during calving season. BMPs will be developed to avoid and minimize impacts to these species during the calving and fawning season. Perimeter and access roads will be wide enough to allow for migration. In addition, the PV solar modules will be securely constructed with concrete foundations. The height of the modules is approximately 12 feet, which will allow several feet of clearance for elk and mule deer. The Applicant will coordinate with WDFW and USFWS on construction timing and activities to avoid impacts to elk and deer during calving season.

A study of cougars conducted by WDFW biologists from 2001 to 2007 estimates the total population density at 4.97 cougars per 100 square kilometers in the area surrounding the Teanaway River, with 1.50 adult males and 1.15 adult females per 100 square kilometers respectively (Cooley et al., 2009a). The remaining estimate consists of juveniles (younger than 24 months) and kittens. The population is composed primarily of older animals, indicating the population is stable. Cooley et al. (2009a) determined the mean age of adult cougars in the area surrounding the Teanaway River based on 65 known specimens. The mean age of males was 60 months (5 years), while the mean age of females was 69 months (5.4 years). A separate study found the average annual survival rate was 0.71 percent for adults (Cooley et al., 2009b), with approximately 1.12 kittens maturing per female each year (Cooley et al., 2009b).

Based on the available data, it is unlikely that any grizzly bears occur within the proposed project area. Currently, bears are only known to occur in one 100-mile area in the Okanogan Highlands. No evidence of the sight being used by grizzly bear was observed during 2009 field surveys. In addition, there are no occurrences listed in the WDFW or USFWS databases, verified or unverified, of bears in the surrounding region.

Fish – bass, salmon, trout, herring, shellfish, other

The project area contains several intermittent rivers and streams. Project construction will not disturb vegetation within these waterbodies. Although the project area contains no fish-bearing streams, the construction contractor will implement BMPs adequate to protect fish habitat. Because no in-water work is anticipated as a project activity, the Applicant did not conduct any fish field surveys.

b. List any threatened or endangered species known to be on or near the site.

The survey team did not find any threatened or endangered species in or near the survey area.

Prior to field surveys, biologists searched the WDFW PHS and WDNR NHP databases for any documented occurrences of listed species within 3 miles of the project area. Agency data did not show any threatened or endangered species occurring within the project area. The PHS database documented occurrences of northern goshawk, black-backed woodpecker, northern spotted owl, and mountain quail occurring within 3 miles of the project area. Because of a lack of suitable habitat, it is unlikely that any of these species occur within the project area. Moreover, the survey team did not observe these species in the survey area. The Migratory Bird Treaty Act protects all of these species from “take” (see Attachment A).

c. Is the site part of a migration route? If so, explain.

Because of this seasonal migration, portions of the project area may be used as a migratory corridor for large, migrating ungulates. However, this route was not identified during the 2009 field survey effort. Portions of the project area include an upland ponderosa pine forest stand, which may provide habitat for several species of wildlife. During spring, elk and mule deer typically use this type of habitat as a calving and fawning ground.

The PHS data identified regions of elk and mule deer habitat along the Teanaway River, east of the project area. The nearest known PHS regions occur between 0.8 and 1.5 miles from the project area. Elk and mule deer species will migrate from western locations to the PHS regions along the Teanaway River in the fall and winter, potentially crossing the project area.

The Applicant has considered these migration pathways during the design of the proposed project layout. The proposed PV arrays will be spaced approximately 10 feet apart and will be 12 feet in height, allowing for the movement of wildlife between sections. No fencing will occur along the property boundary. Such fencing is not required to be installed, per the National Electrical Code (NEC).

Energy and Natural Resources

- a. *What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.*

Minimal amounts of energy will be used to meet the completed project's energy needs; the completed project will produce electricity. A minimal amount of energy will be used to heat and light the O&M facility.

- b. *Would your project affect the potential use of solar energy by adjacent properties?*

The project will not affect the potential use of solar energy by adjacent properties. Any shadows from transmission line-pole structures would have minimal, if any, effect on adjacent properties. The shadows from the solar facility components and other related appurtenant improvements will not interfere with the potential use of solar energy by adjacent properties.

- c. *What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts:*

Minimal amounts of energy will be used to meet the completed project's energy needs. No energy conservation features are included in the plans of this proposal.

Environmental Health

- a. *Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?*

Once the project is completed, there will be minimal exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste. While some solar modules being considered for installation do contain toxic substances, such as cadmium telluride, there is very little chance of exposure because modules are laminated in a glass structure that is designed to last for 25 years. At the end of this 25-year life cycle, the solar modules will be recycled by the manufacturer.

During construction, the construction contractor may use small amounts of lubricants and solvents and will follow appropriate measures to prevent spills and contamination. Except for fuel and oil used in construction equipment, the construction contractor will use no combustible materials. During construction activities, the potential for fires and accidents may exist. However, the construction contractor will construct the project in accordance with applicable federal, state, and County regulations that pertain to fire prevention, presuppression, and suppression.

- 1) *Describe special emergency services that might be required.*

This project does not require any special emergency services related to environmental health.

- 2) *Proposed measures to reduce or control environmental health hazards, if any:*

The Applicant will construct the project to comply with applicable federal, state, and industry standards that address environmental health standards, such as clearances, grounding, lightning protection, and fire protection.

During construction, the construction contractor will implement standard safety measures to reduce or control environmental health hazards. The construction contractor will employ the following BMPs to reduce or control the potential for environmental health hazards:

- Monitoring onsite vehicles for petroleum leaks. The construction contractor will clean up spills immediately upon recovery and report such spills to the appropriate agency.
- Disposing of hazardous waste material generated by project construction and operation in a manner specified by local and state regulations or by the manufacturer.
- Keeping cleanup materials readily available onsite, either at the equipment storage area or on the construction contractor's trucks.

PV arrays will be set back 100 feet from the perimeter of the property to allow for proper firebreaks. In addition, spacing between PV arrays will be 10 feet, to provide for adequate maintenance and fire prevention space.

During operation, the Applicant will continue to implement applicable BMPs to reduce or control environmental health hazards.

b. Noise

- 1) *What types of noise exist in the area which may affect your project (e.g., traffic, equipment, operation, other)?*

The nature of the project is such that it is unaffected by noise.

- 2) *What types and levels of noise are associated with the project on a short-term or a long-term basis (e.g., traffic, equipment, operation, other)? Indicate what hours the noise would come from the site.*

During construction, the project will expose nearby residences to increased noise from construction equipment. Typical equipment the construction contractor is likely to use during construction includes pickup trucks, line trucks, graders and bulldozers, backhoes, boring equipment, tractor-trailers, cranes, drum pullers and tensioners, harrows, and broadcast seeders. Construction equipment typically produces noise levels of 75 to 90 decibels on an A-weighted scale (dBA) at a distance of 50 feet from the construction activity. Noise levels from construction equipment will vary and will be temporary in nature. Construction will occur during daylight hours (7 a.m. to 7 p.m.) and is anticipated to last for several weeks at a given location for up to 9 months over a period of 2 to 3 years.

- 3) *Proposed measures to reduce or control noise impacts:*

Noise levels during construction of the solar facility components and other related appurtenant improvements will depend on the specific construction methods used. Construction noise will be localized and temporary.

To minimize noise impacts, the construction contractor will limit construction activities to daylight hours (7 a.m. to 7 p.m.), and all equipment will have sound-control devices.

Land and Shoreline Use

a. *What is the current use of the site and adjacent properties?*

The site is currently zoned Forest and Range (F&R) (Figure 5). The site was most recently selectively logged in 2001–2002, and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. The adjacent properties are zoned as Commercial Forest (CF), Rural 3, and F&R (Figure 6).

b. *Has the site been used for agriculture? If so, please describe.*

No, the proposed project site has not been used for agriculture. The site is currently zoned F&R and was most recently logged in 2001–2002.

c. *Describe any structures on the site.*

No structures are currently present on the proposed project site. The Applicant selected the proposed project site to maximize significant insulation capacities and sunlight, optimize slopes for year-round energy production, provide adequate site accessibility, avoid environmentally sensitive areas, and minimize visibility from offsite locations.

d. *Will any structures be demolished? If so, please describe.*

The Applicant is not proposing to demolish any structures as part of this project.

d. *What is the current zoning classification of the site?*

The proposed project site is located within the F&R zone in Kittitas County.

e. *What is the current comprehensive plan designation of the site?*

The current comprehensive plan designation of the proposed project site is Rural.

f. *What is the current shoreline master program designation of the site?*

The proposed project will not be located within 200 feet of any rivers designated under the shoreline master program. The closest river with such a designation under Washington Administrative Code (WAC) 173-18-230 is the Teanaway River, which is located approximately 1.0 mile from the proposed project site (Attachment D, Figure 8).

g. *Has any part of the site been classified as an “environmentally sensitive” area? If so, please specify.*

Section 17A.02.060 of the Kittitas County Code (KCC) designates the following habitats and ecosystems as critical areas consistent with state statute (RCW 36.70A.030[5]):

1. Wetlands;
2. Areas with a critical recharging effect on aquifers used for potable water;
3. Fish and wildlife habitat conservation areas;
4. Frequently flooded areas; and
5. Geologically hazardous areas.

The following subsections further define these designated “critical areas.” However, only wetlands and frequently flooded areas apply to the project because the proposed project

does not affect the other critical areas. The Applicant will mitigate the critical areas that the project affects in accordance with the KCC, Critical Areas Ordinance (CAO), and federal and state requirements. The Critical Areas permit application is included as part of the Kittitas County conditional use permit.

Wetlands

CH2M HILL conducted a wetlands and other waters delineation in June and July 2009 for the proposed project.

The proposed project is located in the Teanaway River and Yakima River watersheds within the Yakima River basin and Upper Yakima subbasin. Tributaries within the project site flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices eventually flows into the Yakima River with the exception of one unnamed tributary (S6), which flows directly into the Teanaway River. Wetlands within the project site are hydrologically connected to these tributaries.

Twelve wetlands were delineated (see Table 4). They total 0.97 acre within the survey area (Attachment D, Figure 8). All of the wetlands were determined to be PEM (Cowardin) depressional (HGM) wetlands. Table 4 lists the separate wetlands within the proposed project area. (See *Environmental Elements: Water a. Surface* in this checklist for more details.)

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W1	0.010	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W2	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W3	0.030	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W4	0.067	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W5	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W6	0.253	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W7	0.231	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W8	0.027	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W9	0.013	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W10	0.019	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W11	0.006	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W12	0.312	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES

The survey team delineated wetlands within the proposed project area in accordance with *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE, 2006), and distinguished buffers based on 17A.04.020 of the KCC. The *Wetland Delineation Report* (Attachment B) provides a detailed analysis of the stream classifications for the streams/jurisdictional waters in the project area.

There will be no permanent impacts to wetlands or waters in Washington from the construction of solar PV arrays, transformers, the O&M building, switchgear structures, or the powerline route to the grid. The Applicant will restore temporarily disturbed areas by returning the surface to preconstruction contours and planting with a specified native seed mix immediately following construction.

The Applicant recognizes that there are three Category III wetlands greater than 10,000 square feet within the proposed project area. These wetlands will contain a buffer of 80 feet, which will not be impacted by any permanent or temporary structure (Attachment D, Figure 5). All other wetlands will have a 25-foot buffer pursuant to 17A.04.020 of the KCC.

It is anticipated that the improvements associated with access roads will result in minimal impacts to wetlands and waters. As stated in the Plants section of this checklist, impacts to wetlands and waters will be avoided wherever practicable. For a more detailed analysis of wetland impacts and mitigation measures, please see Attachment B, *Wetland Delineation Report*.

The Applicant will revegetate temporarily disturbed areas with an appropriate seed mix consisting of native shrubs, forbs, and grasses developed in consultation with the Kittitas County Noxious Weed Control Board or landowner and using other applicable state and federal guidelines and plant lists. Permanently disturbed areas will be maintained to prevent the occurrence of noxious weeds.

Critical Aquifer Recharge Areas

Section 17A.02.020 of the KCC defines areas with a critical recharging effect on aquifers used for potable water as “areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water (WAC 365-190-030[2]).”

This project will not have an impact on critical aquifer recharge areas (see Attachment D, Figure 8). Per Section 17A.08.010 of the KCC, no critical aquifer recharge areas have been identified by the County. All nearby wells have been identified (see Attachment D, Figure 8) and will be avoided. No hazardous materials which may contaminate the ground or surface

water will be utilized or stored on site. While some solar modules being considered for installation do contain toxic substances, such as cadmium telluride, there is very little chance of groundwater contamination because modules are laminated in a glass structure that is designed to last for 25 years. At the end of this 25-year life cycle, the solar modules will be recycled by the manufacturer.

During construction, the construction contractor may use small amounts of lubricants and solvents and will follow appropriate measures to prevent spills and contamination.

Fish and Wildlife Habitat Conservation Areas

Section 17A.02.090 of the KCC defines fish and wildlife habitat conservation areas as follows:

1. *Those lands in Kittitas County owned or leased by the Washington State Department of Fish and Wildlife;*
2. *Those lands donated to or purchased by Kittitas County for corridors pursuant to RCW 36.07A.160;*
3. *Wetlands;*
4. *Big game winter range;*
5. *Riparian habitat;*
6. *Habitats for species of local importance.*

There are no lands owned or leased by WDFW within the project area. Also, there are no lands purchased by Kittitas County pursuant to RCW 36.017A.160, which requires the County to designate “open space corridors within and between urban growth areas.” Because no such corridors are located in the project area, they are not affected by the proposed project.

The project area contains wetlands; however, any impacts to wetlands will be minimal. All category-specific buffers will be observed and BMPs will be in place to avoid impacts to wetlands and riparian habitat, where practicable. Please see the Wetlands section directly above for a more detailed discussion of these areas.

There are no areas of important wildlife habitat within the project area. This includes big game winter habitat and habitats for species of local importance. The project will not affect any listed WDFW Priority Habitat or habitats listed under the WDNR NHP database. The nearest PHS habitat is between 0.8 and 1.5 miles from the site.

The Animals section of this checklist discusses detailed wildlife, habitat, and proposed mitigation measures.

Frequently Flooded Areas

Section 17A.02.140 of the KCC defines areas of special flood hazard as “*the one-hundred year floodplain, which are lands subject to a one percent or greater chance of flooding in any given year as designated by the Federal Emergency Management Federal Insurance Rate Map for Kittitas County.*”

The project area does not contain or affect any 100-year floodplains, according to the Federal Emergency Management Agency floodplain areas (Figure 9). The nearest 100-year floodplain is adjacent to the Teanaway River and is approximately 450 feet from the project area.

Geologically Hazardous Areas

Section 17A.02.150 of the KCC defines geologically hazardous areas as “*areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suitable to the siting of major commercial, residential or industrial development consistent with public health or safety concerns without proper engineering consideration and design. The term commercial shall not be construed to include natural resource activities.*”

The proposed project is not “commercial, residential, or industrial development” as defined by the KCC. The Applicant will select the placement and locations of the facility components to minimize susceptibility to erosion, sliding, earthquakes, and other geological events, consistent with proper engineering consideration and design.

Geological hazards are discussed in further detail in the Earth section of this checklist and are presented on Attachment D, Figure 10, Designated Critical Areas: Erosion-Prone Soils and Geologic Hazards.

h. How many people would reside or work in the completed project?

The project will not result directly in any people residing in the project area.

i. How many people would the completed project displace?

The project will not result in the displacement of any people.

j. Please list proposed measures to avoid or reduce displacement impacts:

The project will not create displacement impacts.

k. List proposed measures to ensure the proposal is compatible with existing and projected land uses and plans:

The proposed project is compatible with the existing and projected land uses and plans with the approvals and permits described in the following subsections. This includes compatibility with the *Kittitas County Comprehensive Plan* (Kittitas County, 2006), and the Kittitas County Code.

The Applicant will submit all necessary applications for local land use approvals and permits in Washington to ensure that the project is compatible with existing and projected land uses and plans. These land use approvals and permits include those described below.

Forest Practices Act Permit

The FPA permit will be obtained through WDNR. Trees will be removed from the site only as necessary to install facilities. Trees will be left onsite wherever practicable.

Conditional Use Permits

The Applicant will submit a conditional use permit (CUP) application to Kittitas County consistent with the comprehensive plans and zoning ordinances for both jurisdictions.

The project is defined as a “*Major alternative energy facility*” in KCC Section 17.61.010(9) and may be authorized in the F-R zoning district through approval of a CUP per KCC Section 17.61.020(4).

Kittitas County has indicated that the size and complexity of the project generate the need for a Development Agreement (DA) between the Applicant and the County. A DA will be submitted at the same time as the other application material described above, under separate cover. The DA will condition and govern the CUP.

Critical Areas Permit

The proposed project site includes wetlands, which are critical areas as defined in Section 17A.02.060 of KCC and are described in more detail in item (g). Therefore, the Applicant has applied for a Critical Areas Permit as part of the Kittitas County CUP.

Housing

- a. Approximately how many units would be provided? Indicate whether it is high, middle, or low-income housing.*

The proposed project involves the construction and operation of the Teanaway Solar Reserve on private land in an unincorporated area of Kittitas County, and does not include the development of any new housing units.

The direct average employment in Kittitas County during each of the 7- to 9-month construction periods is estimated at 225 workers (see *Economic Impact Analysis for the Teanaway Solar Reserve, Kittitas County, Washington*). The number of construction workers expected to be transient to Kittitas County will be small enough that adequate temporary housing provided by hotels and motels is available to meet project needs. No housing units will be developed as part of the proposed project.

According to the 2005–2007 American Community Survey 3-Year Estimates, Kittitas County has 9,180 estimated housing units, including 5,464 owner-occupied units and 2,729 renter-occupied units (U.S. Census Bureau, 2009). The vacancy rate is estimated to be 8.8 percent.

According to the Cle Elum Roslyn Chamber of Commerce (2009), approximately 20 hotels and motels are available in the Cle Elum Roslyn area.

- b. Approximately how many units, if any, would be eliminated? Indicate whether it is high, middle, or low-income housing.*

The proposed project will not eliminate any housing units in Washington.

- c. List proposed measures to reduce or control housing impacts.*

No housing impacts will occur as a result of the proposed project.

Aesthetics

- a. *What is the tallest height of any proposed structure(s), not including antennas? What is proposed as the principal exterior building materials?*

The tallest structures associated with the proposed project will be poles associated with the proposed powerline route to interconnect with the grid. The construction could be similar to the existing lattice towers for the BPA line, and could require a height of approximately 150 feet. However, this transmission line will need to be only 3,000 feet long, with a total of five towers. In addition, this line will be constructed at the lowest elevation on the site, helping to minimize its visibility.

Within the project area, the tallest structures will be components associated with the O&M building. The O&M building will be approximately 24 feet in height.

- b. *What views in the immediate vicinity would be altered or obstructed?*

A geographic information system (GIS)-based visibility assessment was conducted to determine areas from which solar modules will be potentially visible. Please see Attachment F, *Zone of Visual Influence Technical Memorandum*. Attachment F was developed to provide background documentation for these conclusions. It was also developed to assist the County in evaluating potential visual impacts associated with the proposed project.

The visibility assessment illustrates that because the proposed site is located on a sloping “bench,” it is above and not visible from many important nearby viewing areas. These include most of the Teanaway Valley to the north, east, and west; US 97 (a state-designated Scenic and Recreational Highway); and the City of Cle Elum. The site is visible from some residences on hillsides southeast of the site that are located on the northwest-facing slope of Lookout Mountain. The distances between these residences and the project site range from approximately 0.5 to 3 miles. Based on several site visits and discussions with one resident in the area (personal communication between M. Greenig [CH2M HILL] and Tom Lambert, property owner, July 26, 2009), many, if not most, of the residences on the northwest-facing slopes of Lookout Mountain have views toward the project site that are obscured, or at least partially screened, by trees.

Conceptual depictions of how the project will change existing views toward the project site from two areas on the slopes of Lookout Mountain (from which the project site is most visible) are contained in Attachment F. The project will alter the view from at least one residence and a public road (Ridgewater Drive, see Attachment F) in that many solar modules will be visible in an area that now has the appearance of an area that was harvested for timber. Although views of Mt. Stewart and other peaks will not be blocked or obscured, the presence of the solar modules will alter views of the harvested area seen from these locations. Most of the trees in the harvested area will be removed and replaced with a series of parallel solar module rows that will have an almost agricultural-orchard appearance.

The project site is also visible from some residential areas on the hillsides south of I-90 (although these are not in the “immediate vicinity”). The distance between these residences and the closest part of the project site varies from approximately 3.5 to 7 miles. Conceptual depictions of how the project will change existing views toward the project site from these areas are contained in Attachment F. The closest part of I-90 (a National Scenic Byway) to the project site is approximately 3 miles away. Because the part of I-90 from which the project will be visible is laid out in a generally southeast-to-northwest direction, motorists likely will not notice the project in their peripheral vision as they drive I-90 with their attention on the freeway ahead of them. The project will likely be noticed from some of these areas, but because of its distance and the flatness of the terrain on which much of it will be located, the project will not block or obscure views of mountains to the north and will cause little alteration to landscape viewed from these areas.

c. Proposed measures to reduce or control aesthetic impacts:

The tallest and potentially most visible project components (the transmission structures) will be galvanized and treated at the factory to create a dulled finish that will reduce light reflection from the structures. In addition, nonspecular (nonreflecting) material will be used for the conductors. Nonspecular conductors and insulators made of materials that do not reflect light will also be used for the proposed substation. As with the transmission structures, the metal frames for the solar modules will be galvanized and treated at the factory to create a dull finish that will reduce reflection. The solar modules themselves require no measures to reduce or control light or glare impacts. Lighting specified for the substation and inverted buildings will be the minimum required to meet safety and security standards. Light fixtures will be hooded to eliminate any potential for glare effects and to prevent light from spilling off the site or up into the sky. In addition, the fixtures will have sensors and switches to permit the lighting to be turned off at times when it is not required. The finish of the inverter buildings’ walls and roofs will be dull so as not to reflect glare.

These measures will limit the reflectivity of the project components and greatly reduce or eliminate the potential for the proposed project to be a source of daytime glare or create nighttime lighting impacts.

Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The proposed solar modules are monochromatic with a dull finish, which minimizes the production of glare. Additionally, the photovoltaic modules proposed are designed (and have antireflective coatings) to absorb and capture sunlight rather than reflect it. Design features such as textured glass further reduce reflectivity. Other project components such as the substation, transmission line, and inverter buildings could potentially create glare, but the measures described in item (d) below explain how that potential has been addressed. Lights associated with the substation and inverter buildings will potentially be seen from some areas for irregular periods of time. Item (d) below explains how that potential has been addressed.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No. See previous item (a).

c. What existing off-site sources of light or glare may affect your proposal?

None. There are very few residences and buildings near the project site and none within the site. Some lighting from residences may be seen below the project site, and some light or glare from vehicles traveling on roads near the project site (but rarely through the project site due to locked gates blocking public access) may be seen from some viewing areas. These offsite sources of light or glare will not affect the proposed project.

d. Proposed measures to reduce or control light and glare impacts:

The tallest and potentially most visible project components (the transmission structures) will be galvanized and treated at the factory to create a dulled finish that will reduce light reflection from the structures. In addition, nonspecular (nonreflecting) material will be used for the conductors. Nonspecular conductors and insulators made of materials that do not reflect light will also be used for the proposed substation. As with the transmission structures, the metal frames for the solar modules will be galvanized and treated at the factory to create a dull finish that will reduce reflection. The solar modules themselves require no measures to reduce or control light or glare impacts. Lighting specified for the substation and inverted buildings will be the minimum required to meet safety and security standards. All light fixtures will be hooded to eliminate any potential for glare effects and to prevent light from spilling off the site or up into the sky. In addition, the fixtures will have sensors and switches to permit the lighting to be turned off at times when it is not required. The finish of the inverter buildings' walls and roofs will be dull so as not to reflect glare.

These measures will limit the reflectivity of the project components and greatly reduce or eliminate the potential for the proposed project to be a source of daytime glare or create nighttime lighting impacts.

Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

The proposed project site and immediate vicinity do not contain any designated or informal recreational opportunities. The proposed project site traditionally has been used as commercial forest, and public access has been prohibited.

Although some hunting or hiking occurs on private land near the proposed project site, there are no designated parks, wildlife refuges, or recreational areas in the immediate vicinity, according to data provided by *National Atlas of the United States* (U.S. Department of the Interior, 2007). The proposed project is not visible from the Indian John Hill rest stop and may be minimally visible from the summit. Three lakes occur approximately 2 miles from the proposed project area (Table 5). No impacts to the lakes are anticipated.

TABLE 5
Potential Locations for Recreational Opportunities Near the Proposed Project Area

Name	Distance to Proposed Project Area
Big Lake	1.95
Cabin Lake	2.16
Little Lake	2.42

Source: U.S. Department of the Interior, 2007.

The majority of the land near the proposed project area is privately owned. Bird watching and hunting are the only types of recreational opportunity to exist on these private lands. There are no known planned future recreational sites or opportunities in or near the proposed project area.

b. Would the project displace any existing recreational uses? If so, please describe.

The project may minimally affect the existing hunting uses. Public access of the primary access point is already restricted by the subject landowners and will continue to be restricted in accordance with easement agreements. The Applicant does not have the authority to grant permission to third party recreationists, including hunters and campers, to access the project, but may grant permission to such parties on a case-by-case basis provided such parties secure written permission from all of the applicable landowners along Loping Lane.

c. Proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant, if any:

Because no significant impacts on important recreational opportunities will occur, the Applicant does not propose any measures to avoid, reduce, or otherwise mitigate project impacts. The Applicant will reduce potential impacts on unimportant recreational opportunities through measures already in use to reduce other project impacts. These measures may include the use of existing roads. Also, because there will be no significant impacts on important recreational resources, no monitoring program is proposed.

Historic and Cultural Resources

a. Are there any places or objects on or near the site which are listed or proposed for national, state, or local preservation registers? If so, please describe.

No places, objects, or sites located in the project area are listed or proposed for listing in the national, state, or local preservation registers. See Attachment C, *Cultural Resources Report* (restricted distribution), for a more complete analysis and field methodology.

b. Please describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

The project site is located on privately owned industrial forest lands. No landmarks or other evidence of historic, archaeological, scientific, or cultural importance are known to be on or adjacent to the site.

c. Proposed measures to reduce or control impacts, if any:

Archaeological surveys did not identify any cultural sites in the project area. Should previously unidentified sites be discovered during the course of construction, the Applicant will halt work in that area until a qualified archaeologist can assess the site and determine whether protective measures should be implemented. See Attachment C, *Cultural Resources Report* (restricted distribution), for a more detailed description of measures to reduce or control impacts.

Transportation

a. Identify the public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Figure 3, *Site Access Map*, shows the local streets and major state highways serving the proposed project. The construction contractor will access the project site primarily from I-90 eastbound to State Route (SR) 970 northbound to Red Bridge Road, which is a local County roadway. From Red Bridge Road, project traffic likely will take Weihl Road northbound for approximately 0.2 mile to Loping Lane, where traffic will turn left and continue westbound on Loping Lane to the project site, as shown in Attachment D, Figure 3. Weihl Road and Loping Lane are private roadways and are not maintained by Kittitas County.

From the main proposed project access off of Loping Lane, proposed project traffic may use private and County roads to access the project site. Use of these roads will depend on weather conditions and on load and size restrictions. Most of these other access routes are privately owned. Table 6 describes the roads that will directly access the project corridor or provide a critical regional transportation link to the project corridor.

TABLE 6
Key Roads Providing Access to the Proposed Project Area

Facility	Description
I-90	Interstate 90 within the vicinity of the project is classified as a rural interstate roadway with rolling terrain, according to the Washington State Department of Transportation (WSDOT) road classification system. This roadway has two lanes in each direction, and has a posted speed limit of 70 miles per hour (mph) outside city limits. Interstate 90 is anticipated to be the major haul route from Seattle, Washington.
US 970	US 970 begins in Cle Elum, Washington, where the speed limit is posted at 55 mph inside city limits. It continues eastbound and then northbound as a two-lane road with a posted speed limit of 60 mph. This facility is classified as a rural principal arterial with level terrain, according to the WSDOT road classification system. This rural principal arterial would provide the main access between the Interstate and local county roadways serving the proposed project area.
Red Bridge Road	Red Bridge Road is a paved two-lane road with a posted speed limit of 25 mph. It is classified as a rural local access road by Kittitas County. This roadway will serve as the main connection between state highway facilities and private access roads.
Weihl Road	Weihl Road is an unpaved, two-lane, privately maintained road without a posted speed limit. It is within a public right-of-way but is not maintained by Kittitas County. This rural privately maintained roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without affecting existing traffic operations.

TABLE 6
Key Roads Providing Access to the Proposed Project Area

Facility	Description
Loping Lane	Loping Lane is an unpaved, two-lane private road without a posted speed limit. It is a private roadway, and is not maintained by Kittitas County. This rural private roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without affecting existing traffic operations.

To evaluate the possible impacts resulting from construction traffic associated with the proposed powerline route to the grid, the analysts obtained traffic volumes for state highways that are part of the expected construction transportation routes. The study team consulted the Washington State Department of Transportation (WSDOT) and Kittitas County for traffic volumes and roadway characteristics.

Table 7 shows the average daily traffic (ADT) volumes between 2005 and 2008, the roadway functional classifications, the jurisdiction, and estimated truck percentages on state-maintained roadways in the project area. These volumes are based on available traffic data in *Annual Traffic Report*, published by WSDOT in 2008; the report provides annual traffic volumes for at least the last 4 years.

TABLE 7
Average Daily Traffic (ADT) Volumes, Roadway Functional Classification, and Estimated Percentage of Trucks

Roadway	State/ Jurisdiction	Functional Classification	2005 ADT	2006 ADT	2007 ADT	2008 ADT	Estimated Truck %
I-90 (MP 82.70) ^a	Washington State Dept of Transportation	Rural Interstate	27,000	27,000	28,000	27,000	23
I-90 (MP 84.61) ^a	Washington State Dept of Transportation	Rural Interstate	24,000	25,000	27,000	25,000	N/A
SR 970 (MP 2.69 west of SR 10)	Washington State Dept of Transportation	Rural Principal Arterial	5,600	5,800	5,800	5,400	N/A
SR 970 (MP 2.69 east of SR 10)	Washington State Dept of Transportation	Rural Principal Arterial	4,700	4,900	4,800	4,500	N/A
Red Bridge Road ^b	Kittitas County	Rural Local Access	260	230	250	200	N/A
Weihl Road	Private	N/A	N/A	N/A	N/A	N/A	N/A
Loping Lane	Private	N/A	N/A	N/A	N/A	N/A	N/A

^a WSDOT, 2008.

^b Wollman, 2009.

N/A = Information not available.

Traffic data along Red Bridge Road were provided by Kittitas County. No traffic data are available on Weihl Road or Loping Lane because they are privately owned, and they are not monitored or maintained by the County.

The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads, along with Wehl Road and Loping Lane, generally consist of gravel and dirt and will be improved pursuant to County requirements. Loping Lane is subject to several road use and cost-sharing agreements, and the Applicant will be subject to those agreements. Additionally, the Applicant is responsible for any improvements to these roads, and will first submit a plan detailing any such improvement for review and approval by the Kittitas County Public Works Department. These roads typically do not have posted speed limits, and ADT volumes are likely not available for these locations.

Transport of major equipment and materials to the site for construction likely will span 7 to 9 months for each of the two or three construction seasons (between April and October or April and December over 2 or 3 consecutive years). Truck deliveries are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. The average daily truck volume will be approximately 15 vehicles, with no more than 10 vehicles (5 light-duty trucks and 5 heavy-duty trucks) expected to either enter or leave the site during the peak hour of construction.

Construction worker traffic is also expected during the three construction seasons. The expected workforce could include 500 construction workers and 50 other personnel during the peak 5 months of construction each year. Assuming that half of the construction workers carpool to the site each day, approximately 300 worker trips can be expected to enter the project site in the morning and leave the site during the evening peak hour.

There is one permanent load restriction on I-90 between Seattle and the project site. This restriction prohibits loads taller than 16 feet 2 inches high from entering the snow shed near Hyak (MP 54-62 on westbound I-90). This restriction is not anticipated to affect truck- and construction-related traffic because any project-related trucks will be empty (no loads) heading westbound. Construction vehicles are expected to be of legal size and legal weight for Washington highways; therefore, no special permitting for transport of materials and equipment will be necessary.

There are no permanent restrictions on SR 970 in the vicinity of the project site.

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The project site is not currently served by public transit.

The nearest public transportation system is in Ellensburg, Washington. Central Transit is a general public transportation system that operates a fixed route serving mainly Central Washington University. It includes bus stops, operates on a schedule, and does not require advance reservations. It is operated by HopeSource. (Source: *Kittitas County Long Range Transportation Plan, 2008*)

c. How many parking spaces would the completed project have?

The Applicant anticipates 20 permanent parking stalls with the completion of this project. These parking stalls will be reserved for vehicles related to project maintenance.

- d. *Will the proposal require new roads or streets, or improvements to existing roads or streets, not including driveways? If so, please describe and indicate whether they are public or private.*

The Applicant and the construction contractor will use existing roads as much as possible. Because project-generated and local traffic volumes are fairly low, the Applicant does not anticipate requiring any improvements to existing paved roads or streets accessing the project.

The Applicant and the construction contractor will also use unimproved, nonpaved, private roadways to access the project site. Based on current conditions, these roadways will need improvements (such as gravel surfacing or widening) to transport large or heavy equipment and materials to the site during construction. As previously discussed, the Applicant will coordinate any improvements to these roads with the Kittitas County Public Works Department to ensure compliance with County requirements.

The number of new access roads will be kept to a minimum to avoid disrupting existing land use. If new construction access roads are necessary on private property, they will be created for temporary access only, and the land will be returned to its natural state after construction.

- e. *Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, please describe.*

The Applicant does not anticipate that the proposed project will use rail, water, or air transportation.

- f. *How many vehicular trips per day would be generated by the completed project? Indicate when peak traffic volumes would occur.*

Once the project has been completed, there will be virtually no traffic (less than five trips per day) for operations and maintenance. Given the low traffic volumes within the project area, these minor added trips will not cause traffic impacts during project operations.

- g. *Proposed measures to reduce or control transportation impacts, if any:*

Because project transportation impacts are limited, the Applicant will not pursue specific measures to reduce traffic impacts on local residents during the construction process.

Public Services

- a. *Would the project result in an increased need for public services (e.g., fire protection, police protection, health care, schools, other)? If so, please describe.*

The proposed project area is currently subject to the fire suppression protection services of WDNR. Should the construction of the project require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression protection services are in place during the construction and ongoing operations of the project. The Applicant will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines

Police protection of the proposed project area is provided by the County's Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and

active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, the Applicant will contact fire protection and police services in the event of an emergency.

The Applicant does not anticipate that health care and school needs will increase during construction or operation of the proposed project.

b. Proposed measures to reduce or control direct impacts on public services, if any.

The Applicant does not propose any measures to reduce or control direct impacts on public services.

Utilities

a. Circle the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

The proposed project will not require utilities.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The Applicant does not anticipate any utility use during construction. The construction contractor will provide mobile utilities such as portable toilets, cellular telephones, and water trucks.

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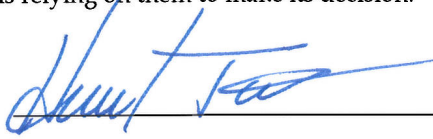
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Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:

A handwritten signature in blue ink, appearing to be "Shunt" followed by a stylized flourish, written over a horizontal line.

Date Submitted: _____

ATTACHMENT A

Sensitive Species Report

Report

Sensitive Species Surveys for the Teanaway Solar Reserve Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

August 2009

Prepared by
CH2MHILL



**Printed on
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1.0 Introduction

CH2M HILL conducted rare plant and wildlife surveys in June and July 2009 for the proposed Teanaway Solar Reserve (project). The proposed project is located on private land in an unincorporated area of Kittitas County, Washington. The purpose of the surveys was to identify potential populations of special status species and to determine whether proposed project activities will affect these populations.

This report provides a brief overview of the project, describes the methodology followed to conduct the surveys, presents survey results and conclusions, and offers recommendations for the future, including proposed measures for avoiding or minimizing impacts.

2.0 Project Description

2.1 Site Location

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for map of site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road, and private roads such as Loping Lane and Weihl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

2.2 Purpose and Need

The purpose of the proposed project is to generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived by Teanaway Solar Reserve, LLC (Applicant) in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

2.3 Key Components

The proposed project will consist of the following key components:

- Solar modules
- Inverter Buildings

- Underground Electrical Conductors
- Substation
- Transmission Line
- Access Roads
- Operations and Maintenance (O&M) Building

Key components are summarized below.

2.4 Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. The solar modules are mounted in a fashion that orients the modules toward the sun.

2.5 Inverter Buildings

Up to 40 inverter buildings will be needed. The inverters can be placed outdoors. An example inverter building includes a concrete pad, and prefabricated facilities are available such as the 2-MW enclosed system offered by Xantrex.

2.6 Underground Electrical Conductors

Underground electrical conductors will be installed in trenches at a depth in compliance with the Kittitas County code (36 inches or greater). Conductors will be buried directly or placed in a polyvinylchloride (PVC) conduit.

2.7 Substation

The Applicant proposes to construct an electrical substation that will interconnect with the 345-kV BPA transmission line. The substation will require a level, fenced area of approximately 10 acres. The 10-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, and overhead electrical bus work. Its appearance will be similar to that of many other substations throughout the Pacific Northwest.

2.8 Transmission Line

A new 345-kV transmission line will be needed to connect the new substation to the existing BPA line. If the substation is located at the BPA right-of-way, this line would be very short. The line would have two circuits, one into the substation and one out of the substation. The construction could be similar to the existing lattice towers, and require a right-of-way of up to 300 feet in width.

2.9 Access Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Loping Lane and Weihl Road are private roads over which the Applicant has easement rights.

3.0 Sensitive Species Surveys

CH2M HILL biologists conducted surveys of the 580-acre survey area for rare plant and wildlife species in June and early July of 2009. Figure 2 (Appendix A) shows the sensitive species survey area within the 982-acre proposed project area.

A species was considered to be rare if it met one or more of the following listing criteria:

- Federally listed as threatened or endangered (*Endangered Species Act of 1973* (16 U.S.C. 1531-1544, 87 Stat. 884))
- State listed as threatened or endangered (State of Washington *Endangered, Threatened, and Candidate Species Classification* WAC 232-12-297)

Target species included all plant and wildlife taxa listed by the U.S. Fish and Wildlife Service (USFWS) or the state of Washington as *Endangered* or *Threatened* and potentially occurring in Kittitas County, Washington. A species was determined to have potential to occur in the survey area if its known or expected geographic range includes the survey area or the vicinity of the survey area, and if its known or expected habitat is represented within or adjacent to the survey area.

3.1 Rare Plant Survey

The purpose of the rare plant survey was to locate all populations of special status plants within the survey area, to precisely record and map their locations using geographic positioning system (GPS) technology with submeter accuracy, and to determine the size and phenology of each rare plant population, and its microhabitat characteristics.

3.1.1 Methods

Office Review. The office review consisted of compiling a list of special status plant species potentially occurring within the survey area, and reviewing topography and soils maps, recent aerial photography, and information on habitat requirements for any of the potentially occurring species.

Sources consulted included the following:

- *List of Known Occurrences of Rare Plants in Washington: Kittitas County*. Washington Natural Heritage Information System (WNHIS). February 2009.
- *State of Washington Priority Habitats and Species (PHS) List*. Washington Department of Fish and Wildlife (WDFW), 2008.
- *Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service Which May Occur Within Kittitas County, Washington*. United States Fish and Wildlife Service (USFWS), July 24, 2008 (Appendix B).
- *Topographic Map of the Teanaway, Washington Quadrangle*. United States Geological Service (USGS), 1985 Provisional Edition.
- *Soil Survey, Kittitas County Area, Washington*. NRCS Soils Survey, 2009.

- *Field Guide to Selected Rare Plants of Washington* (Washington Natural Heritage Program, 2009) (Appendix C).

Field Investigation. Surveys were floristic in nature and were conducted according to the U.S. Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al., 1998).

Two survey methods were used. An Intuitive Controlled Survey was conducted throughout the survey area, and a Complete Survey was conducted in areas of high potential habitat within the survey area. Protocol for these methods is described below.

Intuitive Controlled Survey

An intuitive controlled survey was conducted throughout the survey area. The surveyor traversed the survey area to see a representative cross-section of all the major habitats and topographic features, looking for the target species while en route between different areas. When the surveyor arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a complete survey for the target species was conducted.

Complete Survey

A complete survey was conducted in areas within the survey area where the most suitable habitat was located. These surveys are defined as a 100 percent visual exam of the survey area.

Lists of all vascular plant taxa encountered within each survey area were recorded in the field. Nearly all plant species found in the survey areas were identified to the level needed to determine whether they qualify as special status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references, including the following:

- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Manual of Grasses of the United States* (Hitchcock, 1971)
- *Field Guide to Selected Rare Plants of Washington* (Washington Natural Heritage Program, 2008)
- *WTU Image Collection: Plants of Washington, Lichens of Washington*. University of Washington Herbarium, Burke Museum of Natural History and Culture, 2009.

3.1.2 Results

Office Review. Twelve plant species listed by federal or state agencies as threatened or endangered were identified as potentially occurring in the vicinity of the survey area. Of those species, six were determined to potentially occur within the survey area based on evaluation of habitat requirements, elevation, and records of known occurrence. A complete list of potentially occurring plant species, including habitat requirements and bloom times, is presented in Table 1.

TABLE 1
Threatened or Endangered Plant Species That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status*	State Status*	Habitat Preference	Potential to Occur
Plants					
<i>Astragalus arrectus</i>	Palouse milk-vetch	--	LT	Open ponderosa pine/Douglas fir forests in grassy or shrub dominated openings	May occur. Historical in Kittitas County. Several species of <i>Astragalus</i> identified during site visit.
<i>Carex macrochaeta</i>	Large-awn sedge	--	LT	Moist or wet, open places, frequently found near the coast, but occurs inland as well. Grows in seepage areas, around waterfalls, in wet meadows, and along streams and lakes.	May occur. Only five known extant populations, but like many sedges, it may be underreported.
<i>Delphinium viridescens</i>	Wenatchee larkspur	SoC	LT	Seasonally wet openings, moist meadows, moist microsites in open coniferous forests springs, seeps, riparian areas.	May occur. Known range is very small, but southern extent of know range is less than 15 miles north of proposed project area.
<i>Ophioglossum pusillum</i>	Adder's-tongue	--	LT	Wet meadows, grassy swales, moist woods, mud creeks.	May occur. Historical in Kittitas County. Few extant populations left in range, however potential habitat is present.
<i>Sidalcea oregana var. calva</i>	Wenatchee Mountain checker-mallow	LE	LE	Moist meadows that have surface water or are saturated in the upper portions of the soil profile into early summer. Taxon also occurs in open ponderosa pine/Douglas fir forests and along edges of shrub thickets.	May occur. Range covers roughly 30 square miles of habitat S/SE of Leavenworth, Washington.
<i>Spirathes diuvialis</i>	Ute's ladies tresses	LE	LE	Broad low-elevation intermontane valley plains, with deltaic meandered wetland complexes; restricted to calcareous, temporarily inundated wet meadow zones and segments of channels and swales where there is stable subsurface moisture and relatively low vegetation cover. There are 4 know sites in WA. One is in a periodically flooded alkaline flat (moist meadow) adjacent to a ponderosa pine/Douglas-fir woodlands and sagebrush steppe with big sagebrush, bitterbrush, and rabbitbrush. The other three sites are adjacent to the Columbia River on stabilized gravel bars that are moist throughout the growing season.	Not likely to occur. Occurs between 720 and 1,500 feet elevation. Project area is between 2,100 and 2,800 feet elevation.

* Status Codes:

LE = Listed Endangered (Federal or State)

LT = Listed Threatened (Federal or State)

SoC = Species of Concern (Federal)

FC=Federal Candidate for Listing (Federal)

SC = Washington State Candidate for Listing (State)

Sources: USFWS, 2009; WDFW, 2009; WDNR, 2009.

Field Investigation. CH2M HILL botanists conducted field surveys for rare plant species and potential rare plant habitat on June 16 through 19 and July 9, 2009. This range of survey dates was selected to encompass all or a portion of the blooming times of the special status plants potentially occurring within the project area. Approximately 580 acres were evaluated for the potential presence of rare plant species.

Plant Species Observed

The field survey identified a total of 81 species: 3 trees, 7 shrubs, 12 graminoids, and 56 forbs, and 3 herbaceous species. No special status plant species were found within the survey area. Table 2 presents a complete list of all plant species identified during the course of the field surveys. Appendix D contains photos of typical habitat types that occur in the survey area.

TABLE 2

Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
Alismataceae					
	<i>Alisma plantago-aquatica</i>	European water plantain		X	forb
Apiaceae					
	<i>Ligusticum grayii</i>	Gray's lovage	X		forb
	<i>Lomatium nudicaule</i>	bare-stem desert parsley	X		forb
	<i>Lomatium triternatum</i>	nine-leaf desert parsley	X		forb
	<i>Oenanthe sarmentosa</i>	Pacific water -parsley	X		forb
Asteraceae					
	<i>Achillea millefolium</i>	wooly yarrow	X		forb
	<i>Anaphalis margaritacea</i>	pearly-everlasting	X		forb
	<i>Arnica sororia</i>	foothills arnica	X		forb
	<i>Balsamorhiza sagittata</i>	arrow-leaf balsamroot	X		forb
	<i>Chondrilla juncea</i>	rush skeletonweed		X	forb
	<i>Chrysanthemum leucanthemum</i>	ox-eye daisy		X	forb
	<i>Cirsium vulgare</i>	bull thistle		X	forb

TABLE 2

Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
	<i>Crepis occidentalis</i>	western hawksbeard	X		forb
	<i>Crepis setosa</i>	rough hawksbeard		X	forb
	<i>Eriophyllum lanatum</i>	wooly sunflower	X		forb
	<i>Gnaphalium palustre</i>	marsh cudweed	X		forb
	<i>Hieracium scouleri</i>	wooly-weed	X		forb
	<i>Madia glomerata</i>	mountain tarweed	X		forb
	<i>Madia gracilis</i>	slender tarweed	X		forb
	<i>Madia minima</i>	small-headed tarweed	X		forb
	<i>Senecio sylvaticus</i>	wood groundsel	X		forb
	<i>Symphyotrichum spatulatum</i>	western mountain aster	X		forb
	<i>Tragopogon dubius</i>	yellow salsify		X	forb
	<i>Wyethia amplexifolia</i>	narrow-leaf wyethia	X		forb
Berberidaceae					
	<i>Berberis repens</i>	creeping Oregongrape	X		shrub
Boraginaceae					
	<i>Lithospermum rudemale</i>	Columbia puccoon	X		forb
	<i>Myosotis laxa</i>	small-flowered forget-me-not	X		forb
	<i>Plagiobothrys scouleri</i>	Scouler's popcorn-flower	X		forb
Caprifoliaceae					
	<i>Symphoricarpos albus</i>	snowberry	X		shrub
Caryophyllaceae					
	<i>Agrostemma githago</i>	common corncockle		X	forb
	<i>Symphoricarpos oreophilis</i>	mountain snowberry	X		shrub
Convolvulaceae					
	<i>Convolvulus arvensis</i>	field Morning-glory		X	forb
Cyperaceae					
	<i>Carex hoodii</i>	Hood's sedge	X		graminoid
	<i>Carex pachystachya</i>	thick-headed sedge	X		graminoid
	<i>Carex utriculata</i>	inflated sedge	X		graminoid

TABLE 2

Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
Fabaceae	<i>Scirpus microcarpus</i>	small-fruited bulrush	X		forb
	<i>Cytisus scoparius</i>	Scotch broom		X	shrub
	<i>Lathyrus japonicus</i>	pinewoods peavine	X		forb
	<i>Lupinus polyphyllus</i>	large-leaf lupine	X		forb
	<i>Lupinus sericeus</i>	silky lupine	X		forb
	<i>Vicia americana</i>	American purple vetch	X		forb
Gentianaceae					
	<i>Centaurium erythraea</i>	centaury		X	forb
Juncaceae					
	<i>Juncus parryi</i>	Parry's rush	X		graminoid
Lamiaceae					
	<i>Prunella vulgaris</i>	self-heal		X	forb
Liliaceae					
	<i>Camassia quamash</i>	common camas	X		forb
	<i>Veratrum insolitum</i>	Siskiyou false-hellebore	X		forb
	<i>Zigadenus venenosus</i>	death camas	X		forb
Malvaceae					
	<i>Sidalcea oregana</i> var. <i>procera</i>	Oregon checkmallow	X		forb
Pinaceae					
	<i>Pinus ponderosa</i>	ponderosa pine	X		tree
	<i>Pseudotsuga menziesii</i>	Douglas-fir	X		tree
Plantaginaceae					
	<i>Plantago major</i>	common plantain	X		forb
Poaceae					
	<i>Agropyron smithii</i>	western wheatgrass	X		graminoid
	<i>Agropyron spicatum</i>	bluebunch wheatgrass	X		forb
	<i>Agrostis longiligula</i>	Pacific bentgrass	X		graminoid
	<i>Agrostis scabra</i>	rough bentgrass	X		graminoid
	<i>Danthonia spicata</i>	poverty oatgrass	X		graminoid

TABLE 2

Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
	<i>Elymus elymoides</i>	squirreltail			graminoid
	<i>Elymus glaucus</i>	blue wild-rye	X		graminoid
	<i>Festuca idahoensis</i>	Idaho fescue	X		graminoid
	<i>Phleum pratense</i>	common timothy		X	graminoid
	<i>Poa bulbosa</i>	bulbous bluegrass		X	graminoid
Polemoniaceae					
	<i>Collomia grandiflora</i>	large flowered collomia	X		forb
	<i>Navarretai breweri</i>	Brewer's navarretia	X		forb
	<i>Navarretia intertexta</i>	needle-leaf navarretia	X		forb
Polygonaceae					
	<i>Eriogonum umbellatum</i>	sulfur buckwheat	X		forb
	<i>Polygonum polygaloides</i> <i>spp.confertiti</i>	close-flowered knotweed	X		forb
	<i>Rumex acetosella</i>	sheep sorrel		X	forb
Ranunculaceae					
	<i>Ranunculus acris</i>	tall ranunculus		X	forb
Rosaceae					
	<i>Fragaria virginiana</i>	wild strawberry	X		forb
	<i>Potentill drummondii</i>	Drummonds cinquefoil	X		forb
	<i>Rosa woodsii</i>	Wood's rose	X		shrub
	<i>Spiraea betulifolia</i>	white spiraea	X		shrub
Rubiaceae					
	<i>Galium boreale</i>	northern bedstraw	X		forb
Salicaceae					
	<i>Populus tremuloides</i>	quaking aspen	X		tree
	<i>Salix scouleriana</i>	Scouler's willow	X		shrub
Scrophulariaceae					
	<i>Castilleja hispida</i>	harsh paintbrush	X		forb
	<i>Castilleja tenuis</i>	hairy Indian paintbrush	X		forb
	<i>Delphinium nuttallianum</i>	upland larkspur	X		forb
	<i>Penstemon procerus</i>	small flowered penstemon			forb
	<i>Verbascum thapsus</i>	wooly mullein	X		forb

TABLE 2

Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
Valerianaceae					
	<i>Plectritis macrocera</i>	white plectritis	X		forb

3.2 Wildlife Survey

3.2.1 Methods

Office Review. The office review consisted of compiling a list of special status wildlife species potentially occurring within the proposed survey area. The office review included review of state and federal rare species lists, recent aerial photography, and information on habitat requirements for any of the potentially occurring species.

Sources consulted included the following:

- *Species of Concern in Washington State*. Washington Department of Fish & Wildlife (WDFW), June 2009.
- *State of Washington Priority Habitats and Species (PHS) List*. WDFW, 2008.
- *Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service Which May Occur Within Kittitas County, Washington*. United States Fish and Wildlife Service (USFWS), July 24, 2008 (Appendix B).

Field Investigation. CH2M HILL biologists conducted reconnaissance-level field surveys on June 16 through 19 and July 9, 2009. A reconnaissance-level survey identifies all habitats within the survey area to determine whether there is onsite habitat with the potential to support a listed species. Recommendations are made for further protocol-level surveys for individual species if suitable habitat has been identified. Protocol-level surveys are intensive surveys with specific requirements according to the particular individual wildlife species.

Approximately 580 acres were evaluated for the potential presence of wildlife species.

3.2.2 Results

Office Review. A review of the *Species of Concern in Washington State* and the *State of Washington Priority Habitats and Species (PHS) List* resulted in four wildlife species which have the potential to occur in the vicinity of the proposed survey area. Table 3 summarizes WDFW PHS species, their habitat requirements, and likelihood of occurring in the survey area.

The database includes occurrences of both black-backed woodpecker and mountain quail approximately 1.0 mile from the project boundary. In addition, several occurrences of northern goshawk are documented approximately 1.5 to 1.8 miles from the northern edge of the survey area. The PHS database also includes elk and mule deer habitat regions

approximately 0.8 to 1.5 miles from the proposed project area. While neither species is listed, these habitats likely provide important winter habitat for elk and mule deer.

TABLE 3
Species Listed in the WDFW PHS Database That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status	State Status	Preferred Habitat	Potential to Occur	Notes
Birds						
<i>Picoides arcticus</i>	Black-backed woodpecker	--	SC	Mature coniferous forests that have been burned within 5 years	Unlikely	
<i>Accipiter gentilis</i>	Northern goshawk	SoC	SC	Mature coniferous forests. Often found on moderate slopes at mid to high elevations. Also found along forest edges and occasionally in mixed coniferous/deciduous forests.	May Occur	
<i>Oreortyx pictus</i>	Mountain quail	--	--	Requires dense thicket cover with accessible openings on slopes on mountains and foothills. Often associated with thickets in burned or cut areas. Require a reliable source of water during the summer.	Unlikely	Species of Local Significance
Mammals						
<i>Cervus Canadensis nelsoni</i>	Elk	--	--	Productive grasslands, meadows, or clear cuts, interspersed with closed-canopy forests. Year round range varies from 2,500 to 10,000 acres, and usually includes distinct summering and wintering grounds.	Documented	

Source: WDFW, 2009.

A review of Appendix B resulted in two wildlife species which have the potential to occur in the vicinity of the survey area. Table 4 summarizes the species, their habitat requirements, and the likelihood of occurrence in the survey area.

TABLE 4
USFWS Listed Threatened or Endangered Wildlife Species That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status*	State Status*	Habitat Preference	Potential to Occur
<i>Martes pennanti</i>	Fisher	C	LE	Mature, closed-canopy coniferous forests with some deciduous trees present, primarily along riparian corridors.	Unlikely. Rare in Washington State.
<i>Canis lupus</i>	Gray wolf	LE	LE	Dense, unfragmented coniferous forests.	Unlikely. Only one wolf known to occur in Washington State, in southeast Washington.

* Status Codes:

LE = Listed Endangered (Federal or Washington status)

LT = Listed Threatened (Federal or Washington status)

SoC = USFWS Species of Concern

C=Federal Candidate for Listing

SC = Washington State Candidate for Listing

Source: USFWS, 2009.

Field Investigation. Results indicated a total of five natural habitat types within the survey area. Most of these can be named by using the Chappel et al. (2001) system of vegetation classification. Survey area natural vegetation types are as follows:

- Ponderosa Pine Forest and Woodlands
- Open Water—Lakes, Rivers, and Streams
- Herbaceous Wetlands
- Riparian
- Upland Aspen Forest

These habitat types are illustrated on Figure 3 (Appendix A) and described below. Appendix D contains photos of typical habitat types that occur in the survey area.

Ponderosa Pine Forest and Woodlands

The Ponderosa Pine Forest and Woodland habitat (Appendix D: Photo 1) within the survey area is the most abundant of the five habitat types. The survey area has been actively managed as commercial timberlands for the past 100 years. The area was last logged in 2001-2002, leaving relatively few trees per acre and open stands of predominantly ponderosa pine (*Pinus ponderosa*) trees with Douglas-fir (*Pseudotsuga menzeisii*) present as a subdominant species. Stands typically consist of an overstory of 50-year-old ponderosa pine trees with an understory of mid-successional trees and saplings. There is a mixed herbaceous understory comprised of several co-dominants. Species include arrowleaf balsamroot (*Balsamorhiza sagittata*), yarrow (*Achillea millefolium*), bulbous bluegrass (*Poa bulbosa*), ventenata (*Ventenata dubia*), and several species of fescue (*Festuca* spp.), wheatgrass (*Agropyron* spp.), and lupine (*Lupinus* spp.). Populations of Oregon checker-mallow (*Sidalcea oregana* var. *procera*) and sticky purple geranium (*Geranium viscosissimum*) were also observed.

Open Water—Lakes, Rivers, and Streams

Several intermittent streams and one artificially ponded area (Appendix D: Photo 2) are found within or crossing the survey area. All of the streams were dry at the time of the field

visits and all were vegetated to varying extents. Typical vegetation within most channels includes herbaceous grass and forb species, including Brewer's navarretia (*Navarretia brewerii*), poverty oatgrass (*Danthoia spicata*), and small tarweed (*Madia exigua*). Other channels were dominated by dense shrub and herb species including wild rose (*Rosa woodsii*), snowberry (*Symphoricarpos albus*), cinquefoil (*Potentilla* spp.), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

Herbaceous Wetlands

Herbaceous Wetland habitats within the survey area consist of depressional wetlands dominated by herbaceous vegetation (Appendix D: Photo 3). Exposed soils were cracked, evidence of altering drying and wetting periods (Appendix D: Photo 3). These systems are not hydrologically connected to any stream or drainage ditch. Water arrives as either snowmelt or precipitation. These wetlands support hydrophytic herbaceous vegetation, and met the criteria for hydric soils and wetland hydrology. Common plant species within these wetlands were creeping spikerush and ventenata.

Riparian

The Riparian habitat (Appendix D: Photo 4) is found adjacent to some of the intermittent stream channels in the survey area. It generally consists of a dense shrub layer immediately adjacent to the stream gradually transitioning to ponderosa pine forest. Typical species include oceanspray (*Holodiscus discolor*), mountain spiraea (*Spiraea betulifolia*), Oregon checkermallow (*Sidalcea oregana* var. *procera*), Wood's rose (*Rosa woodsii*), and ponderosa pine.

Upland Aspen Forest

A small patch of aspen (*Populus tremuloides*) forest occurs along a drainage and around an artificially impounded pond in the southwestern portion of the survey area (Appendix D: Photo 5). Associated species include ponderosa pine, snowberry, and wild rose.

Species Observed. Wildlife observed during the field survey consisted of 10 bird and 2 mammal species. Evidence of wildlife (e.g., scat, burrows) observed in the survey area indicate the presence of rodents and coyote (*Canis latrans*).

Table 5 presents the list of all wildlife species observed during the field surveys.

TABLE 5
Wildlife Species Observed, June-July 2009 Field Investigation

Common Name	Scientific Name
Red-tailed hawk	<i>Buteo jamaicensis</i>
Stellar's jay	<i>Cyanocitta stelleri</i>
Common raven	<i>Corvus corax</i>
White-headed woodpecker	<i>Picoides albolarvatus</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
White-crowned sparrow	<i>Zonotrichia albicollis</i>
Chipping sparrow	<i>Spizella passerina</i>
Western tanager	<i>Piranga ludoviciana</i>
Western wood peewee	<i>Contopus sordidulus</i>
Mule deer	<i>Odocoileus hemionus</i>
Rocky Mountain Elk	<i>Cervus canadensis nelsoni</i>

No state or federally listed threatened or endangered wildlife species were observed within the survey area. A state candidate species, the white-headed woodpecker, was observed in the northwest portion of the survey area. Both male and female woodpeckers were observed close to the main access road. The male was observed foraging in a stand of adult ponderosa pine, while the female was located excavating a nest in a snag approximately 10 feet from the road.

4.0 Conclusions and Recommendations

CH2M HILL biologists conducted surveys for rare plant and wildlife species throughout the survey area. The purpose of the surveys was to identify potential populations of special status species and to determine whether proposed project activities will affect these populations.

4.1 Conclusions

The surveys identified 81 plant species, 12 wildlife species, and 5 habitat types. No state or federally listed endangered or threatened species were observed in the survey area during field surveys. The following conclusions were derived:

- Three habitat types in the survey area, Upland Aspen, Riparian, and Herbaceous Wetlands, are considered Washington Priority Habitats (Aspen Stands, Riparian, and Freshwater Wetlands). Because these habitats comprise only a small portion of the

survey area, impacts to these habitats from construction and operation of the project can likely be avoided.

- Back-backed woodpeckers are unlikely to be impacted by the development of this project, as activities relating to this project will not involve the documented area. Black-backed woodpeckers require habitat that includes stands of mature conifers that have experienced a burn event within the last 5 years. No stands of burned, mature conifer trees exist in the survey area. In addition, the proposed project is unlikely to impact any mountain quail or northern goshawk habitat, as no activities related to this project will occur near the PHS listing.
- Both the mule deer and elk PHS regions are located outside the proposed project area, and will not be impacted by project activities
- Potential suitable habitat for several listed species does occur within the Ponderosa Pine Forest and Woodland habitat. However, habitats within the survey area have been disturbed and fragmented by commercial forest practices and by residential development in the surrounding area. State or federal resource agencies may require additional surveys to determine if any rare plants or listed wildlife species occur in the survey area.
- The proposed project is not expected to result in any significant impacts to special status species. However, potentially suitable habitat may be temporarily and permanently impacted. Temporary impacts may occur in conjunction with the placement and use of heavy equipment during project construction. Permanent impacts will occur due to habitat alteration and tree removal. Removal of trees for project placement will disturb and fragment the existing forested habitat.

4.2 Recommendations

4.2.1 Best Management Practices (BMPs)

Best management practices (BMPs) will be implemented during construction to avoid and reduce temporary and permanent impacts to the extent practicable. In the event that a state or federally listed threatened or endangered plant or wildlife species is observed during project development, work will be halted immediately and a qualified biologist notified.

BMPs will be implemented wherever surface disturbances occur. These measures include, but are not limited to, the following:

- Protect trees, shrubbery, and other vegetation not designated for removal from damage caused by the project construction.
- Seed areas of temporary soil disturbance with the specified temporary seed mix.
- Install filter bags, sediment fences, sediment filter fabric traps, and graveled construction accesses as necessary for erosion control.
- Cover stockpiles with impervious materials when unattended or during rainfall.

- Locate construction staging areas for storage, maintenance, and fueling of construction equipment minimum of 150 feet from creeks or wetlands. Show staging areas on the construction plans.
- Take care to prevent petroleum products and other harmful material from entering wetland or waterways.
- Upon completion of construction, seed or plant all areas of disturbance with native plants.

4.2.2 Mitigation

All recommended surveys have been completed. It is still possible that individuals or populations of rare plant species may be encountered in the course of project construction. In the event of such a discovery, a qualified botanist will be retained to verify identity of the plant(s) and make recommendations for addressing the situation. All efforts will be made to avoid disturbance to such species. If disturbance cannot be avoided, efforts will be employed to minimize disturbance to the maximum extent practicable. If such efforts are not possible, mitigation for impacts to the plant(s) will be required. Mitigation measures will be specific to each plant species.

Possible avoidance and mitigation measures may include the following:

- Implement micrositeing: slight relocations of project facilities to avoid rare plant populations.
- Remove and conserve plants; replant following construction.
- Replant disturbed area with seed obtained from a qualified cultivator of rare plants.
- Mitigate by seeding an approved offsite area with the same species.
 - Mitigation will require approval of the agencies, as well as monitoring for a defined period of time.

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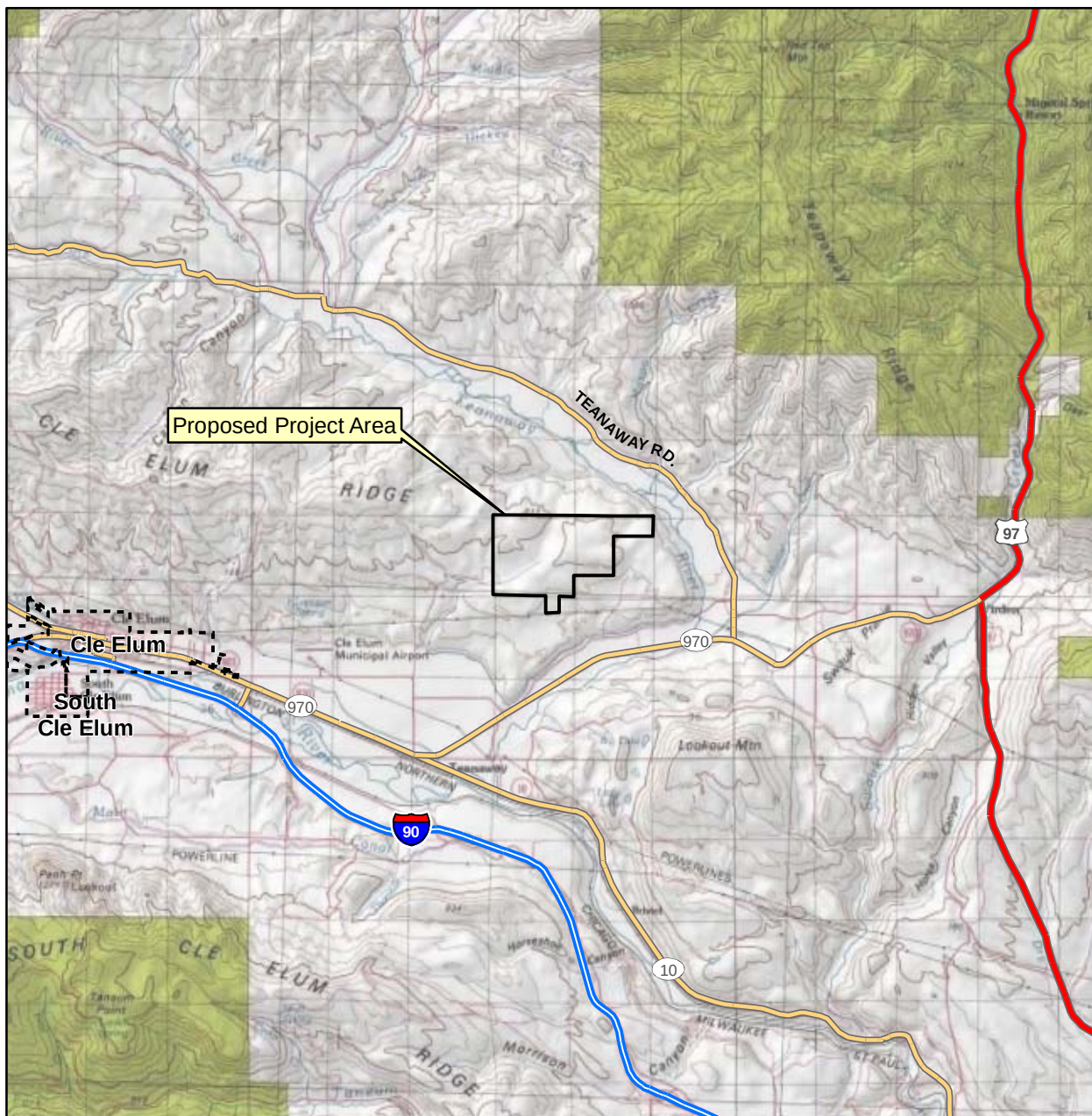
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APPENDIX A

Figures



VICINITY MAP

LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

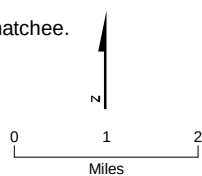
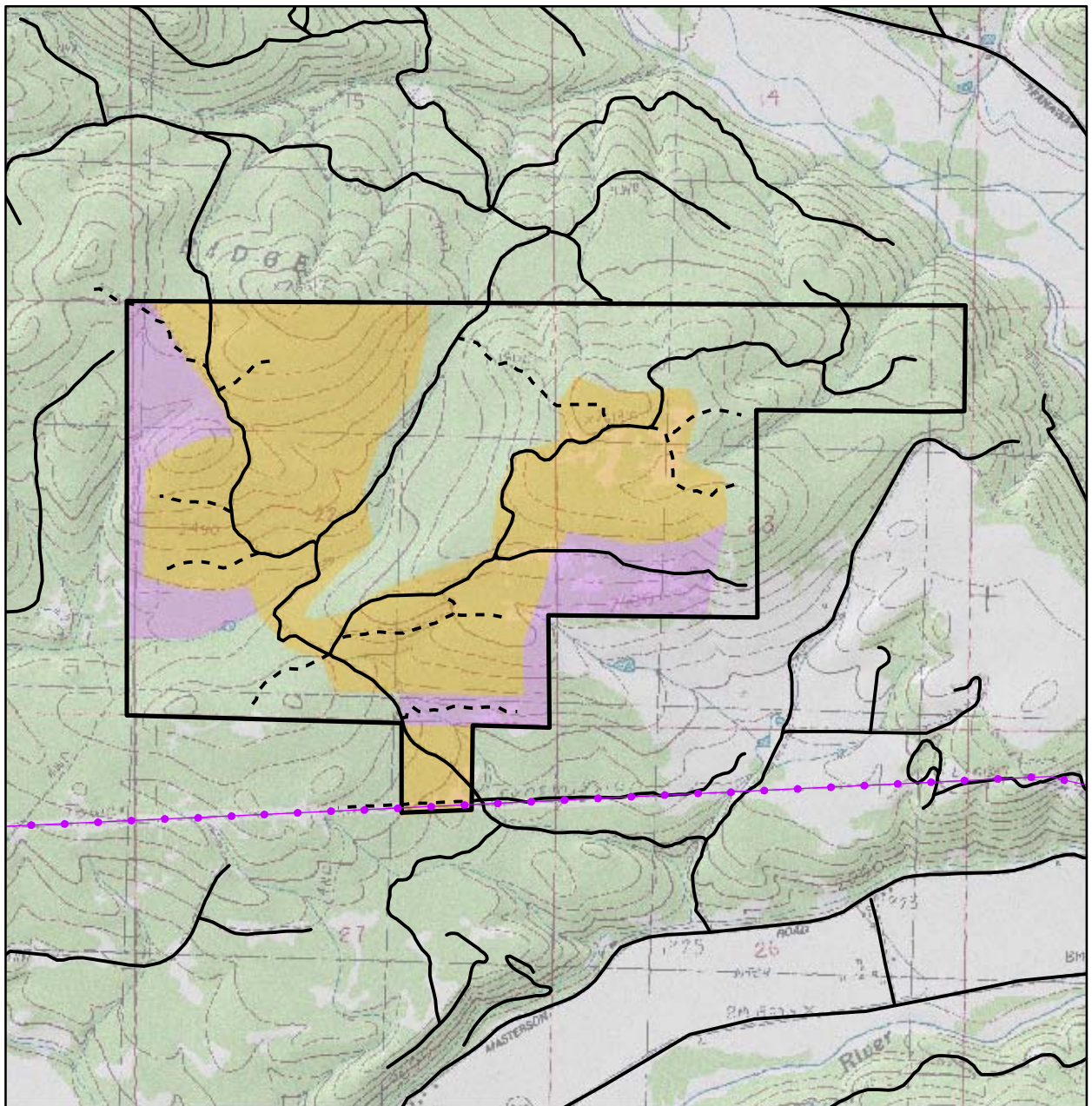


FIGURE 1
Vicinity Map

Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  July 2009 Survey Area
-  June 2009 Survey Area
-  Existing BPA Transmission Line
-  Road
-  Minor Dirt Road

Note:

1. USGS 24K Quadrangle: Teanaway.

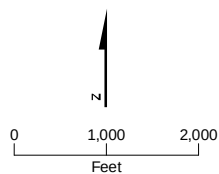
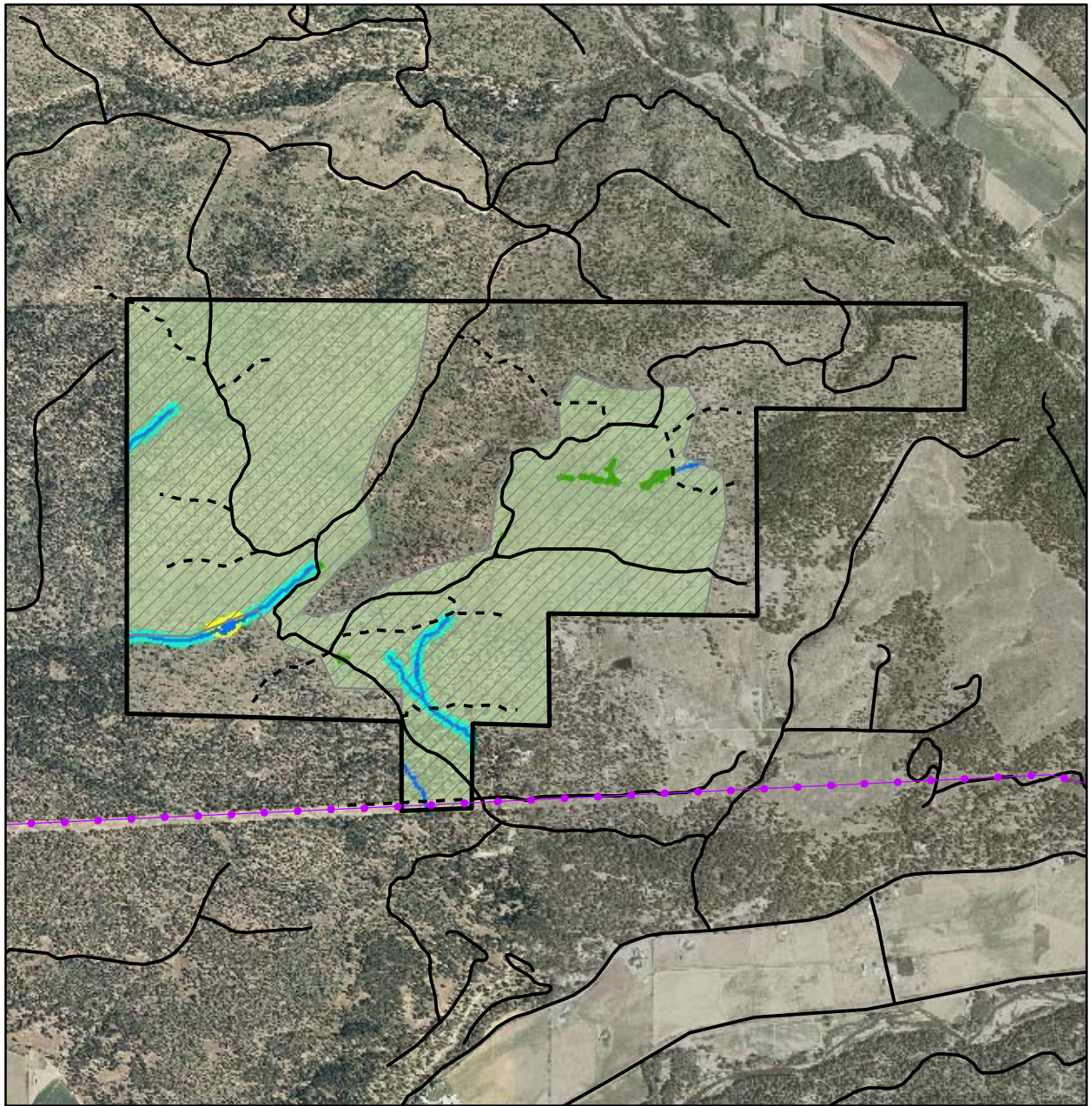


FIGURE 2
Survey Area Map

Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

	Proposed Project Area		Habitat
	Biological Survey Area		Herbaceous Wetlands
	Existing BPA Transmission Line		Open Water
	Road		Ponderosa Pine Forest and Woodlands
	Minor Dirt Road		Riparian
			Upland Aspen

Note:
1. Aerial Imagery: 2006 1m NAIP.

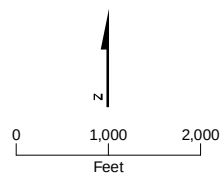


FIGURE 3
Habitat Types
Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX B

U.S. Fish and Wildlife Service Species List

KITTITAS COUNTY

Updated 7/24/2008

LISTED

Endangered

Gray wolf (*Canis lupus*)

Threatened

Bull trout (*Salvelinus confluentus*) – Columbia River distinct population segment

Grizzly bear (*Ursus arctos horribilis*)

Canada lynx (*Lynx canadensis*)

Marbled murrelet (*Brachyramphus marmoratus*)

Northern spotted owl (*Strix occidentalis caurina*)

Spiranthes diluvialis (Ute ladies'-tresses), plant

Designated

Critical habitat for the northern spotted owl

Critical habitat for the Columbia River distinct population segment of the bull trout

CANDIDATE

Fisher (*Martes pennanti*) - West Coast distinct population segment

Greater sage grouse (*Centrocercus urophasianus*) – Columbia Basin distinct population segment

Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Animals

Bald eagle (*Haliaeetus leucocephalus*) (delisted, monitor status)

Black swift (*Cypseloides niger*)

Burrowing owl (*Athene cunicularia*)

Ferruginous hawk (*Buteo regalis*)

Larch Mountain salamander (*Plethodon larselli*)

Loggerhead shrike (*Lanius ludovicianus*)

Long-eared myotis (*Myotis evotis*)

Northern goshawk (*Accipiter gentilis*)

Olive-sided flycatcher (*Contopus cooperi*)

Pacific lamprey (*Lampetra tridentata*)

Pallid Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)

Peregrine falcon (*Falco peregrinus*) (Delisted, monitor status)

Pygmy whitefish (*Prosopium coulteri*)
Redband trout (*Oncorhynchus mykiss*)
River lamprey (*Lampetra ayresi*)
Sagebrush lizard (*Sceloporus graciosus*)
Sharptail snake (*Contia tenuis*)
Townsend's ground squirrel (*Spermophilus townsendii*)
Western brook lamprey (*Lampetra richardsoni*)
Western gray squirrel (*Sciurus griseus griseus*)
Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
Wolverine (*Gulo gulo*)

Vascular Plants

Astragalus columbianus (Columbia milk-vetch)
Cypripedium fasciculatum (Clustered lady's-slipper)
Delphinium viridescens (Wenatchee larkspur)
Lomatium tuberosum (Hoover's desert-parsley)
Phacelia minutissima (Least phacelia)
Pinus albicaulis (Whitebark pine)
Silene seelyi (Seely's silene)
Tauschia hooveri (Hoover's tauschia)

Mosses

Orthotrichum praemorsum

APPENDIX C

Washington Natural Heritage Program Species List



**Washington
Natural
Heritage
Program**

Reference Desk

Reference Desk	Location Search	Rare Plants	Rare Animals	Communities
GIS	Field Guides	Publications	Natural Heritage Plan	

**Washington Natural Heritage Information System
List of Known Occurrences of Rare Plants in Washington
February 2009
Kittitas County**

A key to status fields appears below. If a scientific name is underlined you may click on it to go to a field guide page (pdf format, average size 300 kb) for that taxon.

Scientific Name	Common Name	State Status	Federal Status	Historic Record
<u>Agoseris elata</u>	tall agoseris	S		
<u>Anemone patens var. multifida</u>	pasqueflower	T		
<u>Anthoxanthum hirtum</u>	common northern sweet grass	R1		H
<u>Astragalus arrectus</u>	Palouse milk-vetch	T		H
<u>Astragalus columbianus</u>	Columbia milk-vetch	S	SC	
<u>Astragalus misellus var. pauper</u>	Pauper milk-vetch	S		
<u>Camissonia pygmaea</u>	dwarf evening-primrose	S		
<u>Camissonia scapoidea ssp. scapoidea</u>	naked-stemmed evening-primrose	S		
<u>Carex comosa</u>	bristly sedge	S		H
<u>Carex macrochaeta</u>	large-awn sedge	T		H
<u>Carex pauciflora</u>	few-flowered sedge	S		
<u>Carex scirpoidea ssp. scirpoidea</u>	Canadian single-spike sedge	S		
<u>Chaenactis thompsonii</u>	Thompson's chaenactis	S		
<u>Collomia macrocalyx</u>	bristle-flowered collomia	S		
<u>Cryptantha gracilis</u>	narrow-stem cryptantha	S		
<u>Cryptantha leucophaea</u>	gray cryptantha	S	SC	
<u>Cryptantha rostellata</u>	beaked cryptantha	T		
<u>Cryptantha scoparia</u>	miner's candle	S		
<u>Cypripedium fasciculatum</u>	clustered lady's-slipper	S	SC	
<u>Delphinium viridescens</u>	Wenatchee larkspur	T	SC	
<u>Eatonella nivea</u>	white eatonella	T		
<u>Erigeron basalticus</u>	basalt daisy	T	SC	
<u>Erigeron piperianus</u>	Piper's daisy	S		H
<u>Erigeron salishii</u>	Salish fleabane	S		H
<u>Gentiana douglasiana</u>	swamp gentian	S		
<u>Hackelia hispida var. disjuncta</u>	sagebrush stickseed	S		H
<u>Iliamna longisepala</u>	longsepal globemallow	S		
<u>Juncus howellii</u>	Howell's rush	T		
<u>Lomatium tuberosum</u>	Hoover's desert-parsley	S	SC	

<u>Mimulus suksdorfii</u>	Suksdorf's monkey-flower	S	
<u>Minuartia nuttallii ssp. fragilis</u>	Nuttall's sandwort	T	
<u>Montia diffusa</u>	branching montia	S	H
<u>Nicotiana attenuata</u>	coyote tobacco	S	
<u>Oenothera caespitosa ssp. caespitosa</u>	cespitose evening-primrose	S	
<u>Ophioglossum pusillum</u>	Adder's-tongue	T	H
<u>Oxytropis campestris var. gracilis</u>	slender crazyweed	S	H
<u>Pediocactus nigrispinus</u>	snowball cactus	R1	
<u>Pellaea breweri</u>	Brewer's cliff-brake	S	
<u>Penstemon eriantherus var. whitedii</u>	fuzzytongue penstemon	S	
<u>Phacelia minutissima</u>	least phacelia	E	SC
<u>Pyrrocoma hirta var. sonchifolia</u>	sticky goldenweed	S	
<u>Sidalcea oregana var. calva</u>	Wenatchee Mountain checker-mallow	E	LE
<u>Silene seelyi</u>	Seely's silene	S	SC
<u>Spiranthes porrifolia</u>	western ladies-tresses	S	
<u>Subularia aquatica var. americana</u>	water awlwort	R1	
<u>Tauschia hooveri</u>	Hoover's tauschia	T	SC

Description of Codes

Historic Record:

H indicates most recent sighting in the county is before 1977.

State Status

State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness.

Values include:

E = Endangered. In danger of becoming extinct or extirpated from Washington.

T = Threatened. Likely to become Endangered in Washington.

S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.

X = Possibly extinct or Extirpated from Washington.

R1 = Review group 1. Of potential concern but needs more field work to assign another rank.

R2 = Review group 2. Of potential concern but with unresolved taxonomic questions.

Federal Status

Federal Status under the U.S. Endangered Species Act(USESA) as published in the Federal Register:

LE = Listed Endangered. In danger of extinction.

LT = Listed Threatened. Likely to become endangered.

PE = Proposed Endangered.

PT = Proposed Threatened.

C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.

SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

Washington Natural Heritage Program - www.dnr.wa.gov/ResearchScience/Topics/NaturalHeritage/Pages/amp_nh.aspx/ [back to top](#)

Washington Dept. of Natural Resources, PO Box 47014, Olympia, WA 98504-7014

APPENDIX D

Site Photographs



Photo 1: View of ponderosa pine forest and woodland in project area.



Photo 2: View of open water habitat in project area. Several intermittent streams present, as well.



Photo 3: View of herbaceous wetland in project area.



Photo 4: View of riparian habitat overhanging intermittent stream channel.



Photo 5: Upland aspen habitat south of artificially impounded pond. Aspen rings the pond in association with ponderosa pine and Douglas fir and continues for a short distance up the drainage.

ATTACHMENT B

Wetland Delineation Report

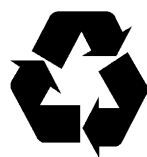
Report

Teanaway Solar Reserve Wetland Delineation Report Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

August 2009

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
Paper**

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1.0 Introduction

CH2M HILL conducted a wetlands and other waters delineation in June and July 2009 for the proposed Teanaway Solar Reserve project (project), a solar facility on private land in an unincorporated area of Kittitas County, Washington. Twelve wetlands and six ephemeral streams were delineated.

The 982-acre proposed project area is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge (see Figure 1 in Appendix A). The solar facility and associated components will include solar panels, a substation on approximately 10 acres, and potentially a transmission line (up to 300 feet wide of right-of-way required) to connect the substation to the existing Bonneville Power Administration (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line.

Subsequent sections of this report are organized as follows:

- 2.0—Landscape Setting and Land Use (Historical and Current)
- 3.0—Site Alterations
- 4.0—Precipitation Data and Analysis
- 5.0—Methods
- 6.0—Description of Wetlands and Other Waters
- 7.0—Mapping Method
- 8.0—Results and Conclusions
- 9.0—References

Report figures are presented in Appendix A. U.S. Army Corps of Engineers (USACE) wetland data forms are included in Appendix B. Site photographs are in Appendix C. Washington wetland rating forms and maps are in Appendix D. Washington State Department of Ecology function assessment forms are in Appendix E. Background information supporting these forms is available upon request.

2.0 Landscape Setting and Land Use (Historical and Current)

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for map of site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road, and private roads such as Loping Lane and Wehl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 580 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

Vegetation communities within the proposed project area are early to mid-successional ponderosa pine (*Pinus ponderosa*) forests and sloped hillside meadows where logging has occurred more recently. Current and historical land uses in the vicinity of the project site are ranching and commercial tree farming.

The proposed project is located in the Teanaway River and Yakima River watersheds within the Yakima River basin and Upper Yakima subbasin. Tributaries within the project site flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices may eventually flow into the Yakima River several miles to the south with the exception of one unnamed tributary (S6), which flows directly into the Teanaway River. Wetlands within the project site are hydrologically connected to these tributaries.

3.0 Site Alterations

Trees within the project site have been selectively harvested. The most recent harvest was in 2001 and 2002. An old earthen berm crosses stream S4 and has created or enlarged wetland W12 (see Section 6.0 for description of wetlands and other waters).

4.0 Precipitation Data and Analysis

Annual precipitation in the region averages approximately 23.07 inches of rain and 86.5 inches of snow for the water year (NRCS, 2002). Precipitation data were reviewed for the nearest weather station located approximately 5 miles west of the project site in Cle Elum, Washington. This weather station is approximately 400 feet lower in elevation than the project site. Precipitation for the water year beginning October 2008 through June 2009 was 18.35 inches (Table 1).

TABLE 1
Monthly Precipitation Data (NRCS, 2002; KWACLEEL Weather Station, 2009)

	Actual Precipitation (in inches)	Normal Range* (in inches)	Outside Normal Range (in inches)
October 2008	1.36	0.72 - 2.14	
November 2008	5.96	2.61 - 4.61	+1.35
December 2008	1.48	3.05 - 5.27	-1.70
January 2009	4.36	2.31 - 4.60	
February 2009	0.52	1.52 - 3.04	-1.00
March 2009	2.48	1.12 - 1.99	+0.49
April 2009	0.83	0.79 - 1.38	
May 2009	1.08	0.57 - 1.12	
June 2009	0.28	0.57 - 1.16	-0.29
Total	18.35	13.26 – 25.31	

*"Normal Range" is the range within which precipitation for the given period has a 70 percent chance of occurring.

Table 2 presents the precipitation data for the 2-week period preceding the field investigation dates of June 9, 10, 16, and 17, 2009. Precipitation totaled 0.28 inch.

TABLE 2
Daily Precipitation Data (KWACLEEL3 Weather Station, 2009)

Date	Precipitation (in inches)
May 27, 2009	0.0
May 28, 2009	0.0
May 29, 2009	0.0
May 30, 2009	0.0
May 31, 2009	0.0
June 1, 2009	0.0
June 2, 2009	0.0
June 3, 2009	0.0
June 4, 2009	0.12
June 5, 2009	0.0
June 6, 2009	0.0
June 7, 2009	0.0
June 8, 2009	0.0
June 9, 2009	0.16
June 10, 2009	0.0
June 11, 2009	0.0
June 12, 2009	0.0
June 13, 2009	0.0
June 14, 2009	0.0
June 15, 2009	0.0
June 16, 2009	0.0
Total:	0.28

Table 3 presents the precipitation data for the 2-week period preceding the field investigation date of July 9, 2009. Precipitation totaled 0.0 inch.

TABLE 3
Daily Precipitation Data (KWACLEEL3 Weather Station, 2009)

Date	Precipitation (in inches)
June 27, 2009	0.0
June 27, 2009	0.0
June 28, 2009	0.0
June 29, 2009	0.0
June 30, 2009	0.0
July 1, 2009	0.0
July 2, 2009	0.0
July 3, 2009	0.0
July 4, 2009	0.0
July 5, 2009	0.0
July 6, 2009	0.0
July 7, 2009	0.0
July 8, 2009	0.0
July 9, 2009	0.0
Total:	0.0

Based on the above precipitation data, precipitation for the water year prior to the fieldwork was within the normal range. June precipitation was 0.29 inch below the normal range and there was no precipitation in July. However, the actual precipitation amounts were only slightly below the normal range and were unlikely to be significant enough to affect the observation and interpretation of wetland hydrological indicators or stream flow duration indicators at that time of year.

5.0 Methods

Before the field investigation began, the following information was reviewed:

- Watercourses mapped by the Washington State Department of Natural Resources (WADNR) (2006)
- U.S. Geological Survey (USGS) 24K topographic maps: Teanaway quadrangle
- National Wetland Inventory (NWI) 24K maps: Teanaway quadrangle
- Soil Survey Geographic Database of Kittitas County, Washington (2002) (see Figure 4 in Appendix A)
- Hydric Soils List of Kittitas County, Washington
- True color aerial photographs flown in various years

One NWI-mapped wetland is in the southwest corner of section 22. It is labeled as *palustrine emergent, semi-permanently flooded*. Five streams were mapped by WADNR. All five are classified as *non-fish, seasonal*. There are no mapped hydric soil units within the project site.

Fieldwork was conducted on June 9, 10, 16, and 17, and July 9, 2009. Potential waters and wetlands identified in the office review were field verified. Additional potential waters and wetlands were observed during fieldwork and were delineated.

Data collection and analysis followed procedures in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valley and Coast* (USACE, 2008). The routine onsite wetland determination method was used to observe vegetation, soils, and hydrological conditions at representative locations. Paired sample plots were used to document wetland and upland areas adjacent to wetland boundaries. The *National List of Plant Species that Occur in Wetlands: Northwest (Region 9)* (USFWS, 1988) and the 1993 supplement (USACE, 1993) were used to determine hydrophytic status of vegetation.

The widths of stream channels were estimated in the field [Ordinary High Water Mark to Ordinary High Water Mark (OHWM to OHWM)].

Wetlands were rated using the Department of Ecology's *Wetland Rating System for Eastern Washington* (Hruby, 2004).

6.0 Description of Wetlands and Other Waters

Twelve wetlands and six ephemeral streams were delineated (see Figure 5 in Appendix A).

6.1 Wetlands

Twelve wetlands were delineated (see Table 4, located on page 11). They total 0.97 acre within the project site. All of the wetlands were determined to be palustrine emergent (PEM) (Cowardin). Eleven wetlands were depressional (HGM) wetlands. Wetland W12 was riverine (HGM).

Wetlands W1, W3, and W6 and wetlands W4, W5, and W7 formed two complexes in the northeast portion of the survey area. Wetlands W8, W9, and W11 were adjacent to road fill and were probably created or enlarged by the fill backing up water. W11 appeared to be an excavated roadside ditch and W8 was at the outlet of a culvert that carried water under the road from W11. Wetland W10 was created or enlarged by road fill across the headwaters of stream S4 that backs up water due to a perched culvert. Wetland W12, which corresponded to the NWI-mapped wetland, was created or enlarged by an old earthen berm across stream S4.

The hydrologic source of all wetlands within the project site is precipitation and snowmelt. No springs or seeps were observed. Inundation and saturation were only observed at wetland W12. Primary hydrologic indicators observed were predominantly surface soil cracks (B6); however, some wetlands had sparsely vegetated concave surface (B8), and algal mat or crust (B4) indicators. The secondary indicator of geomorphic position (D2) was observed for all the wetlands. These indicators suggest that precipitation and snowmelt pond in depressional areas during the wet season and dry out during the summer.

Hydric soil indicators observed in soil pits included Depleted Matrix (F3) and Redox Dark Surface (F7). Soils were predominantly silt loams with some clay soils occurring below 6 inches. Most of the wetlands had a restrictive layer of rock and gravel, usually at about 12 inches.

Dominant wetland plants included *Ventenata dubia* (NOL), *Juncus parryi* (FAC), *Gnaphalium palustre* (FAC), and *Eleocharis palustris* (OBL). Other wetland plants included *Plagiobotrys scouleri* (FACW), *Carex feta* (FACW), *Potentilla gracilis* (FAC), *Camassia quamash* (FACW), and *Ranunculus acris* (FACW). Some wetlands were sparsely vegetated and contained little or no vegetation. The hydrophytic vegetation criterion was met for many of the wetlands through problematic vegetation procedures, because they were dominated by *Ventenata dubia*, an invasive annual species that presumably dominates depressional areas in dryer years or as the depressions dry out.

6.2 Other Waters

Six ephemeral streams were delineated within the project site (see Table 5, located on page 12). Indicators observed during site visits that suggest ephemeral water flow included moderately apparent bed and banks, scour marks, and cobble, gravel, and sand stream substrate. Abrupt headcuts and defined and continuous bed and banks were used to determine the extent of streams. No springs, seeps, or evidence of groundwater was observed along stream corridors indicating the source of hydrology is solely precipitation and snow melt. Lack of water-dependant organisms (fish, amphibians, macro invertebrates, streamer mosses) within stream corridors suggests that water does not persist in streams longer than the wet season.

7.0 Mapping Method

Wetland sample plot locations and wetland other waters boundaries were mapped within the project site using a hand-held Trimble GeoXT geographical positioning system (GPS) unit with sub-meter accuracy capability. Acreages of wetlands within the project site boundaries were calculated using geographical information system (GIS) software.

Estimated accuracy of mapped wetland boundaries and sample plot locations is +/- 3 feet.

8.0 Wetland Ratings

All of the wetlands rated as Category 3. Wetland rating forms and associated figures are in Appendix D.

9.0 Results and Conclusions

Twelve wetlands totaling 0.97 acre and six ephemeral streams were delineated in the project site. All of the waters and wetlands identified in this report are potentially subject to federal or state jurisdiction. Jurisdictional determinations, including the applicability of exemptions, are made on a case-by-case basis by the Washington State Department of Ecology (Ecology) and the USACE.

9.1 Waters of the State

"Surface waters of the state" include lakes, rivers, ponds, streams, inland waters, saltwaters, wetlands, and all other surface waters and water courses within the jurisdiction of the state of Washington (Washington Administrative Code 173-201A-020). All of the delineated streams and wetlands at the project site are naturally occurring features of the landscape and are likely waters of the state.

9.2 Waters of the United States

USACE asserts jurisdiction over the following waters:

- Traditional navigable waters (TNWs)
- Wetlands adjacent to TNWs
- Non-navigable tributaries of TNWs that are relatively permanent waters (RPWs) where the tributaries typically flow year-round or have continuous flow at least seasonally (i.e., typically 3 months)
- Wetlands that directly abut (i.e., have a continuous surface connection to) such tributaries (U.S. Environmental Protection Agency [EPA] and USACE, 2008)

USACE will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent nonnavigable tributary (EPA and USACE, 2008)

A “significant nexus” is determined through analysis of “the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream TNWs” (EPA and USACE, 2008).

USACE will decide jurisdiction over isolated (i.e., nonadjacent) wetlands and waters based on a fact-specific analysis to determine whether impacts to those wetlands or waters could affect interstate commerce.

9.2.1 Traditional Navigable Waters

There are no traditional navigable waters in the project site. The nearest TNW is the Yakima River (USACE Seattle District, 2008b, 2008c).

9.2.2 Relatively Permanent Waters and Abutting Wetlands

There are no RPWs in the project site.

9.2.3 Non-RPWs and Adjacent Wetlands

All of the non-RPWs (i.e., ephemeral streams) are natural tributaries to the Teanaway and Yakima rivers. The Teanaway River flows into the Yakima River, a TNW. These streams and their adjacent wetlands in the proposed project area potentially have a significant nexus to the Yakima River, which is the nearest downstream TNW, based on their contributions of water supply, nutrients, and flood flow attenuation to the Yakima. They are all presumed to be jurisdictional until a final determination has been made by USACE.

Tables 4 and 5 provide a summary of potentially jurisdictional wetlands and waters within the project site boundaries.

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W1	0.010	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W2	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W3	0.030	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W4	0.067	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W5	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W6	0.253	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W7	0.231	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W8	0.027	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W9	0.013	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W10	0.019	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W11	0.006	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W12	0.312	PEM	Riverine	NO	YES	Potentially – if significant nexus to TNW	YES

TABLE 5
Other Waters Summary Table

Water ID	Width (feet)	Flow Regime	Nearest TNW	Non RPW	RPW	USACE Jurisdiction	State Jurisdiction
S1	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S2	2-6	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S3	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S4	2-4	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S5	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S6	1-2	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES

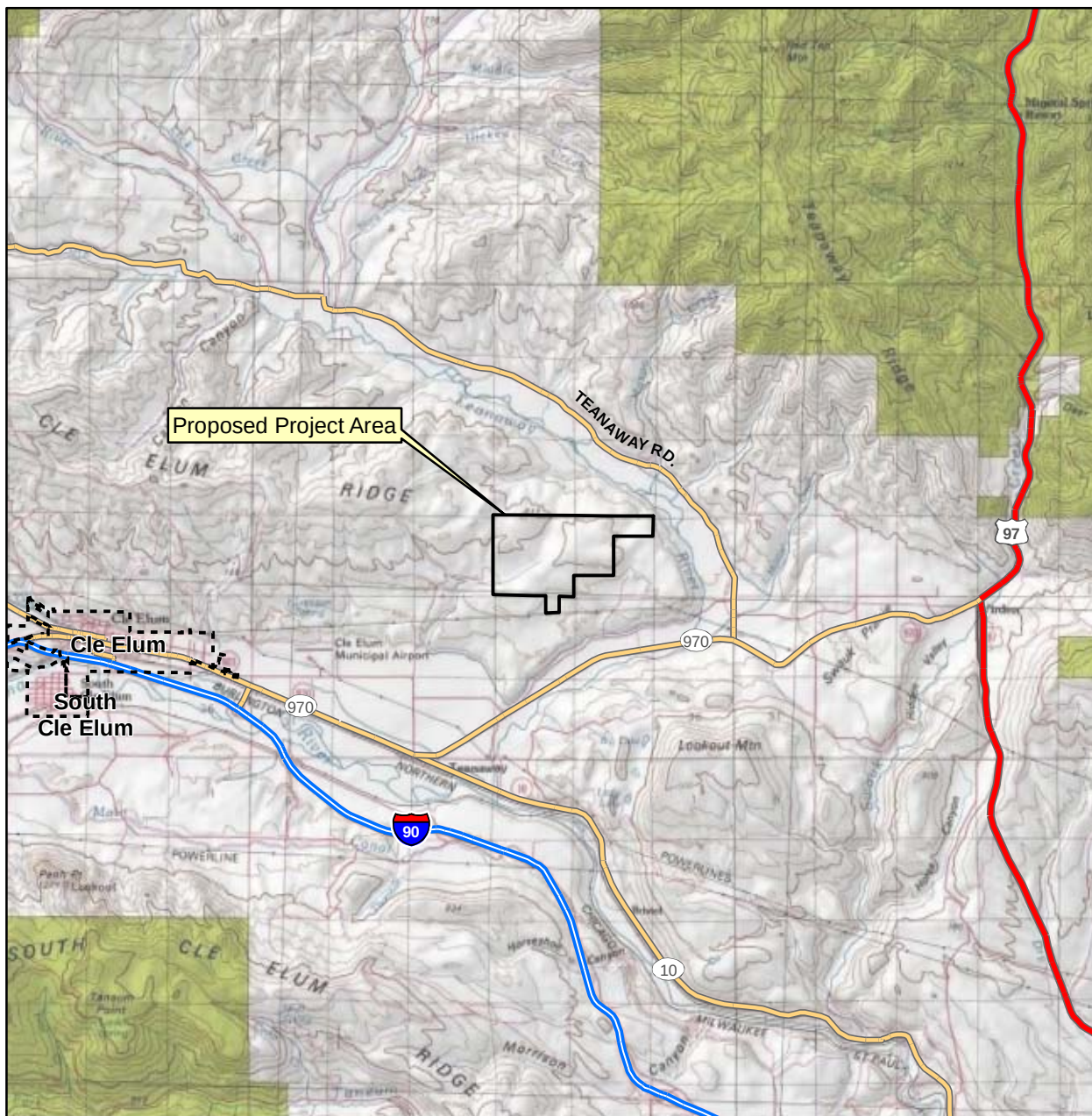
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APPENDIX A

Figures



VICINITY MAP

LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

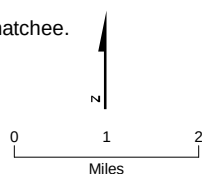
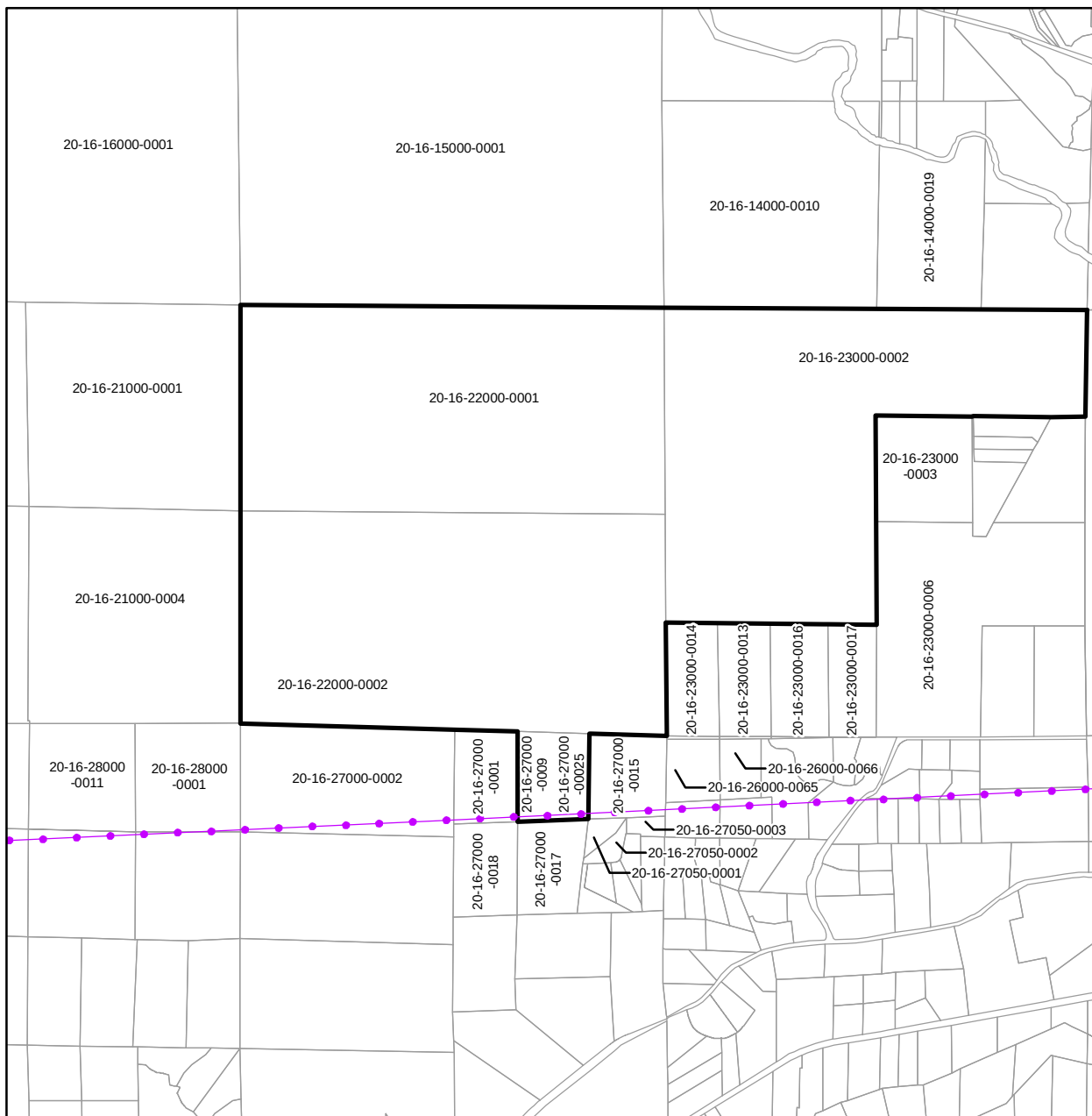


FIGURE 1
Vicinity Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  Existing BPA Transmission Line
-  Tax Lot Boundary

Note:

1. USGS 24K Quadrangle: Teanaway.

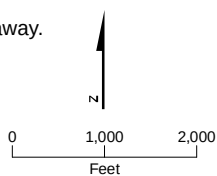
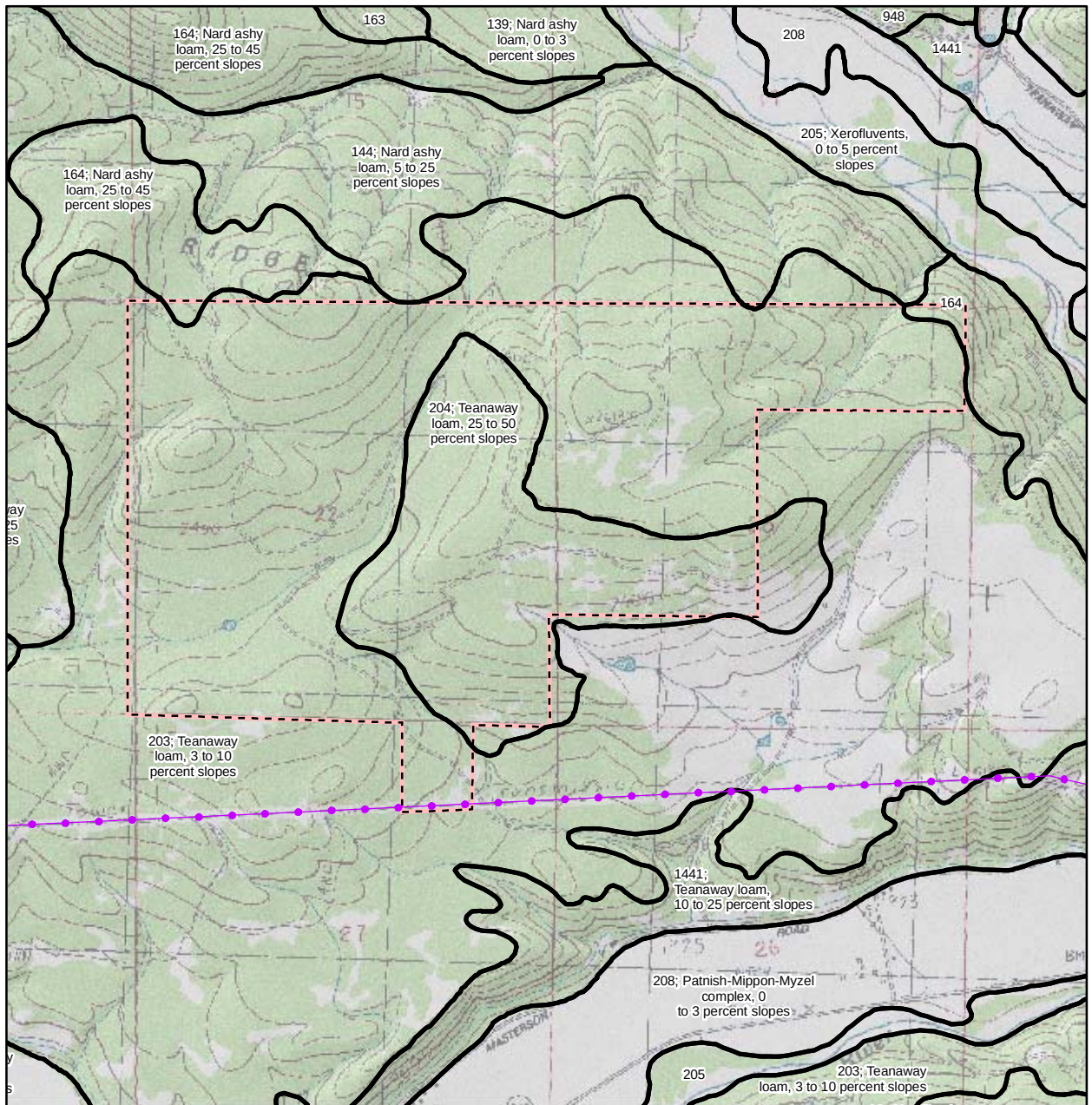


FIGURE 2
Tax Lot Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Proposed Project Area
- Existing BPA Transmission Line
- Soil Unit

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. Soils Data: Soil Survey Geographic (SSURGO) Database. MUSYM; MUNAME labeled.

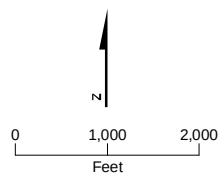
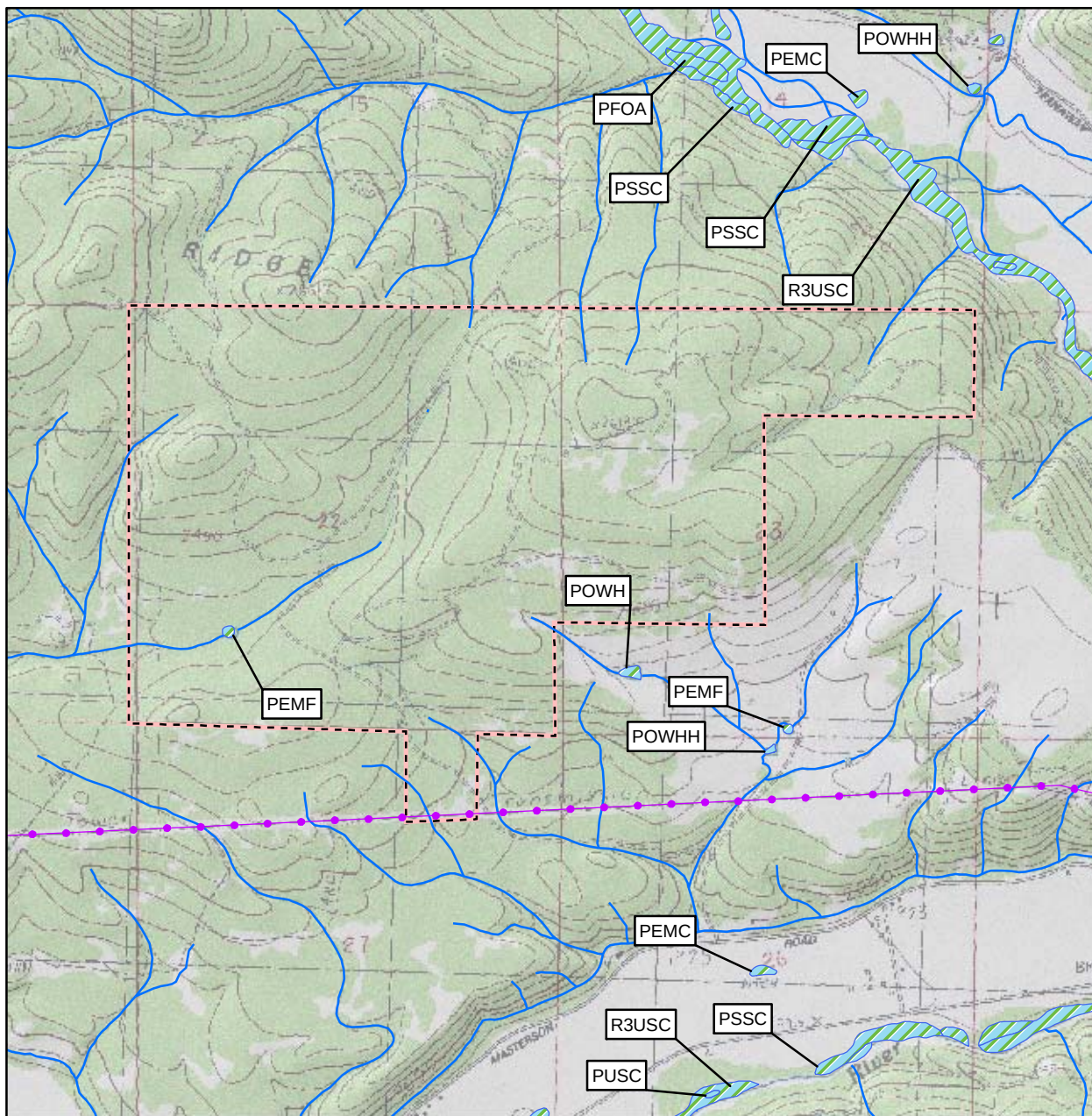


FIGURE 3
Soils Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Proposed Project Area
- Existing BPA Transmission Line
- Stream
- NWI Wetland

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. National Wetlands Inventory (NWI) Wetlands Data: United States Fish and Wildlife Service.
3. Stream Data: Washington Department of Natural Resources.

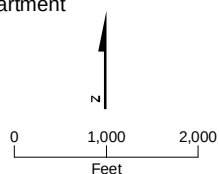
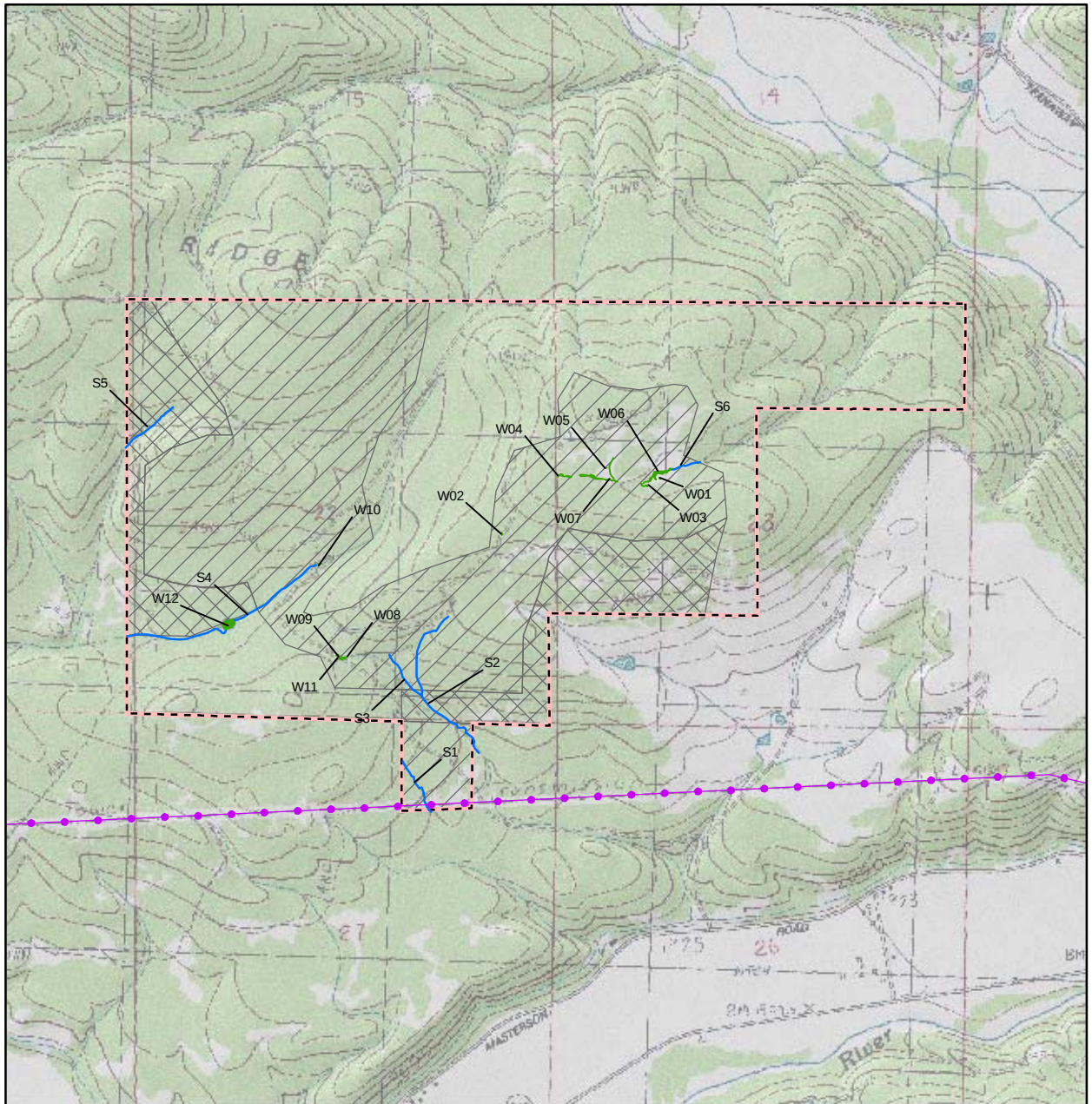


FIGURE 4
National Wetlands Inventory Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Proposed Project Area
- June 2009 Survey Area
- July 2009 Survey Area
- Existing BPA Transmission Line
- Wetland
- Stream

Note:

1. USGS 24K Quadrangle: Teanaway.

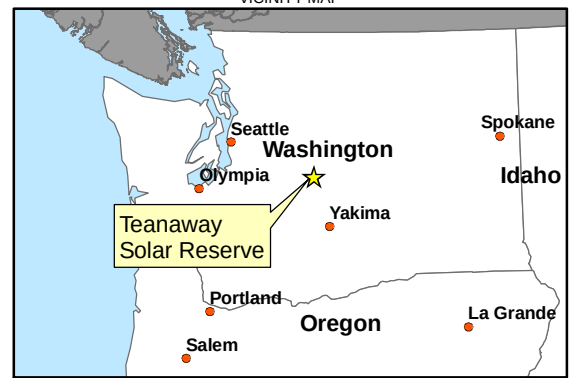
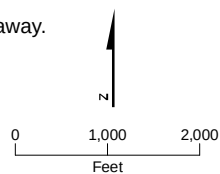
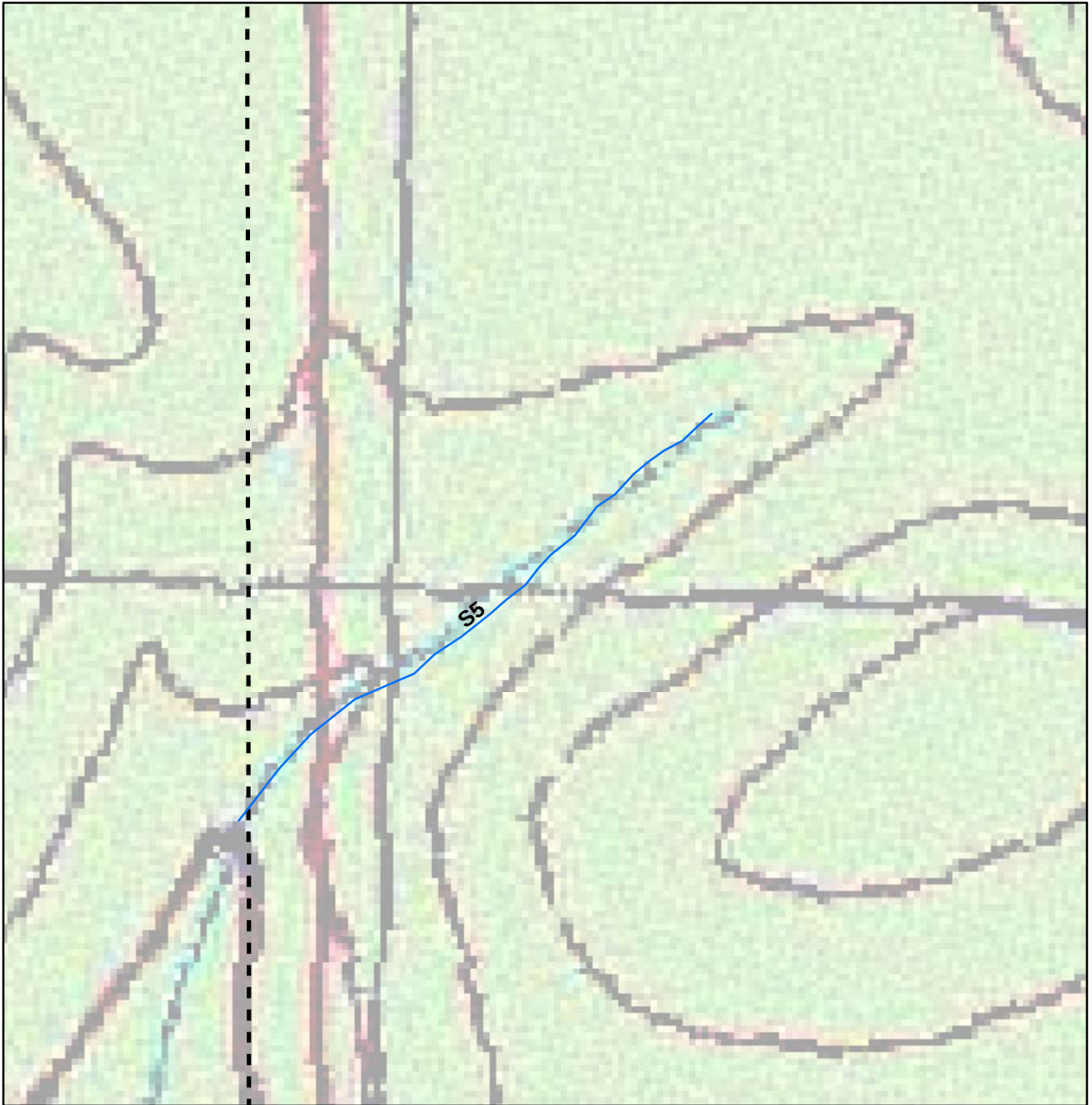


FIGURE 5
Delineation Map-Overview

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

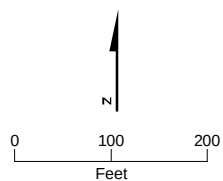


LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

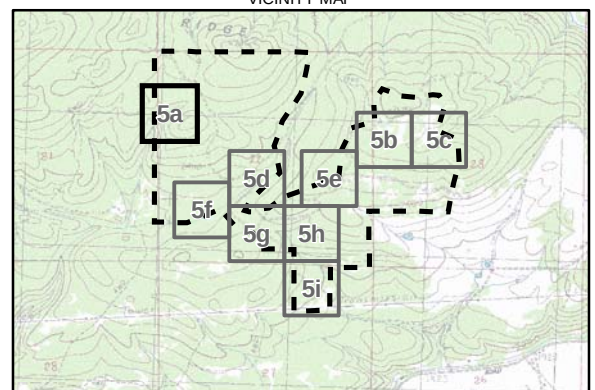
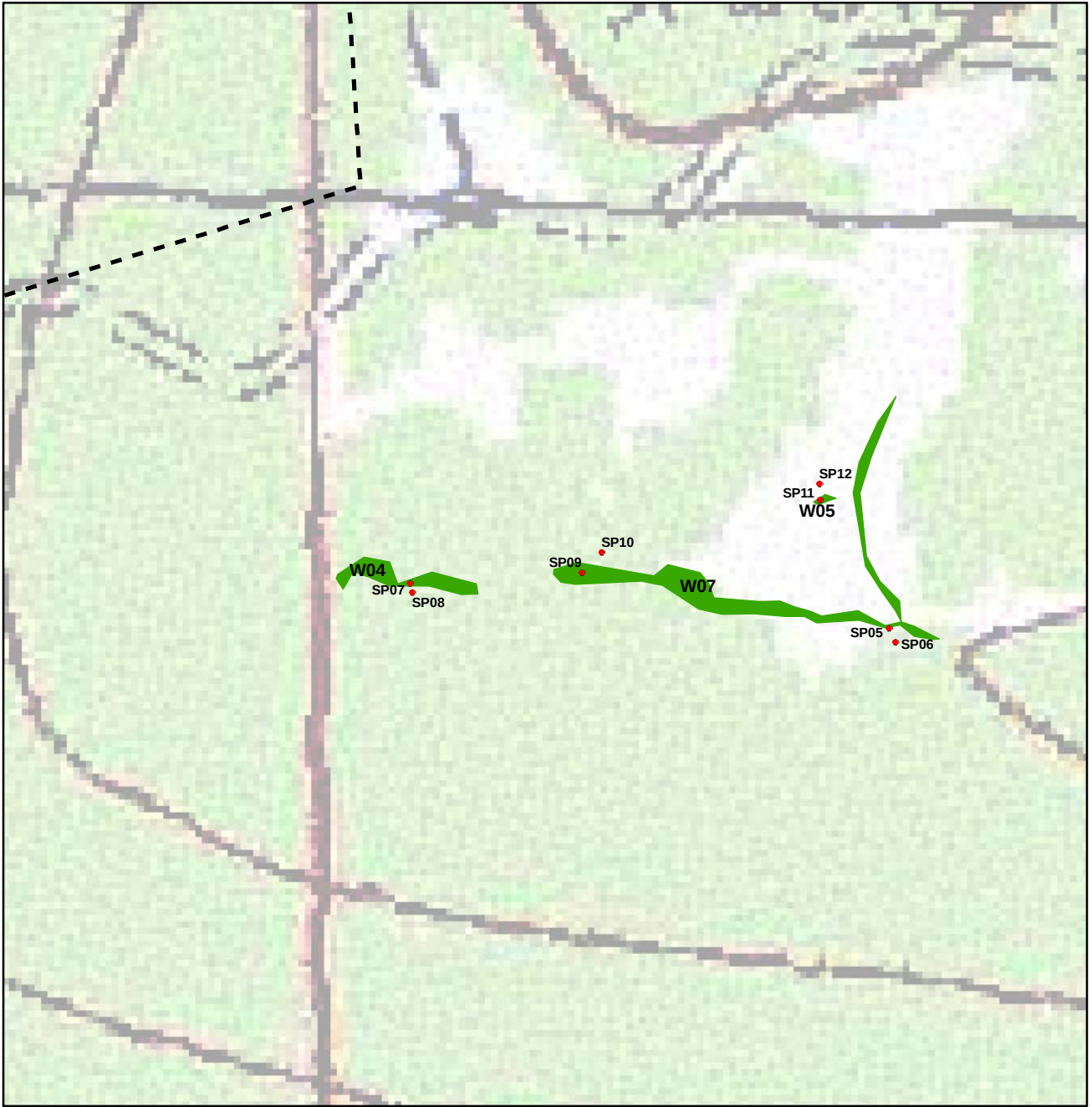


Figure 5a
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

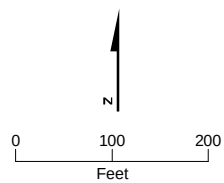


LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

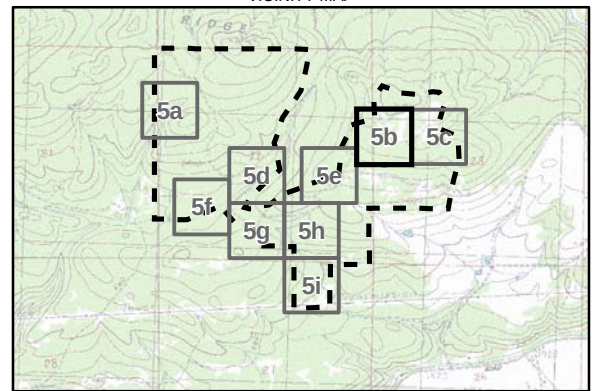
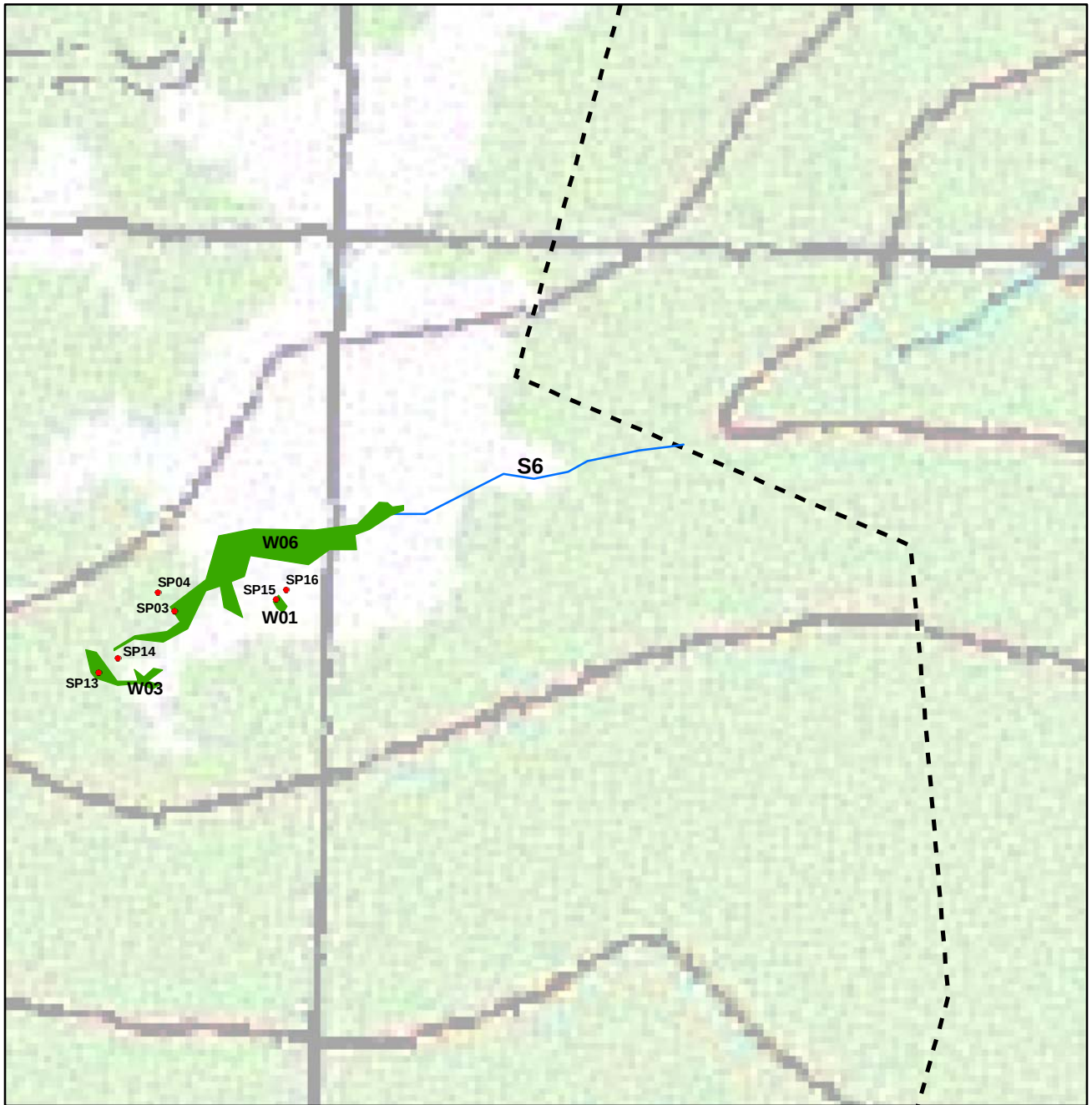


Figure 5b
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

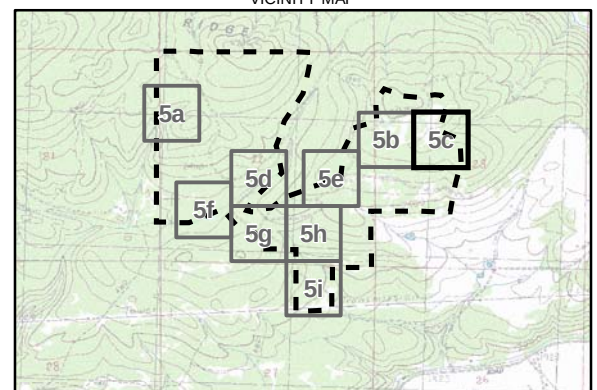
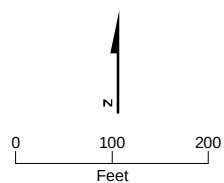
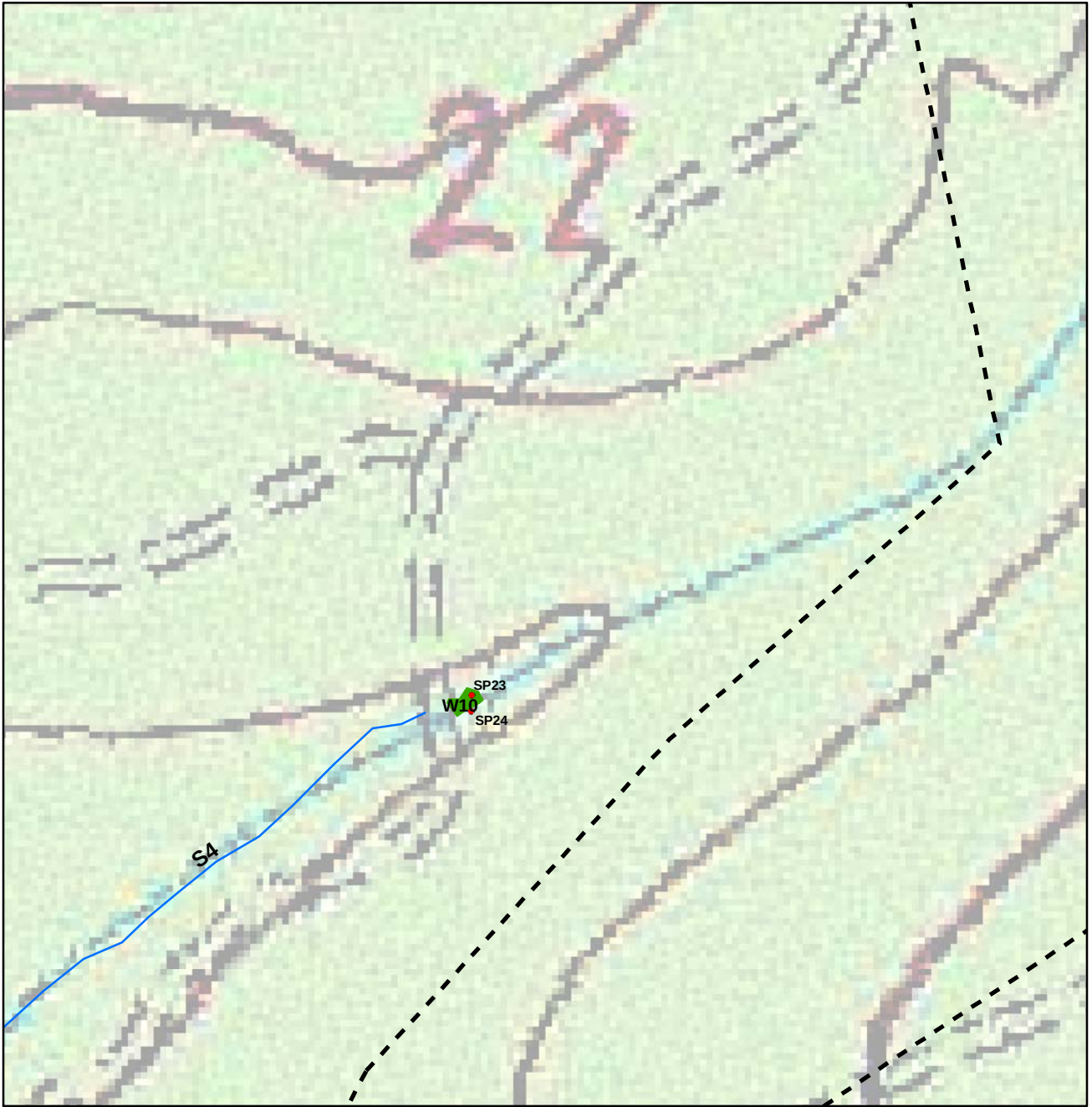


Figure 5c
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

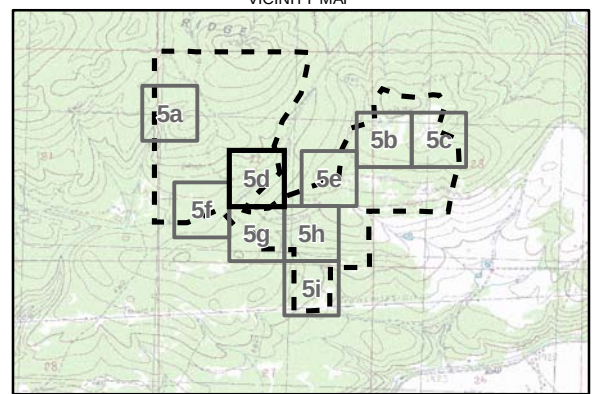
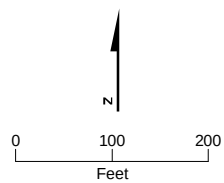
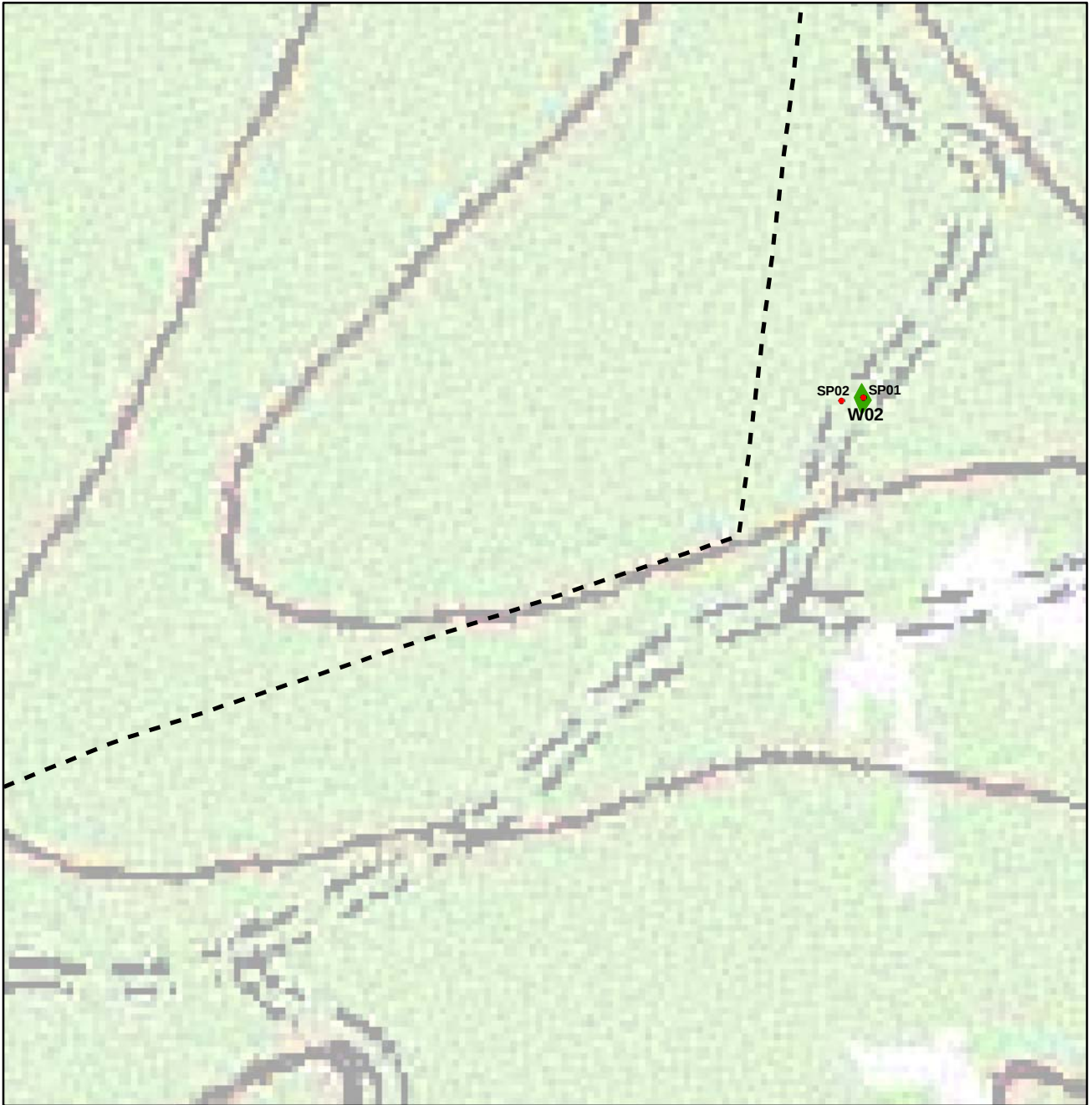


Figure 5d
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

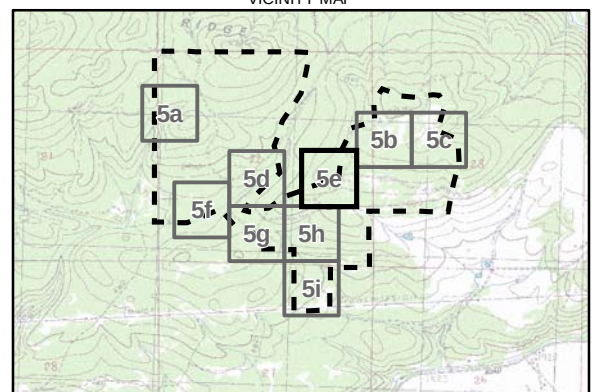
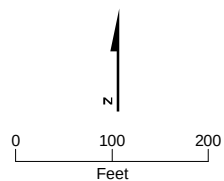
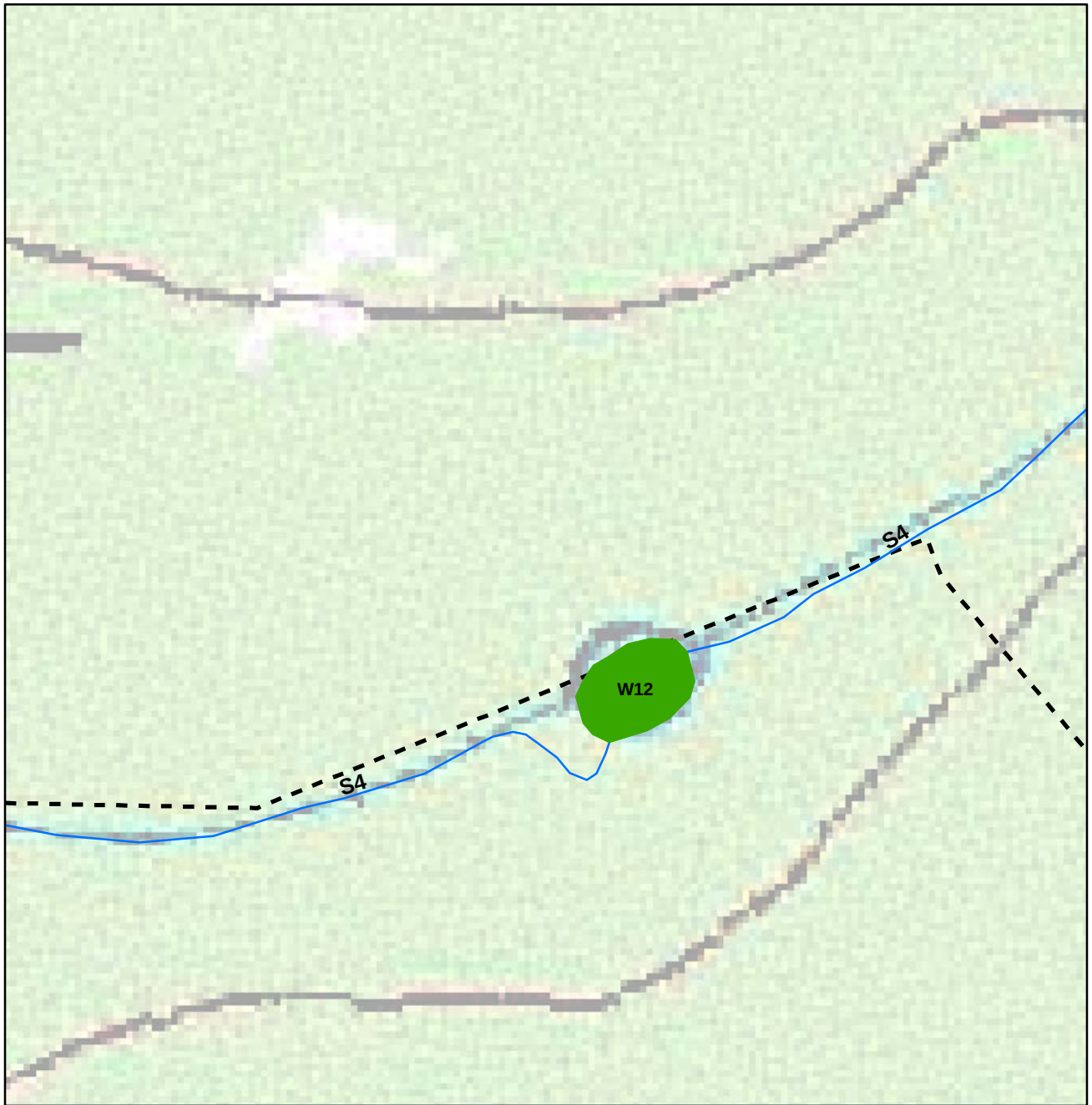


Figure 5e
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

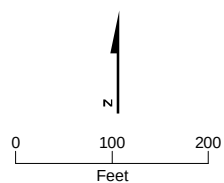


LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

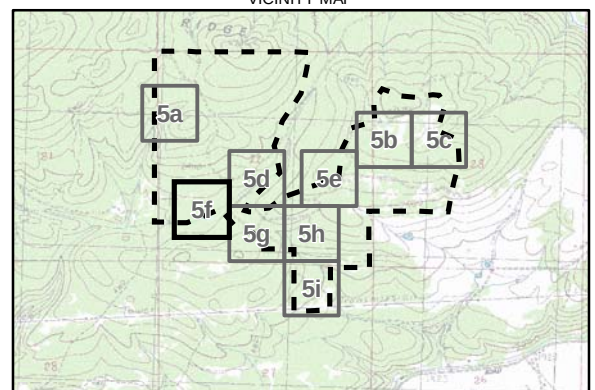
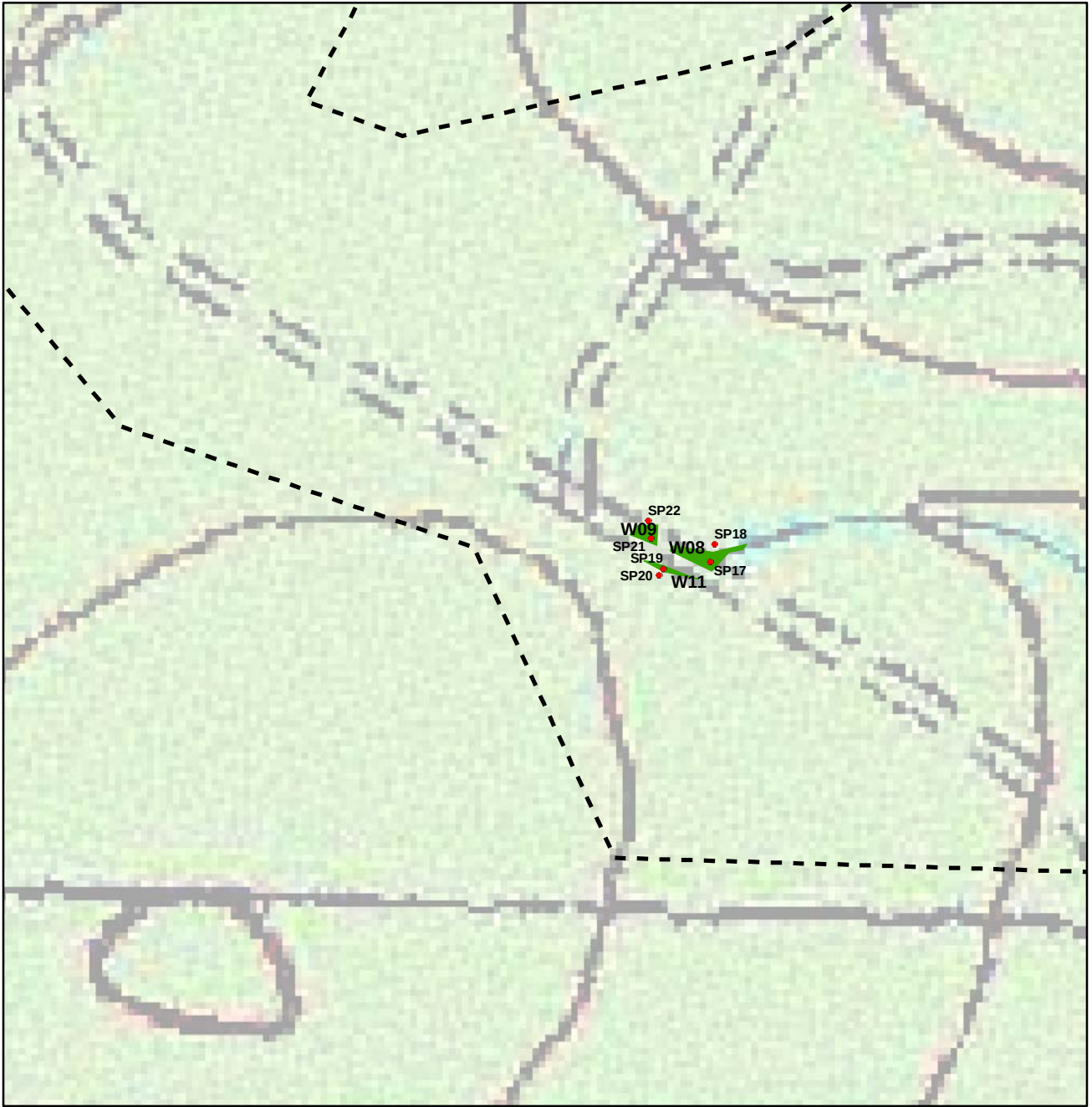


Figure 5f
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

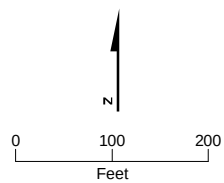


LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

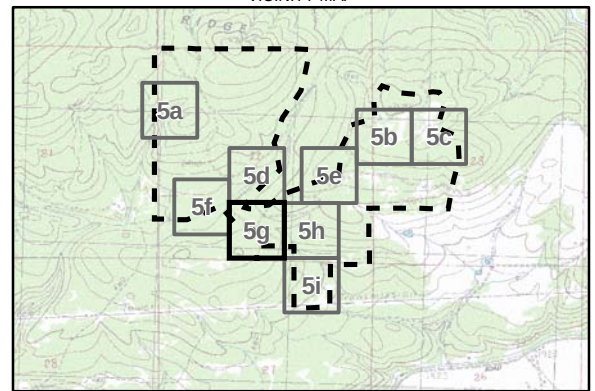
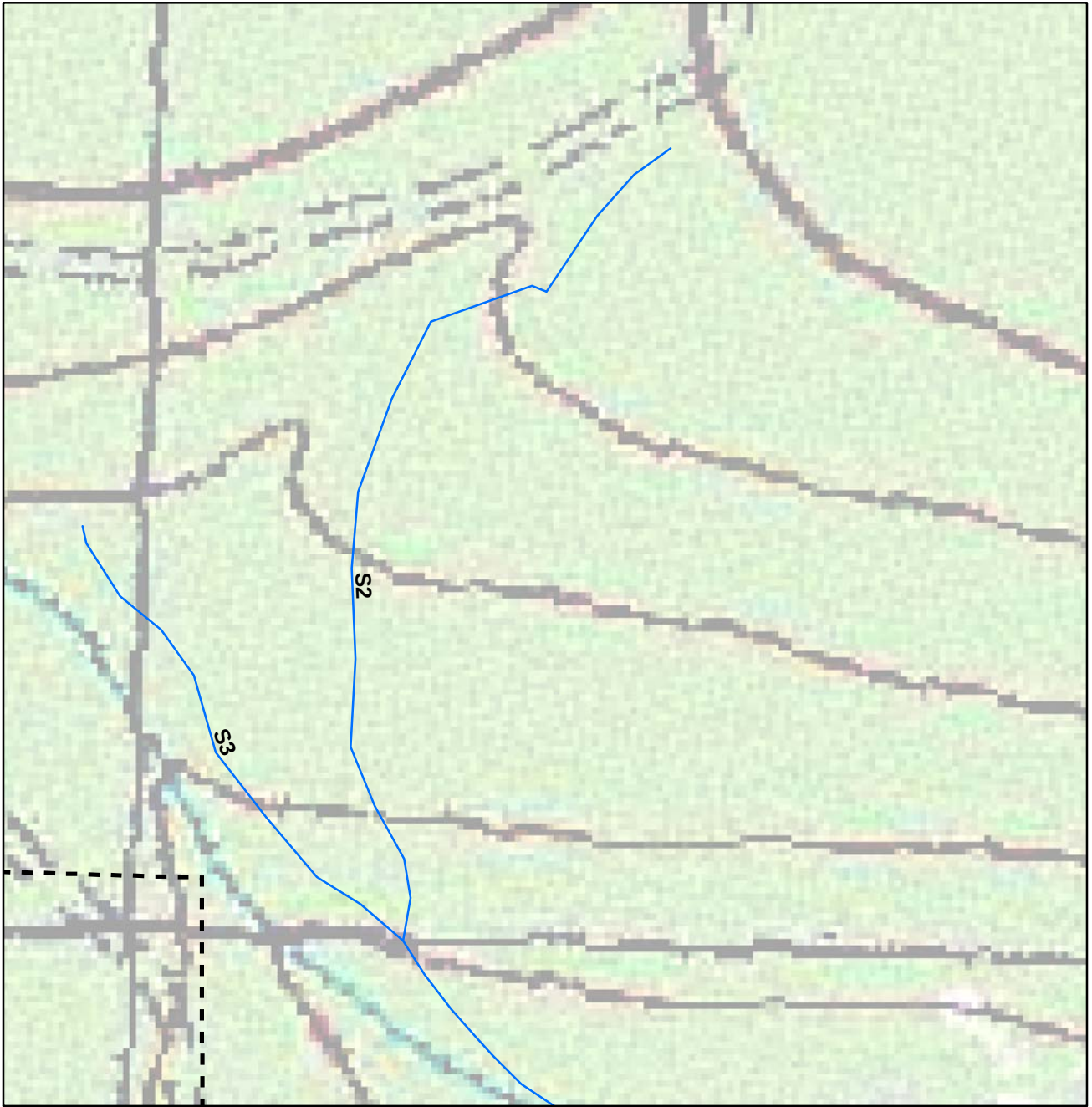


Figure 5g
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

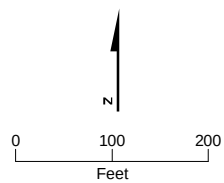


LEGEND

- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

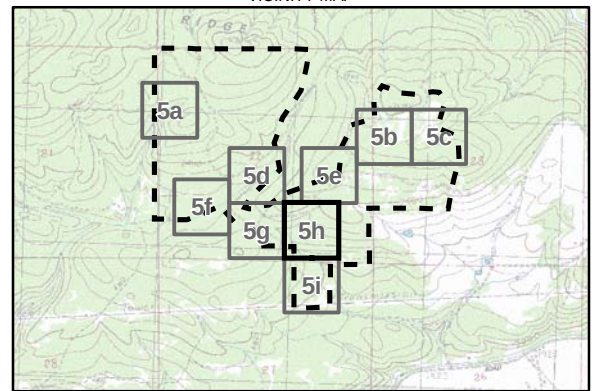


Figure 5h
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

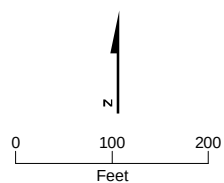


LEGEND

- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

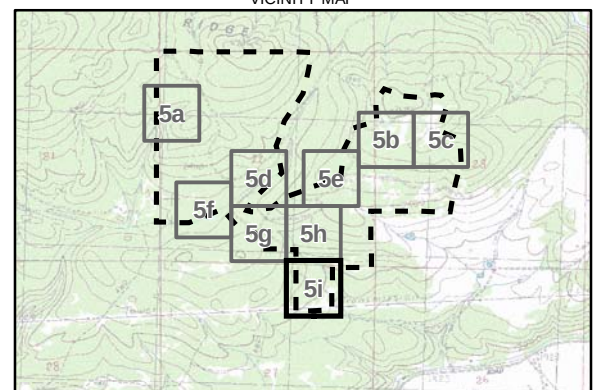


Figure 5i
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX B

U.S. Army Corps of Engineers Wetland Determination Data Forms

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/09/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP1
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212769 Long: -120.8140945 Datum: NAD 83
 Soil Map Unit Name: 204-Teanaway loam, 25-50 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, 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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland W2 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area and a change from wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u>13</u> x 3 = <u>39</u> FACU species <u> </u> x 4 = <u> </u> UPL species <u>83</u> x 5 = <u>415</u> Column Totals: <u>96</u> (A) <u>454</u> (B) Prevalence Index = B/A = <u>4.73</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>80</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Juncus parryi</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
3. <u>Wyethia amplexicaulis</u>	<u>3</u>	<u>N</u>	<u>FAC</u>	
4. <u>Poa bulbosa</u>	<u>3</u>	<u>N</u>	<u>NOL</u>	
5. <u>Unknown grasses</u>	<u>4</u>	<u>N</u>	<u>unk.</u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, algal crust and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years				

SOIL

Sampling Point: SP1

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 3/2	85	10YR 4/6	15	C	PL	silt loam	
6-18	10YR 4/2	95	10YR 5/8	5	C	PL	silty clay	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☒ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/09/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP2
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21014404 Long: 120.8173599 Datum: NAD 83
 Soil Map Unit Name: 204-Teanaway loam, 25-50 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u>Pinus ponderosa</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>10</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Balsamorhiza sagittata</u>	<u>25</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Lupinus sericeus</u>	<u>20</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Achillea millefolium</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Lomatium nudicaule</u>	<u>15</u>	<u>Y</u>	<u>NOL</u>	
5. <u>Poa bulbosa</u>	<u>15</u>	<u>Y</u>	<u>NOL</u>	
6. <u>Unknown grass</u>	<u>5</u>	<u>N</u>	<u>unk.</u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>95</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>5</u>				
Remarks:				

SOIL

Sampling Point: SP2

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-19	10YR 3/2	100					silt loam	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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 X Depth (inches): _____

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

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

Wetland Hydrology Present? Yes _____ No X

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP3
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21204758 Long: -120.8098526 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, 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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W6 is a PEM (Cowardin), depressionnal (HGM). Wetland boundaries determined by the toe of slope of a distinct depressionnal area containing cracked soils and a change from wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u>30</u> x 3 = <u>90</u> FACU species <u> </u> x 4 = <u> </u> UPL species <u>70</u> x 5 = <u>350</u> Column Totals: <u>100</u> (A) <u>440</u> (B) Prevalence Index = B/A = <u>4.4</u>
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>100</u> = Total Cover				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years				

SOIL

Sampling Point: SP3**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	10YR 4/1	92	7.5YR 4/6	8	C	PL	silt loam	
9-17	10YR 5/2	95	10YR 5/8	5	C	PL	silty clay	
17-20	10YR 3/1	70	10YR 5/8	30	C	PL	clay	Soil contains 40% gravel below 17"

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☒ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)**Wetland Hydrology Present?** Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP4
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21211243 Long: -120.8099365 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>) 1. <u>Pinus ponderosa</u> <u>10</u> <u>Y</u> <u>FACU</u> 2. <u> </u> <u> </u> <u> </u> <u> </u> 3. <u> </u> <u> </u> <u> </u> <u> </u> 4. <u> </u> <u> </u> <u> </u> <u> </u> <u>10</u> = Total Cover Sapling/Shrub Stratum (Plot size: <u>15'</u>) 1. <u> </u> <u> </u> <u> </u> <u> </u> 2. <u> </u> <u> </u> <u> </u> <u> </u> 3. <u> </u> <u> </u> <u> </u> <u> </u> 4. <u> </u> <u> </u> <u> </u> <u> </u> 5. <u> </u> <u> </u> <u> </u> <u> </u> <u>0</u> = Total Cover Herb Stratum (Plot size: <u>5'</u>) 1. <u>Balsamorhiza sagittata</u> <u>70</u> <u>Y</u> <u>NOL</u> 2. <u>Lupinus sericeus</u> <u>10</u> <u>N</u> <u>NOL</u> 3. <u>Achillea millefolium</u> <u>3</u> <u>N</u> <u>FACU</u> 4. <u>Lomatium nudicaule</u> <u>3</u> <u>N</u> <u>NOL</u> 5. <u>Poa bulbosa</u> <u>7</u> <u>N</u> <u>NOL</u> 6. <u>Bromus sp.</u> <u>7</u> <u>N</u> <u>unk.</u> 7. <u> </u> <u> </u> <u> </u> <u> </u> 8. <u> </u> <u> </u> <u> </u> <u> </u> 9. <u> </u> <u> </u> <u> </u> <u> </u> 10. <u> </u> <u> </u> <u> </u> <u> </u> 11. <u> </u> <u> </u> <u> </u> <u> </u> <u>100</u> = Total Cover Woody Vine Stratum (Plot size: <u>15'</u>) 1. <u> </u> <u> </u> <u> </u> <u> </u> 2. <u> </u> <u> </u> <u> </u> <u> </u> <u>0</u> = Total Cover % Bare Ground in Herb Stratum <u>0</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B) Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td>Total % Cover of:</td> <td>Multiply by:</td> </tr> <tr> <td>OBL species <u> </u></td> <td>x 1 = <u> </u></td> </tr> <tr> <td>FACW species <u> </u></td> <td>x 2 = <u> </u></td> </tr> <tr> <td>FAC species <u> </u></td> <td>x 3 = <u> </u></td> </tr> <tr> <td>FACU species <u> </u></td> <td>x 4 = <u> </u></td> </tr> <tr> <td>UPL species <u> </u></td> <td>x 5 = <u> </u></td> </tr> <tr> <td>Column Totals: <u> </u> (A)</td> <td><u> </u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u> </u></td> </tr> </table> Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	Total % Cover of:	Multiply by:	OBL species <u> </u>	x 1 = <u> </u>	FACW species <u> </u>	x 2 = <u> </u>	FAC species <u> </u>	x 3 = <u> </u>	FACU species <u> </u>	x 4 = <u> </u>	UPL species <u> </u>	x 5 = <u> </u>	Column Totals: <u> </u> (A)	<u> </u> (B)	Prevalence Index = B/A = <u> </u>	
Total % Cover of:	Multiply by:																
OBL species <u> </u>	x 1 = <u> </u>																
FACW species <u> </u>	x 2 = <u> </u>																
FAC species <u> </u>	x 3 = <u> </u>																
FACU species <u> </u>	x 4 = <u> </u>																
UPL species <u> </u>	x 5 = <u> </u>																
Column Totals: <u> </u> (A)	<u> </u> (B)																
Prevalence Index = B/A = <u> </u>																	
Remarks:																	

SOIL

Sampling Point: SP4**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-19	10YR 3/2	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators 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 X

Remarks:

HYDROLOGY

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

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

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 X Depth (inches): _____Water Table Present? Yes _____ No X Depth (inches): _____Saturation Present? Yes _____ No X Depth (inches): _____
(includes capillary fringe)**Wetland Hydrology Present?** Yes _____ No X

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

Remarks:

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP5
Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21197891 Long: -120.8116913 Datum: NAD 83
Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
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? N Are "Normal Circumstances" present? Yes X No _____
Are Vegetation X, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

Hydrophytic Vegetation Present?	Yes <u> X </u>	No <u> </u>	Is the Sampled Area within a Wetland?
Hydric Soil Present?	Yes <u> X </u>	No <u> </u>	
Wetland Hydrology Present?	Yes <u> X </u>	No <u> </u>	
Yes <u> X </u> No <u> </u>			
Remarks: Wetland W7 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .			

Tree Stratum (Plot size: 30')		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
		0	= Total Cover	
Herb Stratum (Plot size: 5')		Absolute % Cover	Dominant Species?	Indicator Status
1.	Ventenata dubia	30	Y	NOL
2.	Juncus parryi	60	Y	FAC
3.	Wyethia amplexicaulis	7	N	FAC
4.	Allium douglasii	3	N	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		100	= Total Cover	
Woody Vine Stratum (Plot size: 15')		Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
		0	= Total Cover	
% Bare Ground in Herb Stratum		0		

Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 4", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species 70	x 3 = 210
FACU species	x 4 =
UPL species 30	x 5 = 150
Column Totals: 100 (A)	360 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0¹

___ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants¹

X Problematic Hydrophytic Vegetation¹ (Explain)

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

Hydrophytic Vegetation Present? Yes X No

SOIL

Sampling Point: SP5**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4+	10YR 3/2	90	7.5YR 4/6	10	C	PL	silt loam	rocks present in soils

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: Rocks and gravelDepth (inches): >4"**Hydric Soil Present?** Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:Primary Indicators (minimum of one required; check all that apply)Secondary Indicators (2 or more required)

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)	☐ Drainage Patterns (B10)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)	☐ Dry-Season Water Table (C2)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)	☒ Geomorphic Position (D2)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Shallow Aquitard (D3)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ FAC-Neutral Test (D5)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)	☐ Raised Ant Mounds (D6) (LRR A)
☒ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)	☐ Frost-Heave Hummocks (D7)
☐ Inundation Visible on Aerial Imagery (B7)		
☐ Sparsely Vegetated Concave Surface (B8)		

Field Observations:Surface Water Present? Yes ☐ No ☒ Depth (inches): Water Table Present? Yes ☐ No ☒ Depth (inches): Saturation Present? Yes ☐ No ☒ Depth (inches):
(includes capillary fringe)**Wetland Hydrology Present?** Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP6
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21193314 Long: -120.8116608 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Balsamorhiza sagittata</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Lupinus sericeus</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Achillea millefolium</u>	<u>8</u>	<u>N</u>	<u>FACU</u>	
4. <u>Lomatium nudicaule</u>	<u>7</u>	<u>N</u>	<u>UPL</u>	
5. <u>Poa bulbosa</u>	<u>7</u>	<u>N</u>	<u>NOL</u>	
6. <u>Agrostis sp.</u>	<u>7</u>	<u>N</u>	<u>unk.</u>	
7. <u>Vicia americana</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>~6</u>				
Remarks:				

SOIL

Sampling Point: SP6

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-13	7.5YR 3/2	100					silt loam	
0-13	7.5YR 3/2	100					silt clay loam	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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 X Depth (inches): _____

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

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

Wetland Hydrology Present? Yes _____ No X

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP7
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212769 Long: -120.8140945 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, 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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland W4 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>95</u> x 5 = <u>475</u> Column Totals: <u>100</u> (A) <u>495</u> (B) Prevalence Index = B/A = <u>4.95</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years				

SOIL

Sampling Point: SP7**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 4/1	95	2.5YR 4/6	5	C	PL	silt loam	
12-								rock/gravel refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: Rocks and gravelDepth (inches): >12"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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP8
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21209717 Long: -120.8140869 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>) 1. <u> </u> 2. <u> </u> 3. <u> </u> 4. <u> </u> <u>0</u> = Total Cover Sapling/Shrub Stratum (Plot size: <u>15'</u>) 1. <u> </u> 2. <u> </u> 3. <u> </u> 4. <u> </u> 5. <u> </u> <u>0</u> = Total Cover Herb Stratum (Plot size: <u>5'</u>) 1. <u>Ventenata dubia</u> 2. <u>Potentilla drummondii</u> 3. <u> </u> 4. <u> </u> 5. <u> </u> 6. <u> </u> 7. <u> </u> 8. <u> </u> 9. <u> </u> 10. <u> </u> 11. <u> </u> <u>100</u> = Total Cover Woody Vine Stratum (Plot size: <u>15'</u>) 1. <u> </u> 2. <u> </u> <u>0</u> = Total Cover % Bare Ground in Herb Stratum <u> </u>	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B) Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u> Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Remarks:				

SOIL

Sampling Point: SP8

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	7.5YR 2.5/1	98	7.5YR 4/6	2	C	PL	silt loam	
4+	10YR 4/3	100					silt loam	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP9
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21216965 Long: -120.8132324 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, Soil , or Hydrology naturally problematic? Y (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W7 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>95</u> x 5 = <u>475</u> Column Totals: <u>100</u> (A) <u>495</u> (B) Prevalence Index = B/A = <u>4.95</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years.				

SOIL

Sampling Point: SP9**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	95	7.5YR 5/8	7	C	PL	silt loam	
12-								rock/gravel refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: Rocks and gravelDepth (inches): >12"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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP10
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21223831 Long: 120.8131332 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>80</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u>Potentilla gracilis</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	
4. <u>Juncus parryi</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	
5. <u>Zigadenus venenosus</u>	<u>trace</u>	<u>N</u>	<u>FACU</u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>85</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>15</u>				
Remarks:				

SOIL

Sampling Point: SP10

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	100					silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Gravel/rock

Depth (inches): 12"+

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009

Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP11

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.2124176 Long: -120.8120422 Datum: NAD 83

Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No

Are Vegetation X, Soil , or Hydrology naturally problematic? Y (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W5 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>95</u> x 5 = <u>475</u> Column Totals: <u>100</u> (A) <u>495</u> (B) Prevalence Index = B/A = <u>4.95</u>
<u>0</u> = Total Cover				
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Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u>Juncus parryi</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
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11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
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Woody Vine Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years				

SOIL

Sampling Point: SP11

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 2/2	95	7.5YR 4/6	~5	C	PL	silt loam	
10-								rock/gravel refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: Rocks and gravelDepth (inches): >10"Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

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

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

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP12
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21247482 Long: -120.8120422 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
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Remarks: Sample point taken above depressional area.			

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30'</u>) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Tree Stratum</th> <th style="width: 10%;">Absolute % Cover</th> <th style="width: 10%;">Dominant Species?</th> <th style="width: 10%;">Indicator Status</th> </tr> </thead> <tbody> <tr><td>1. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>2. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>3. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>4. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr> <td colspan="2" style="text-align: center;"><u>0</u> = Total Cover</td> <td colspan="2"></td> </tr> </tbody> </table> <u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Sapling/Shrub Stratum</th> <th style="width: 10%;">Absolute % Cover</th> <th style="width: 10%;">Dominant Species?</th> <th style="width: 10%;">Indicator Status</th> </tr> </thead> <tbody> <tr><td>1. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>2. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>3. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>4. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>5. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr> <td colspan="2" style="text-align: center;"><u>0</u> = Total Cover</td> <td colspan="2"></td> </tr> </tbody> </table> <u>Herb Stratum</u> (Plot size: <u>5'</u>) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Herb Stratum</th> <th style="width: 10%;">Absolute % Cover</th> <th style="width: 10%;">Dominant Species?</th> <th style="width: 10%;">Indicator Status</th> </tr> </thead> <tbody> <tr><td>1. <u>Poa bulbosa</u></td><td><u>25</u></td><td><u>Y</u></td><td><u>NOL</u></td></tr> <tr><td>2. <u>Castilleja tenuis</u></td><td><u>15</u></td><td><u>Y</u></td><td><u>FACU</u></td></tr> <tr><td>3. <u>Potentilla gracilis</u></td><td><u>5</u></td><td><u>N</u></td><td><u>FAC</u></td></tr> <tr><td>4. <u>Agrostis scabra</u></td><td><u>20</u></td><td><u>Y</u></td><td><u>FAC</u></td></tr> <tr><td>5. <u>Zigadenus venenosus</u></td><td><u>5</u></td><td><u>N</u></td><td><u>FACU</u></td></tr> <tr><td>6. <u>Achillea millefolium</u></td><td><u>10</u></td><td><u>N</u></td><td><u>FACU</u></td></tr> <tr><td>7. <u>Lomatium simplex</u></td><td><u>5</u></td><td><u>N</u></td><td><u>NOL</u></td></tr> <tr><td>8. <u>Lupinus sericeus</u></td><td><u>5</u></td><td><u>N</u></td><td><u>NOL</u></td></tr> <tr><td>9. <u>Balsamorhiza sagittata</u></td><td><u>10</u></td><td><u>N</u></td><td><u>NOL</u></td></tr> <tr><td>10. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>11. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr> <td colspan="2" style="text-align: center;"><u>100</u> = Total Cover</td> <td colspan="2"></td> </tr> </tbody> </table> <u>Woody Vine Stratum</u> (Plot size: <u>15'</u>) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Woody Vine Stratum</th> <th style="width: 10%;">Absolute % Cover</th> <th style="width: 10%;">Dominant Species?</th> <th style="width: 10%;">Indicator Status</th> </tr> </thead> <tbody> <tr><td>1. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr><td>2. <u> </u></td><td><u> </u></td><td><u> </u></td><td><u> </u></td></tr> <tr> <td colspan="2" style="text-align: center;"><u>0</u> = Total Cover</td> <td colspan="2"></td> </tr> </tbody> </table> % Bare Ground in Herb Stratum <u>0</u>	Tree Stratum	Absolute % Cover	Dominant Species?	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FACW species <u> </u>	x 2 = <u> </u>																																																																																																																																						
FAC species <u> </u>	x 3 = <u> </u>																																																																																																																																						
FACU species <u> </u>	x 4 = <u> </u>																																																																																																																																						
UPL species <u> </u>	x 5 = <u> </u>																																																																																																																																						
Column Totals: <u> </u> (A)	<u> </u> (B)																																																																																																																																						
Remarks:																																																																																																																																							

SOIL

Sampling Point: SP12

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	100					silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Gravel/rock

Depth (inches): 12"+

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009

Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP13

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21183395 Long: -120.8102341 Datum: NAD 83

Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No

Are Vegetation X, Soil , or Hydrology naturally problematic? Y (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W3 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u>5</u> x 3 = <u>15</u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>90</u> x 5 = <u>450</u> Column Totals: <u>100</u> (A) <u>485</u> (B) Prevalence Index = B/A = <u>4.85</u>
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Ventenata dubia</u>	<u>90</u>	<u>Y</u>	<u>NOL</u>	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u>Juncus parryi</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				

Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive *Ventenata dubia* may dominate in dryer years

SOIL

Sampling Point: SP13

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	95	7.5YR 4/6	5	C	PL	silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: Rocks and gravelDepth (inches): >12"Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

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

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

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP14
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21188354 Long: -120.8101349 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>) 1. <u> </u> 2. <u> </u> 3. <u> </u> 4. <u> </u> <u>0</u> = Total Cover Sapling/Shrub Stratum (Plot size: <u>15'</u>) 1. <u> </u> 2. <u> </u> 3. <u> </u> 4. <u> </u> 5. <u> </u> <u>0</u> = Total Cover Herb Stratum (Plot size: <u>5'</u>) 1. <u>Poa bulbosa</u> <u>25</u> <u>Y</u> <u>NOL</u> 2. <u>Castilleja tenuis</u> <u>15</u> <u>Y</u> <u>FACU</u> 3. <u>Potentilla drummondii</u> <u>5</u> <u>N</u> <u>FAC</u> 4. <u>Agrostis scabra</u> <u>20</u> <u>Y</u> <u>FAC</u> 5. <u>Zigadenus venenosus</u> <u>5</u> <u>N</u> <u>FACU</u> 6. <u>Achillea millefolium</u> <u>10</u> <u>N</u> <u>FACU</u> 7. <u>Lomatium simplex</u> <u>5</u> <u>N</u> <u>NOL</u> 8. <u>Lupinus sericeus</u> <u>5</u> <u>N</u> <u>NOL</u> 9. <u>Balsamorhiza sagittata</u> <u>10</u> <u>N</u> <u>NOL</u> 10. <u> </u> 11. <u> </u> <u>100</u> = Total Cover Woody Vine Stratum (Plot size: <u>15'</u>) 1. <u> </u> 2. <u> </u> <u>0</u> = Total Cover % Bare Ground in Herb Stratum <u>0</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B) Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td>Total % Cover of:</td> <td>Multiply by:</td> </tr> <tr> <td>OBL species <u> </u></td> <td>x 1 = <u> </u></td> </tr> <tr> <td>FACW species <u> </u></td> <td>x 2 = <u> </u></td> </tr> <tr> <td>FAC species <u> </u></td> <td>x 3 = <u> </u></td> </tr> <tr> <td>FACU species <u> </u></td> <td>x 4 = <u> </u></td> </tr> <tr> <td>UPL species <u> </u></td> <td>x 5 = <u> </u></td> </tr> <tr> <td>Column Totals: <u> </u> (A)</td> <td><u> </u> (B)</td> </tr> </table> Prevalence Index = B/A = <u> </u> Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Total % Cover of:	Multiply by:	OBL species <u> </u>	x 1 = <u> </u>	FACW species <u> </u>	x 2 = <u> </u>	FAC species <u> </u>	x 3 = <u> </u>	FACU species <u> </u>	x 4 = <u> </u>	UPL species <u> </u>	x 5 = <u> </u>	Column Totals: <u> </u> (A)	<u> </u> (B)
Total % Cover of:	Multiply by:														
OBL species <u> </u>	x 1 = <u> </u>														
FACW species <u> </u>	x 2 = <u> </u>														
FAC species <u> </u>	x 3 = <u> </u>														
FACU species <u> </u>	x 4 = <u> </u>														
UPL species <u> </u>	x 5 = <u> </u>														
Column Totals: <u> </u> (A)	<u> </u> (B)														
Remarks:															

SOIL

Sampling Point: SP14**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	100					silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1) ☐ Sandy Redox (S5)
☐ Histic Epipedon (A2) ☐ Stripped Matrix (S6)
☐ Black Histic (A3) ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
☐ Hydrogen Sulfide (A4) ☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11) ☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12) ☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1) ☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4) ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Gravel/rock
 Depth (inches): 12"+

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

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

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

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? Yes ☐ No ☒ Depth (inches): _____
 (includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP15
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21208572 Long: -120.8093414 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W1 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Gnaphalium palustre</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Polygonum polygaloides</u>	<u>trace</u>	<u>N</u>	<u>FACW</u>	
3. <u>Navarretia brewerii</u>	<u>trace</u>	<u>N</u>	<u>NOL</u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>5</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>95</u>				
Remarks:				

SOIL

Sampling Point: SP15

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/1	95	7.5YR 4/6	5	C	PL	silt loam	
12-								rock/gravel refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☒ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**

Type: Rocks and gravel

Depth (inches): >12"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

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

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

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? Yes ☐ No ☒ Depth (inches):
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP16
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212006 Long: -120.809288 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Poa bulbosa</u>	<u>10</u>	<u>N</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>12</u>	<u>Y</u>	<u>FACU</u>	
3. <u>Potentilla gracilis</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
4. <u>Agrostis scabra</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
5. <u>Agrostemma githago</u>	<u>20</u>	<u>Y</u>	<u>NOL</u>	
6. <u>Lomatium simplex</u>	<u>10</u>	<u>N</u>	<u>NOL</u>	
7. <u>Juncus parryi</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
8. <u>Balsamorhiza sagittata</u>	<u>8</u>	<u>N</u>	<u>NOL</u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

SOIL

Sampling Point: SP16

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	100					silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Gravel/rock

Depth (inches): 12"+

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP17
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20587158 Long: 120.8251495 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland W8 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Eleocharis palustris</i> to dominant upland vegetation <i>Achillea millefolium</i> .	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Eleocharis palustris</u>	<u>70</u>	<u>Y</u>	<u>OBL</u>	
2. <u>Juncus parryi</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>75</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>25</u>				
Remarks:				

SOIL

Sampling Point: SP17

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 4/2	95	7.5YR 5/8	5	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1) ☐ Sandy Redox (S5)
☐ Histic Epipedon (A2) ☐ Stripped Matrix (S6)
☐ Black Histic (A3) ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
☐ Hydrogen Sulfide (A4) ☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11) ☒ Depleted Matrix (F3)
☐ Thick Dark Surface (A12) ☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1) ☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4) ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

³Indicators 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) ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
☐ High Water Table (A2) ☐ Salt Crust (B11)
☐ Saturation (A3) ☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1) ☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2) ☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4)
☒ Algal Mat or Crust (B4) ☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5) ☐ Stunted or Stressed Plants (D1) (**LRR A**)
☒ Surface Soil Cracks (B6) ☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Wetland is along road fill at road culvert outlet.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP18
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20593262 Long: -120.8251266 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>10</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Agropyron smithii</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
2. <u>Agrostemma githago</u>	<u>40</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Achillea millefolium</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Juncus parryi</u>	<u>15</u>	<u>N</u>	<u>FAC</u>	
5. <u>Madia exigua</u>	<u>5</u>	<u>N</u>	<u>NOL</u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>90</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>10</u>				
Remarks:				

SOIL

Sampling Point: SP18

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	100					silt loam	
3-12	10YR 4/2	90	7.5YR 4/6	10	C	PL	silt loam	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP19
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20584869 Long: -120.825386 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland W11 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Eleocharis palustris</i> to dominant upland vegetation <i>Achillea millefolium</i> . Wetland appears to be a created roadside ditch.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u>X</u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Eleocharis palustris</u>	<u>70</u>	<u>Y</u>	<u>OBL</u>	
2. <u>Juncus parryi</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>25</u>				
Remarks:				

SOIL

Sampling Point: SP19

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 4/2	95	7.5YR 5/8	5	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

Indicators for Problematic Hydric Soils³:³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☒ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☒ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)**Wetland Hydrology Present?** Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP20
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20582581 Long: -120.8254089 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>10</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Agropyron smithii</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
2. <u>Agrostemma githago</u>	<u>40</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Achillea millefolium</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Juncus parryi</u>	<u>15</u>	<u>N</u>	<u>FAC</u>	
5. <u>Madia exigua</u>	<u>5</u>	<u>N</u>	<u>NOL</u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>90</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>10</u>				
Remarks:				

SOIL

Sampling Point: SP20

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	100					silt loam	
3-12	10YR 4/2	90	7.5YR 4/6	10	C	PL	silt loam	

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

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☐ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP21
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20595169 Long: -120.8254471 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, Soil , or Hydrology naturally problematic? Y (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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>	
Remarks: Wetland W9 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u>50</u> x 5 = <u>250</u> Column Totals: <u>50</u> (A) <u>250</u> (B) Prevalence Index = B/A = <u>5</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>50</u>	<u>Y</u>	<u>NOL</u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>50</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years.				

SOIL

Sampling Point: SP21

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 4/2	90	7.5YR 5/8	10	C	PL	silt loam	
12-								gravel/rock refusal

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

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

Restrictive Layer (if present):

Type: Rocks and gravel
Depth (inches): >12"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)	☐ Drainage Patterns (B10)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)	☐ Dry-Season Water Table (C2)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)	☒ Geomorphic Position (D2)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Shallow Aquitard (D3)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ FAC-Neutral Test (D5)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)	☐ Raised Ant Mounds (D6) (LRR A)
☒ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)	☐ Frost-Heave Hummocks (D7)
☐ Inundation Visible on Aerial Imagery (B7)		
☒ Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt. Wetland is against road fill.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP22
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20600891 Long: -120.8254623 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Agropyron spicatum</u>	<u>35</u>	<u>Y</u>	<u>UPL</u>	
2. <u>Lupinus sericeus</u>	<u>25</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Agropyron smithii</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Lomatium nudicaule</u>	<u>10</u>	<u>N</u>	<u>NOL</u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

SOIL

Sampling Point: SP22

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

☐ Histosol (A1)	☐ Sandy Redox (S5)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

³Indicators 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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 X Depth (inches): _____

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

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

Wetland Hydrology Present? Yes _____ No X

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: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP23
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20911407 Long: -120.8263702 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none
 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? N Are "Normal Circumstances" present? Yes X No
 Are Vegetation X, 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 <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Wetland W10 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u>10</u> x 2 = <u>20</u> FAC species <u>30</u> x 3 = <u>90</u> FACU species <u> </u> x 4 = <u> </u> UPL species <u>30</u> x 5 = <u>150</u> Column Totals: <u>70</u> (A) <u>260</u> (B) Prevalence Index = B/A = <u>3.7</u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u>X</u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Ventenata dubia</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Juncus parryi</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Scirpus sp.</u>	<u>10</u>	<u>N</u>	<u>FACW/OBL</u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>70</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>30</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years.				

SOIL

Sampling Point: SP23

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16+	10YR 4/1	50	5YR 4/6	10	C	PL	silt loam	Mixed matrix
0-16+	10YR 4/2	40						Mixed matrix

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)****Indicators for Problematic Hydric Soils³:**

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators 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)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)
☒ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)
☐ Inundation Visible on Aerial Imagery (B7)	
☐ Sparsely Vegetated Concave Surface (B8)	

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? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)**Wetland Hydrology Present?** Yes ☒ No ☐

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

Remarks: Only apparent source of hydrology is precipitation and snow melt. Wetland appears to have been created or enlarged by road fill across drainageway and perched culvert that backs up and ponds water.

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

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009

Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP24

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

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

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20905685 Long: -120.8263702 Datum: NAD 83

Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

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? N Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? N (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 <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present?	Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u> No <u>X</u>	
Remarks: Sample point taken above depressional area.		

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1. <u>Pinus ponderosa</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators: <u> </u> Dominance Test is >50% <u> </u> Prevalence Index is ≤3.0 ¹ <u> </u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Wetland Non-Vascular Plants ¹ <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	
Sapling/Shrub Stratum (Plot size: <u>15'</u>) 1. <u>Syphoricarpos albus</u> <u>40</u> <u>Y</u> <u>FACU</u> 2. <u> </u> <u> </u> <u> </u> <u> </u> 3. <u> </u> <u> </u> <u> </u> <u> </u> 4. <u> </u> <u> </u> <u> </u> <u> </u> 5. <u> </u> <u> </u> <u> </u> <u> </u> <u>40</u> = Total Cover				Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>
Herb Stratum (Plot size: <u>5'</u>) 1. <u>Achillea millefolium</u> <u>20</u> <u>Y</u> <u>FACU</u> 2. <u>Penstemon procerus</u> <u>trace</u> <u>N</u> <u>NI</u> 3. <u> </u> <u> </u> <u> </u> <u> </u> 4. <u> </u> <u> </u> <u> </u> <u> </u> 5. <u> </u> <u> </u> <u> </u> <u> </u> 6. <u> </u> <u> </u> <u> </u> <u> </u> 7. <u> </u> <u> </u> <u> </u> <u> </u> 8. <u> </u> <u> </u> <u> </u> <u> </u> 9. <u> </u> <u> </u> <u> </u> <u> </u> 10. <u> </u> <u> </u> <u> </u> <u> </u> 11. <u> </u> <u> </u> <u> </u> <u> </u> <u>20</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>) 1. <u> </u> <u> </u> <u> </u> <u> </u> 2. <u> </u> <u> </u> <u> </u> <u> </u> <u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>20</u>				
Remarks: 10% ground cover and pine needles				

SOIL

Sampling Point: SP24

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16	10YR 2/2	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

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

Indicators for Problematic Hydric Soils³:

☐ Histosol (A1)	☐ Sandy Redox (S5)	☐ 2 cm Muck (A10)
☐ Histic Epipedon (A2)	☐ Stripped Matrix (S6)	☐ Red Parent Material (TF2)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (except MLRA 1)	☐ Other (Explain in Remarks)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)	
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)	
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)	
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)	

³Indicators 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 X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
☐ High Water Table (A2)	☐ Salt Crust (B11)	☐ Drainage Patterns (B10)
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)	☐ Dry-Season Water Table (C2)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres along Living Roots (C3)	☐ Geomorphic Position (D2)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Shallow Aquitard (D3)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ FAC-Neutral Test (D5)
☐ Iron Deposits (B5)	☐ Stunted or Stressed Plants (D1) (LRR A)	☐ Raised Ant Mounds (D6) (LRR A)
☐ Surface Soil Cracks (B6)	☐ Other (Explain in Remarks)	☐ Frost-Heave Hummocks (D7)
☐ Inundation Visible on Aerial Imagery (B7)		
☐ Sparsely Vegetated Concave Surface (B8)		

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

APPENDIX C

Site Photographs

APPENDIX C

Site Photographs



Photo 1: Wetland W1 facing north from SP15.



Photo 2: Wetland W2 facing northeast toward SP1.



Photo 3: Wetland W3 facing southwest from SP14.



Photo 4: Wetland W3 facing north from SP13.



Photo 5: SP8 facing southwest.



Photo 6: Wetland W4 facing northeast from SP7.



Photo 7: SP12 facing east. Wetland W7 is in the background.



Photo 8: Wetland W5 facing northeast from SP11.



Photo 9: Wetland W6 facing northwest toward SP4.



Photo 10: Wetland W6 facing northeast from the eastern half of the wetland.



Photo 11: Wetland W7 facing south from transitional area at north end of the wetland.



Photo 12: Wetland W7 facing west between SP5 and SP6.



Photo 13: SP10 facing west.



Photo 14: Wetland W7 facing east from SP9.

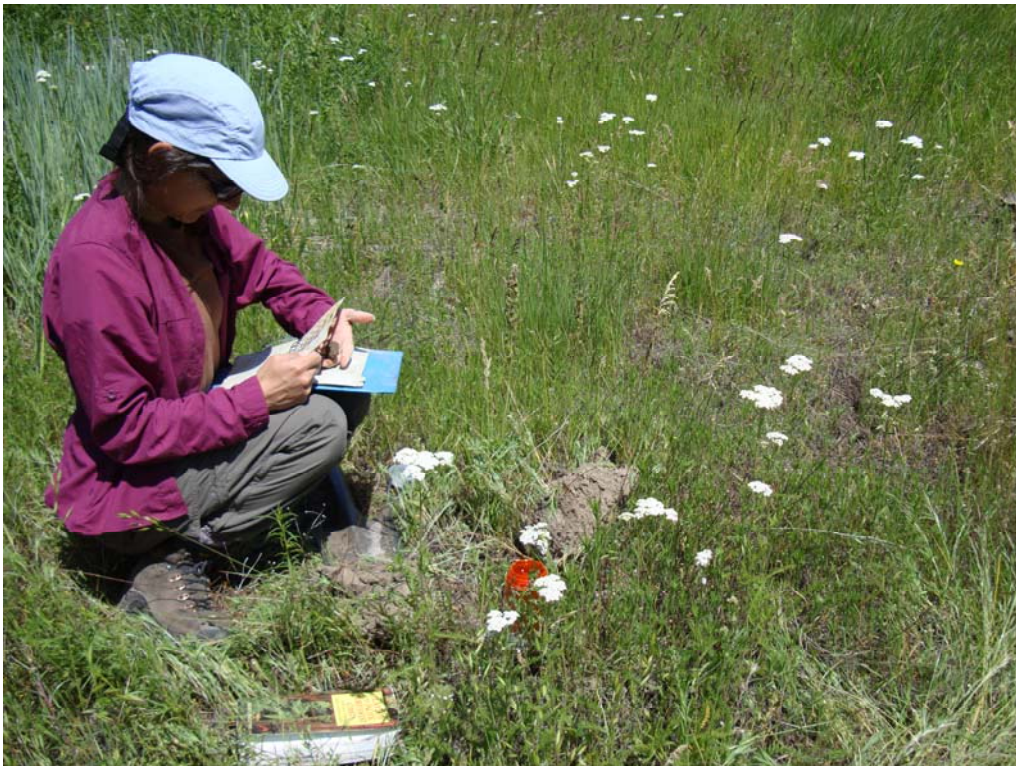


Photo 15: SP18 facing northeast.



Photo 16: Wetland W8 facing northwest from SP17.



Photo 17: SP22 facing northwest.



Photo 18: Wetland W9 facing west toward SP21.



Photo 19: SP24 facing east.



Photo 10: Wetland W10 facing southeast toward SP23.



Photo 21: Wetland W11 facing east from SP19.



Photo 22: Wetland W12 facing west.



Photo 23: Wetland W12 facing northwest.



Photo 24: Stream S1 facing south (downstream) at transmission line corridor.



Photo 25: Stream S1 facing north (upstream) at transmission line corridor.



Photo 26: Stream S2 facing south (downstream) at the southern portion of project area.



Photo 27: Stream S2 facing north (upstream) in southern portion of project area.



Photo 28: Stream S2 facing south (downstream) upstream from the confluence with S3.



Photo 29: Stream S2 facing north (upstream) upstream from the confluence with S3.



Photo 30: Stream S2 facing south near a road crossing and downstream from the confluence with S3.



Photo 31: Stream S3 facing south (downstream).



Photo 32: Steam S3 facing north (upstream).



Photo 33: Stream S4 facing west (downstream) toward road culvert.



Photo 34: Stream S4 facing northeast (upstream).



Photo 35: Stream S5 facing southwest from headwater.



Photo 36: S5 facing southwest near west edge of project area.

APPENDIX D

Washington Wetland Rating Forms and Associated Figures

Wetland name or number W1

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W1 Date of site visit: 6/9/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes___No X Date of training_____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure 2 Estimated size 0.01 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III X IV___

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

Score for “Water Quality” Functions

9

Score for Hydrologic Functions

20

Score for Habitat Functions

15

TOTAL score for functions

44

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ III___ Does not Apply X

Final Category (choose the “highest” category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

☒ NO

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

☒ NO

- go to Step 3

YES – The wetland class is **Slope**

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

☒ NO

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

☒ YES

– The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W1

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

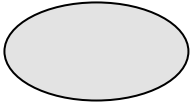
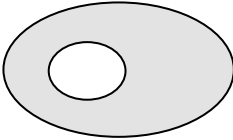
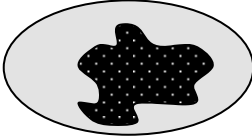
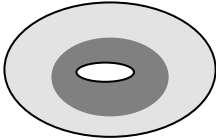
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	5
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 1
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 Add the points in the boxes above	9
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	9

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	8
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) points = 6 Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	2
D	Total for D 3 <i>Add the points in the boxes above</i>	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems ☒ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier 2
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 <u>Categories of vegetation structure</u> (<i>see p.62</i>) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres.</i> ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) <i>Add the number of vegetation types that qualify. If you have:</i> <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 2 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (<i>see p .64</i>) YES = 1 point NO = 0 points		0								
H 1.3. <u>Surface Water</u> (<i>see p.65</i>) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 8 3								
H 1.4. <u>Richness of Plant Species</u> (<i>see p. 66</i>) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) <i>You do not have to name the species.</i> <i>Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</i> If you counted: > 9 species points = 2 4-9 species points = 1 # of species 3 < 4 species points = 0 points <i>List species below if you wish</i>		0								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points  High = 3 points NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 2 1
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	0
TOTAL Potential to provide habitat Add the scores in the column above	4

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 14 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 X — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	15

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i> SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 (NO -) not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I (NO -) not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W2

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W2 Date of site visit: 6/9/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.004

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for “Water Quality” Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

12

TOTAL score for functions

43

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the “highest” category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

☒ NO

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

☒ NO

- go to Step 3

YES – The wetland class is **Slope**

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

☒ NO

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

☒ YES

– The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide).** Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W2

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

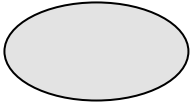
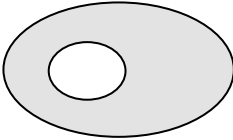
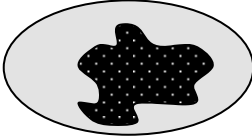
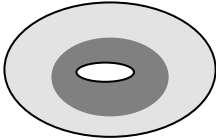
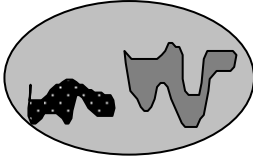
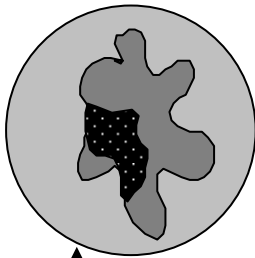
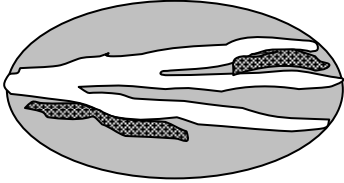
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 4 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 10 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 4 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. <u>Surface Water</u> (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 10 0								
H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species 5 < 4 species points = 0 points List species below if you wish		1								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points    High = 3 points  [Riparian braided channel] NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 4 0
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	0
TOTAL Potential to provide habitat Add the scores in the column above	1

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 16 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 X — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	12

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i> SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 (NO -) not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I (NO -) not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W3

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W3 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.03 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES)

The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W3

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

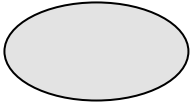
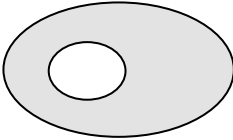
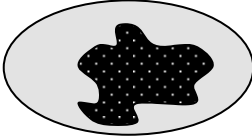
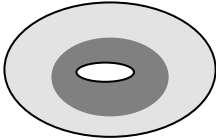
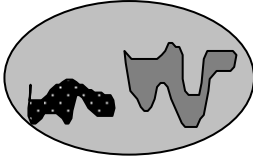
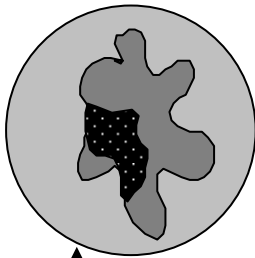
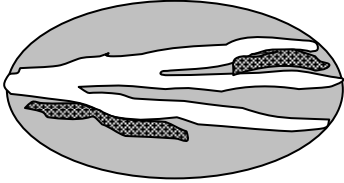
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 <i>Add the points in the boxes above</i>	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 <u>Categories of vegetation structure</u> (<i>see p.62</i>) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 2 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (<i>see p .64</i>) YES = 1 point NO = 0 points		0								
H 1.3. <u>Surface Water</u> (<i>see p.65</i>) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 8 0								
H 1.4. <u>Richness of Plant Species</u> (<i>see p. 66</i>) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species 3 < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points    High = 3 points  [Riparian braided channel] NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 2 0
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	0
TOTAL Potential to provide habitat Add the scores in the column above	0

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. X 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 14 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) (NO) go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? (YES) = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 x — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type		Category
Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met. SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics		
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III		Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland		Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W4

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W4 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.067 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES)

The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W4

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

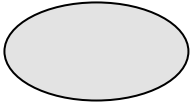
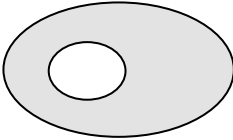
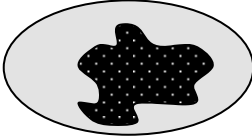
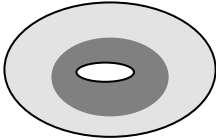
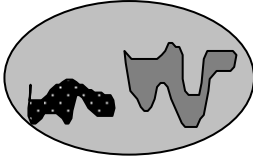
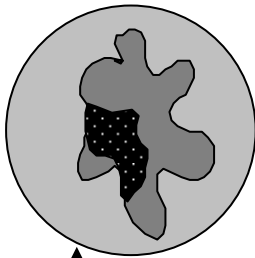
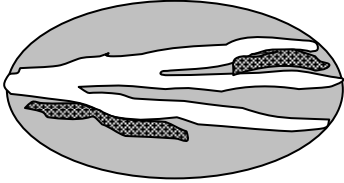
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 1 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. <u>Surface Water</u> (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 7 0								
H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points  High = 3 points    [Riparian braided channel] NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 1 0
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	0
TOTAL Potential to provide habitat Add the scores in the column above	0

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 13 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 X — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type		Category
Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met. SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics		
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III		Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland		Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W5

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W5 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.004 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES)

The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide).** Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W5

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

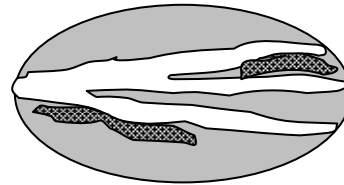
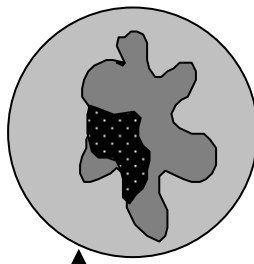
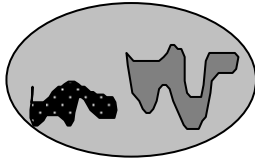
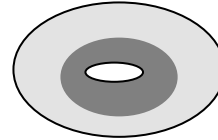
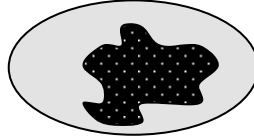
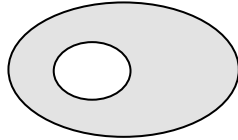
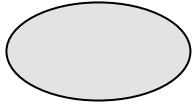
D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 1 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 7 0								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species 3 < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67)

Decided from the diagrams below whether interspersions between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



High = 3 points

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3

H 1.6. Special Habitat Features: (*see p. 68*)

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ___ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ___ Cattails or bulrushes are present within the unit.
- ___ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ___ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ___ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

TOTAL Potential to provide habitat
Add the scores in the column above

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 13 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 x — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type <i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i>	Category
SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W6

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W6 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.253 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES) – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W6

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

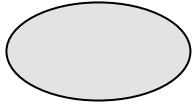
D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

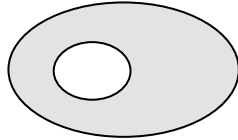
These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 2 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. <u>Surface Water</u> (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 8 0								
H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67)

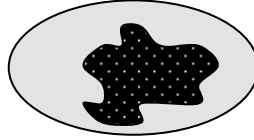
Decided from the diagrams below whether interspersions between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



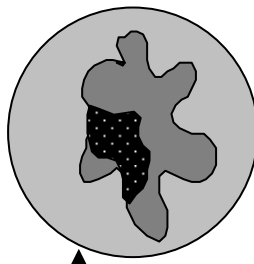
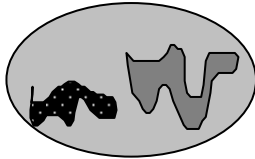
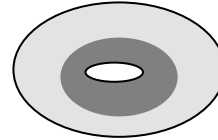
None = 0 points



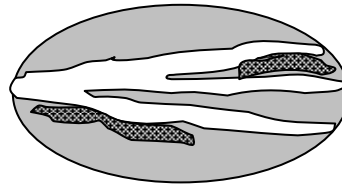
Low = 1 point



Moderate = 2 points



High = 3 points



[Riparian braided channel]

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3

H 1.6. Special Habitat Features: (*see p. 68*)

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ___ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ___ Cattails or bulrushes are present within the unit.
- ___ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ___ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ___ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

TOTAL Potential to provide habitat
Add the scores in the column above

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 14 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 X — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type <i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i>	Category
SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W7

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W7 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.231 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

13

TOTAL score for functions

44

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

☒ NO

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

☒ NO

- go to Step 3

YES – The wetland class is **Slope**

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

☒ NO

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

☒ YES

– The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W7

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

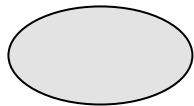
D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

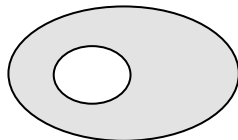
These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 1 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 7 0								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species 5 < 4 species points = 0 points List species below if you wish		1								

H 1.5. Interspersion of habitats (see p. 67)

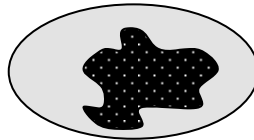
Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



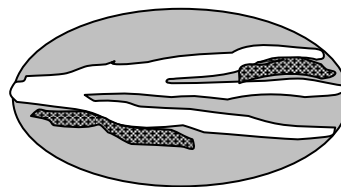
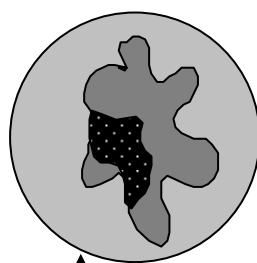
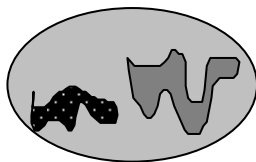
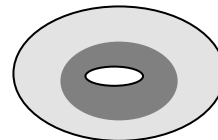
None = 0 points



Low = 1 point



Moderate = 2 points



[Riparian braided channel]

High = 3 points

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3

Figure 1

1

H 1.6. Special Habitat Features: (see p. 68)

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ☐ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ☐ Cattails or bulrushes are present within the unit.
- ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

0

TOTAL Potential to provide habitat
Add the scores in the column above

2

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. ☒ 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 13 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) ☒ NO = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) ☒ NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? ☒ YES = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 x — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	5
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points NO = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	13

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type		Category
Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met. SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics		
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III		Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland		Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W8

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W8 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.027 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

14

Score for Hydrologic Functions

20

Score for Habitat Functions

12

TOTAL score for functions

46

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES)

The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W8

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

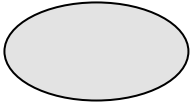
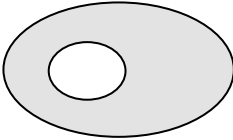
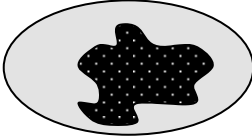
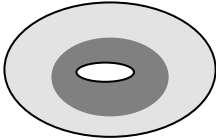
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 1
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 Add the points in the boxes above	7
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland X A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 2
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	14

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table border="0"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 6 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> ☒ YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 12 3								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points  High = 3 points NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 6 1
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☒ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	1
TOTAL Potential to provide habitat Add the scores in the column above	5

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 18 4
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) (NO) go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? (YES) = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 X — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	2
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	7
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	12

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type <i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i>	Category
SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W9

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W9 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.013 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

9

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

40

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

- go to Step 3

YES – The wetland class is **Slope**

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

(NO)

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

(YES)

The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W9

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 3
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 Add the points in the boxes above	9
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	9

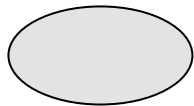
D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

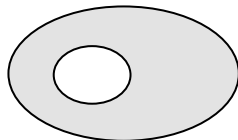
These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 6 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> ☒ YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 12 3								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>1</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67)

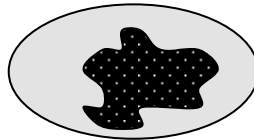
Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



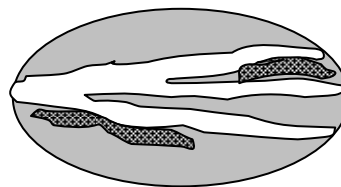
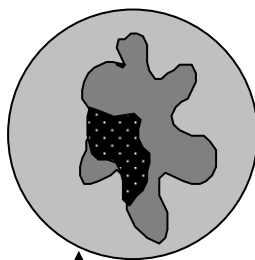
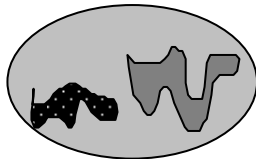
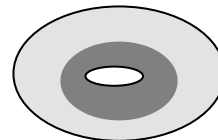
None = 0 points



Low = 1 point



Moderate = 2 points



[Riparian braided channel]

High = 3 points

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3

Figure 6**1****H 1.6. Special Habitat Features: (see p. 68)**

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ☐ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ☐ Cattails or bulrushes are present within the unit.
- ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

0

TOTAL Potential to provide habitat
Add the scores in the column above

4**Comments**

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 18 4
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) (NO) go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? (YES) = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 X — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	2
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	7
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i> SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 (NO -) <i>not a vernal pool</i> SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – <i>not a vernal pool with special characteristics</i>	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I (NO -) <i>not an alkali wetland</i>	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	Cat. I Cat. I

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W10

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W10 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.019 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

11

TOTAL score for functions

42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

☒ NO

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

☒ NO

- go to Step 3

YES – The wetland class is **Slope**

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

☒ NO

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

☒ YES

– The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W10

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 3 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 9 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

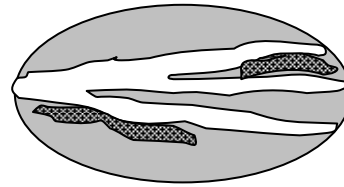
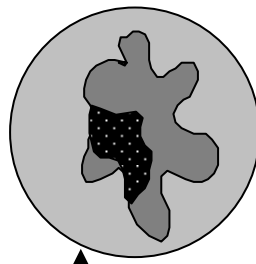
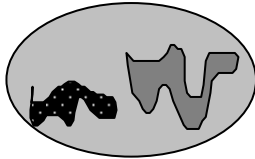
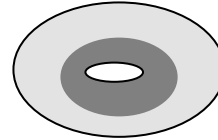
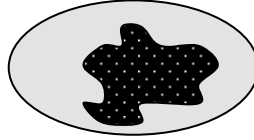
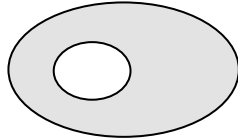
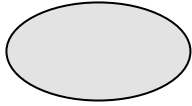
D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 3 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 9 0								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species 3 < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67)

Decided from the diagrams below whether interspersions between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



High = 3 points

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3

H 1.6. Special Habitat Features: (see p. 68)

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ___ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ___ Cattails or bulrushes are present within the unit.
- ___ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ___ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ___ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

TOTAL Potential to provide habitat
Add the scores in the column above

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 15 4
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) (NO) go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? (YES) = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☒ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☒ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	4

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 X — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	2
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points <u>NO</u> = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	11

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i> SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 (NO -) not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I (NO -) not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W11

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W11 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.006 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

8

TOTAL score for functions

39

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	<u>X</u>
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	<u>X</u>	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

☒ NO

- go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

☒ NO

- go to Step 3

YES – The wetland class is **Slope**

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

☒ NO

- go to Step 4

YES – The wetland class is **Riverine**

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

NO – go to Step 5

☒ YES

– The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide).** Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W11

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

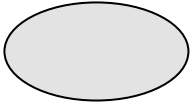
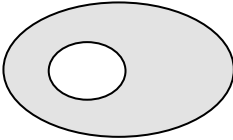
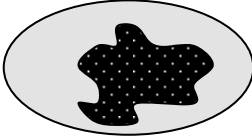
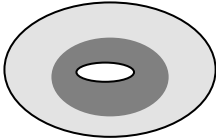
If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier 1
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 Record score on p. 1 of field form	11

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) <u>points = 6</u> Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 Record score on p. 1 of field form	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 6 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 12 0								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points  Low = 1 point  Moderate = 2 points  High = 3 points NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3	Figure 6 0
H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column. ☐ Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream. ☐ Cattails or bulrushes are present within the unit. ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i> ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity ☒ Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>) Maximum score possible = 6	1
TOTAL Potential to provide habitat Add the scores in the column above	1

Comments

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 18 4
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? YES = 2 points (go to H 2.3) (NO) go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)? (YES) = 1 point NO = 0 points	1

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☐ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	0

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 ☒ There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	2
H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above	7
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points ☒ NO = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	8

Comments

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type <i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i>	Category
SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

Wetland name or number W12

WETLAND RATING FORM – EASTERN WASHINGTON

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

Name of wetland (if known): W12 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.312 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

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

Score for "Water Quality" Functions

12

Score for Hydrologic Functions

20

Score for Habitat Functions

15

TOTAL score for functions

47

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

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

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	
Alkali		Riverine	X
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

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

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

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

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

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

Classification of Vegetated Wetlands for Eastern Washington

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

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

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

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

(NO)

go to Step 2

YES – The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the 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**?

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 <3ft diameter and less than a foot deep).*

(NO)

go to Step 3

YES – The wetland class is **Slope**

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

NO - go to Step 4

(YES)

The wetland class is **Riverine**

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

NO – go to Step 5

YES – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W12

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

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

R Riverine Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		Points (only 1 score per box)
R	R 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 45)
R	R 1.1 Area of surface depressions within the riverine unit that can trap sediments during a flooding event: Depressions cover >1/3 area of wetland points = 6 Depressions cover > 1/10 area of wetland points = 3 If depressions > 1/10th of area of unit draw polygons on aerial photo or map Depressions present but cover < 1/10 area of wetland points = 1 No depressions present points = 0	Figure <u>6</u>
R	R 1.2 Characteristics (cover) of the vegetation in the unit (<i>area of polygons with >90% cover at person height. This is not Cowardin vegetation classes</i>): Forest or shrub > 2/3 the area of the wetland points = 10 Forest or shrub 1/3 – 2/3 area of the wetland points = 5 Ungrazed, herbaceous plants > 2/3 area of wetland points = 5 Ungrazed herbaceous plants 1/3 – 2/3 area of wetland points = 2 Forest, shrub, and ungrazed herbaceous < 1/3 area of wetland points = 0 Aerial photo or map showing polygons of different vegetation cover	Figure <u>0</u>
R	Total for R1 Add the points in the boxes above	6
R	R 2.0 Does the wetland have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150ft — Wetland intercepts groundwater within the Reclamation Area — Untreated stormwater flows into wetland — Tilled fields or orchards within 150 feet of wetland ☒ Water flows into wetland from a stream or culvert that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential or urban areas are within 150 ft of wetland — The river or stream that floods the wetland has a contributing basin where human activities have raised the levels of sediment, toxic compounds or nutrients in the river water above water quality standards — Other _____ ☒ YES multiplier is 2 NO multiplier is 1	(see p.46)
R	TOTAL - Water Quality Functions Multiply the score from R1 by the multiplier in R2 Record score on p. 1 of field form	12

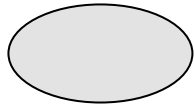
R Riverine Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream degradation		Points (only 1 score per box)
R	R 3.0 Does the wetland have the <u>potential</u> to reduce flooding and erosion?	(see p. 47)
R	R 3.1 Amount overbank storage the wetland provides: <i>Estimate the average width of the wetland perpendicular to the direction of the flow of water and the width of the stream or river channel (distance between banks). Calculate the ratio: width of wetland/ width of stream.</i> If the ratio is 2 or more points = 10 If the ratio is between 1 and < 2 points = 8 If the ratio is ½ to < 1 points = 4 If the ratio is ¼ to < ½ points = 2 If the ratio is < ¼ points = 1 Aerial photo or map showing average widths	Figure ____ 10
R	R 3.2 Characteristics of vegetation that slow down water velocities during floods: <i>Treat large woody debris as "forest or shrub" (area of polygons with >90% cover at person height. This is not Cowardin vegetation classes):</i> Forest or shrub for more than 2/3 the area of the wetland. points = 6 Forest or shrub for >1/3 area OR herbaceous plants > 2/3 area points = 4 Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 2 Vegetation does not meet above criteria points = 0 Aerial photo or map showing polygons of different vegetation types	Figure ____ 0
R	Total for R3 Add the points in the boxes above	10
R	R 4.0 Does the wetland have the <u>opportunity</u> to reduce flooding and erosion? <i>Answer NO if the major source of water is irrigation return flow or water levels are controlled by a reservoir.</i> <i>Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply.</i> ☒ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) than can be damaged by flooding ☐ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 50) multiplier 2
R	TOTAL - Hydrologic Functions Multiply the score from R3 by the multiplier in R4 Record score on p. 1 of field form	20

Comments

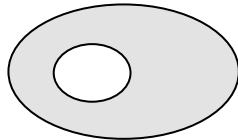
These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres. ☐ Aquatic bed ☒ Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) Add the number of vegetation types that qualify. If you have: <table> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> Map of Cowardin vegetation classes and areas with different heights of emergents		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 5 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points		0								
H 1.3. Surface Water (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> ☒ YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points Map showing areas of open water		Figure 11 3								
H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites, Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk) If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>3</u> < 4 species points = 0 points List species below if you wish		0								

H 1.5. Interspersion of habitats (see p. 67)

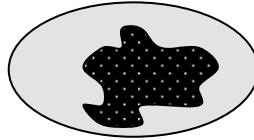
Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.



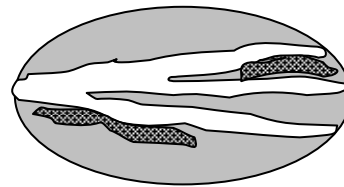
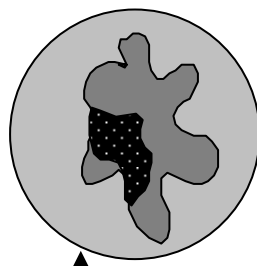
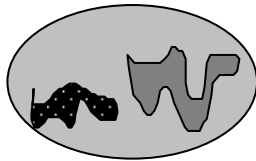
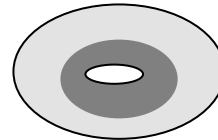
None = 0 points



Low = 1 point



Moderate = 2 points



[Riparian braided channel]

High = 3 points

NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3

Figure 5**1****H 1.6. Special Habitat Features: (see p. 68)**

Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.

- ☐ Loose rocks larger than 4" **or** large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.
- ☐ Cattails or bulrushes are present within the unit.
- ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.
- ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. *The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.*
- ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity
- ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)

Maximum score possible = 6

0

TOTAL Potential to provide habitat
Add the scores in the column above

4**Comments**

H 2.0 Does the wetland have the opportunity to provide habitat for many species?	
H 2.1 Buffers (see p. 71) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed." Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer. X 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 If buffer does not meet any of the criteria above — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 Aerial photo showing buffers	Figure 17 5
H 2.2 Wet Corridors (see p. 72) H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor). YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2 H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a "wet" corridor, OR a riverine wetland without a surface channel connecting to the stream? (YES) = 2 points (go to H 2.3) NO go to H 2.2.3 H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (do not include man-made ditches)? YES = 1 point NO = 0 points	2

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u> Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i> ☐ Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). ☐ Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>). ☐ Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>). ☐ Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>) ☐ Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover). ☒ Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>) ☐ Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points <i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i>	2

H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76) — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 X There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0	2
H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores in the column above</i>	11
H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?	
H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers) YES = - 5 points NO = 0 points	Points will be subtracted 0
Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1	15

Comments

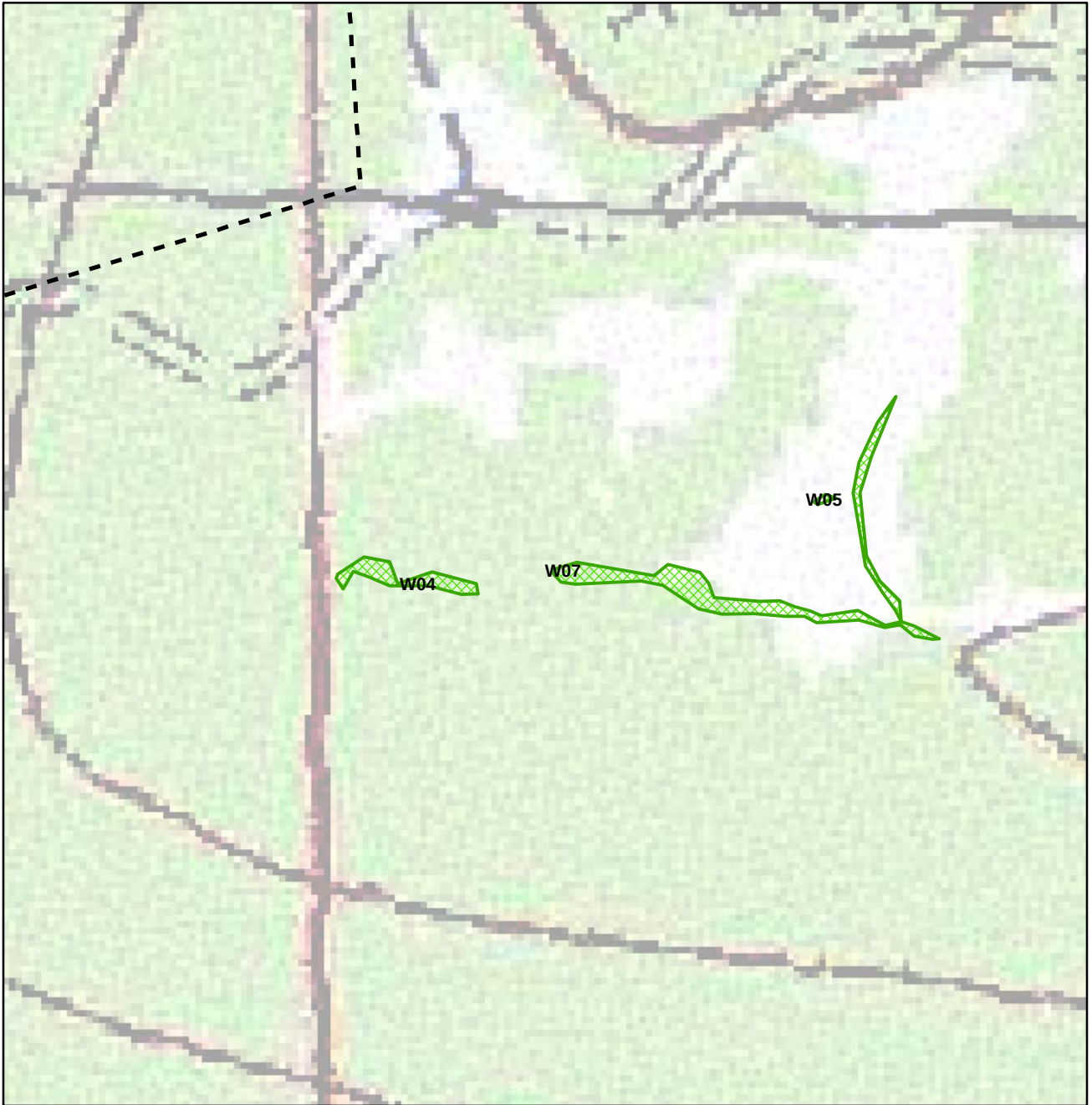
CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

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

Wetland Type <i>Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.</i>	Category
SC 1.0 Vernal pools (see p. 79) wetland is in forested area Is the wetland unit less than 4000 ft², and does it meet at least two of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. <i>NOTE: If you find perennial, “obligate”, wetland plants the wetland is probably NOT a vernal pool</i> — The soil in the wetland are shallow (<1ft deep (30 cm)) and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the “wet” season. YES = Go to SC 1.1 NO - not a vernal pool SC 1.1 Is the vernal pool relatively undisturbed in February and March? YES = Go to SC 1.2 NO – not a vernal pool with special characteristics	
SC 1.2 Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 miles (other wetlands, rivers, lakes etc.)? YES = Category II NO = Category III	Cat. II Cat. III
SC 2.0 Alkali wetlands (see p. 81) Does the wetland unit meets one of the following two criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 2 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. OR does the wetland unit meets two of the following three sub-criteria? — Salt encrustations around more than 80% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 2 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. YES = Category I NO - not an alkali wetland	Cat. I

SC 3.0 Natural Heritage Wetlands (see p. 81) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 3.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? <i>(this question is used to screen out most sites before you need to contact WNHP/DNR)</i> S/T/R information from Appendix D <u>X</u> or accessed from WNHP/DNR database ____ YES ____ – contact WNHP/DNR (see p. 79) and go to SC 3.2 <u>NO</u> ____ SC 3.2 Has DNR identified the wetland unit as a high quality undisturbed wetland or as or as a site with state threatened, endangered, or sensitive plant species? YES = Category I NO –not a natural heritage wetland	Cat. I
SC 4.0 Bogs (see p. 82) Does the wetland unit (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs. <i>Use the key below to identify if the wetland is a bog. If you answer yes you will still need to rate the wetland based on its functions.</i> SC 4.1. Does the wetland unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to SC 4.3 <u>No</u> - go to SC 4.2 SC 4.2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?? Yes - go to SC 4.3 <u>No</u> - Is not a bog for rating SC 4.3. Does the wetland unit have more than 70% cover of mosses at ground level in any area within its boundaries, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Category I bog No - go to Q. 4.4 <i>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog.</i> SC 4.4. Is the unit, or any part of it, forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? Yes – Category I bog NO	

SC 5.0 Forested Wetlands (see p. 85) Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria? — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (see p. 83) YES = go to SC 5.1 NO —not a forested wetland with special characteristics	
SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>). YES = Category I NO = go to SC 5.2 SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species? YES = Category I NO = go to SC 5.3 SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species. Fast growing species are: Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>) Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>) Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>) YES = Category II NO = go to SC 5.5 SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream? YES = Category II	Cat. I Cat. I Cat. II Cat. II
Category of wetland based on Special Characteristics Choose the “highest” rating if wetland falls into several categories. If you answered NO for all types enter “Not Applicable” on p.1	NA

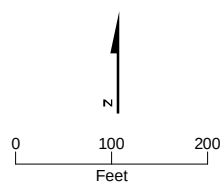


LEGEND

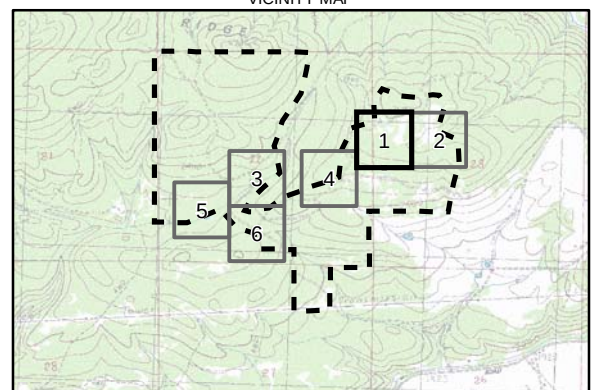
-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

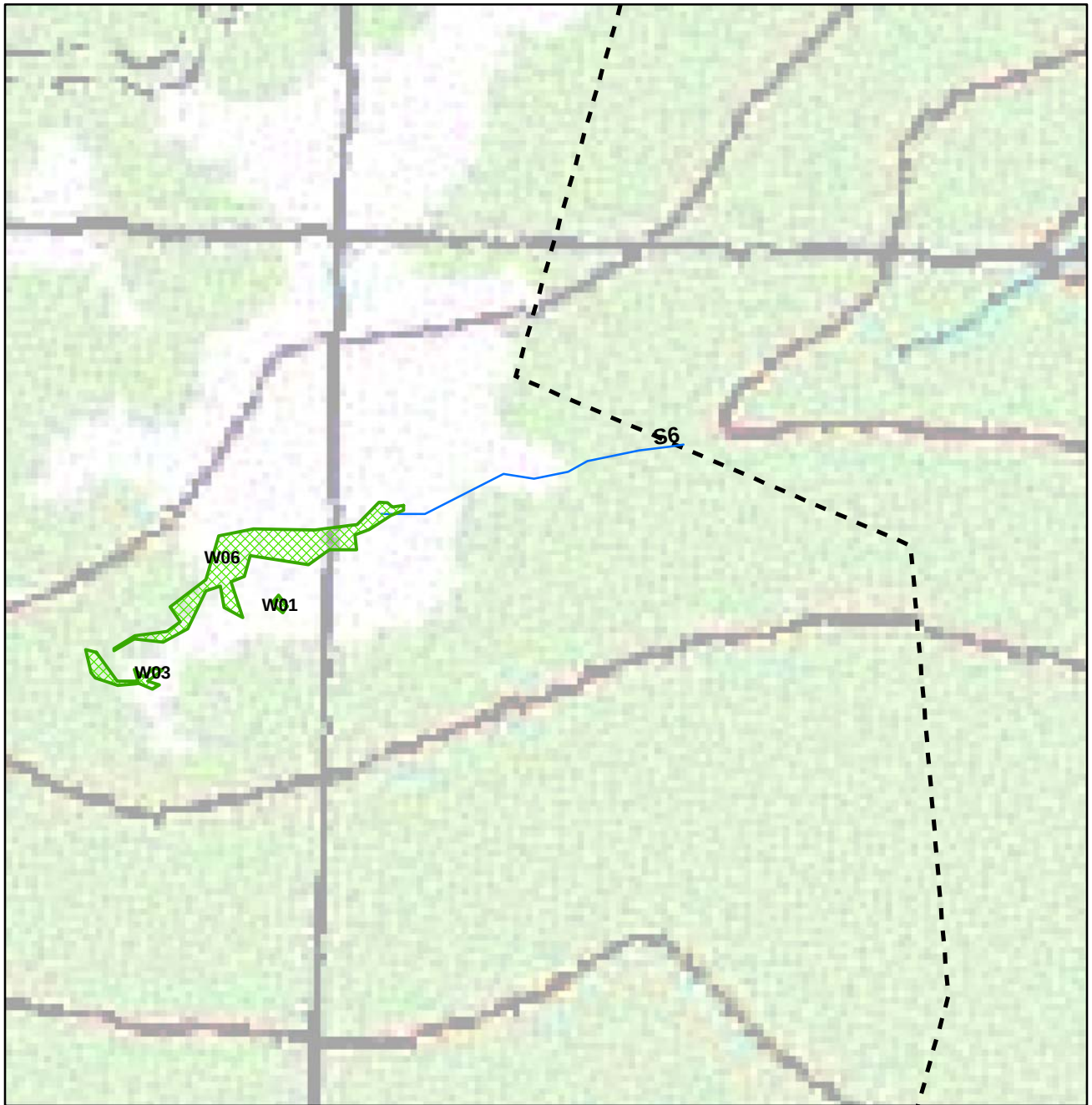


VICINITY MAP



Appendix D Figure 1 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



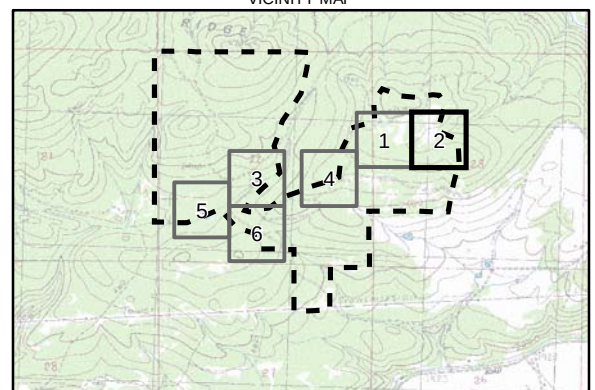
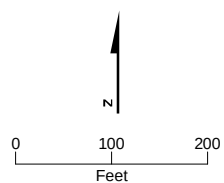
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

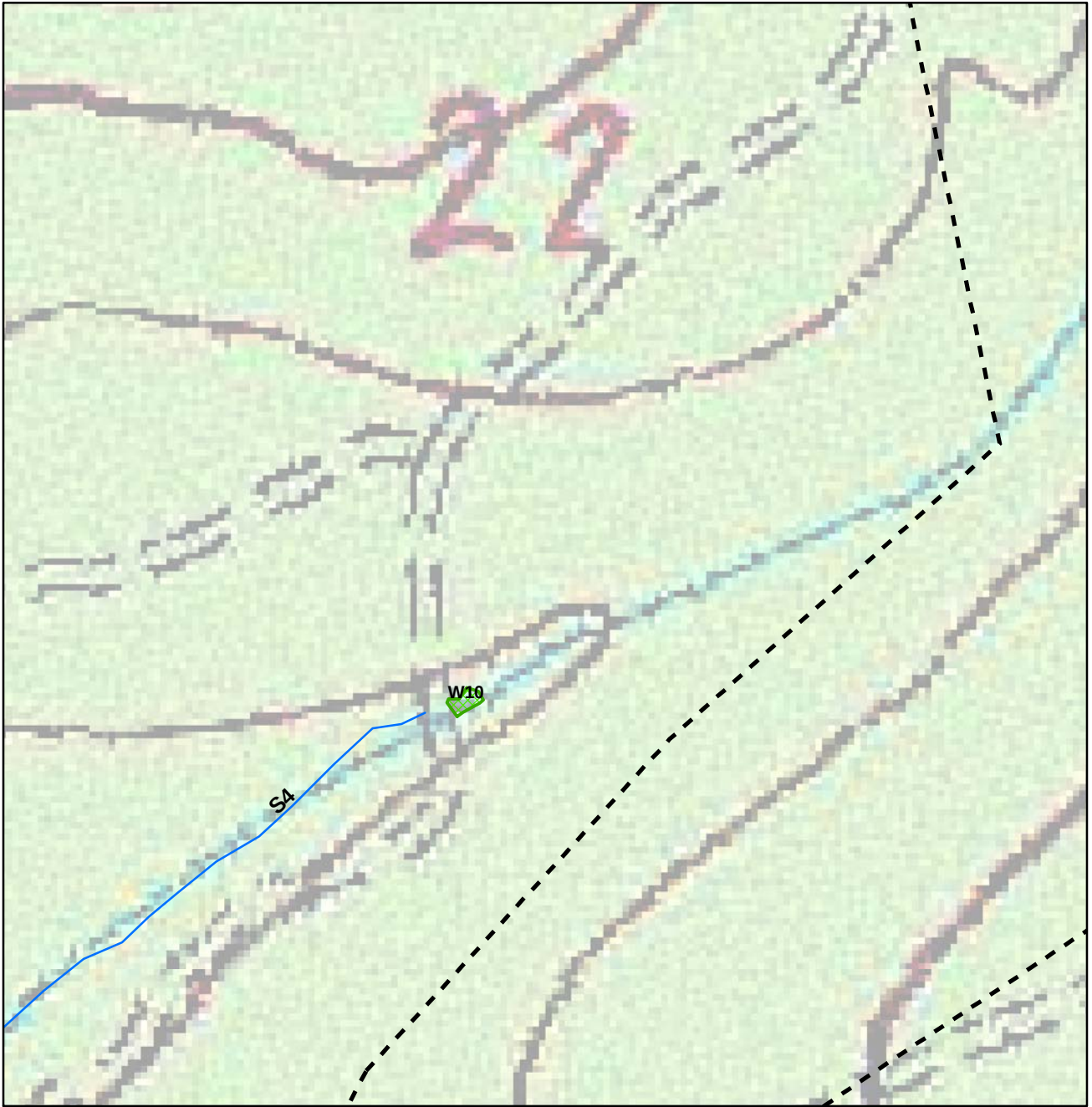
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 2 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



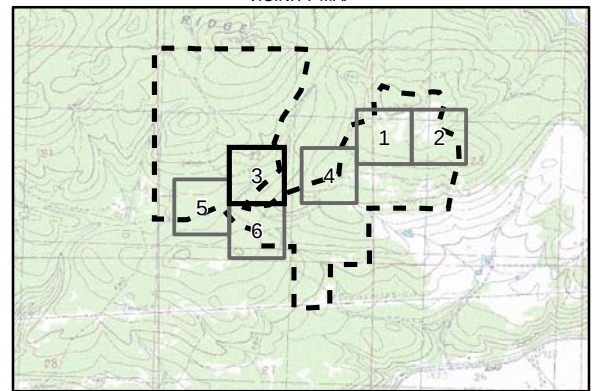
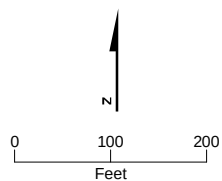
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

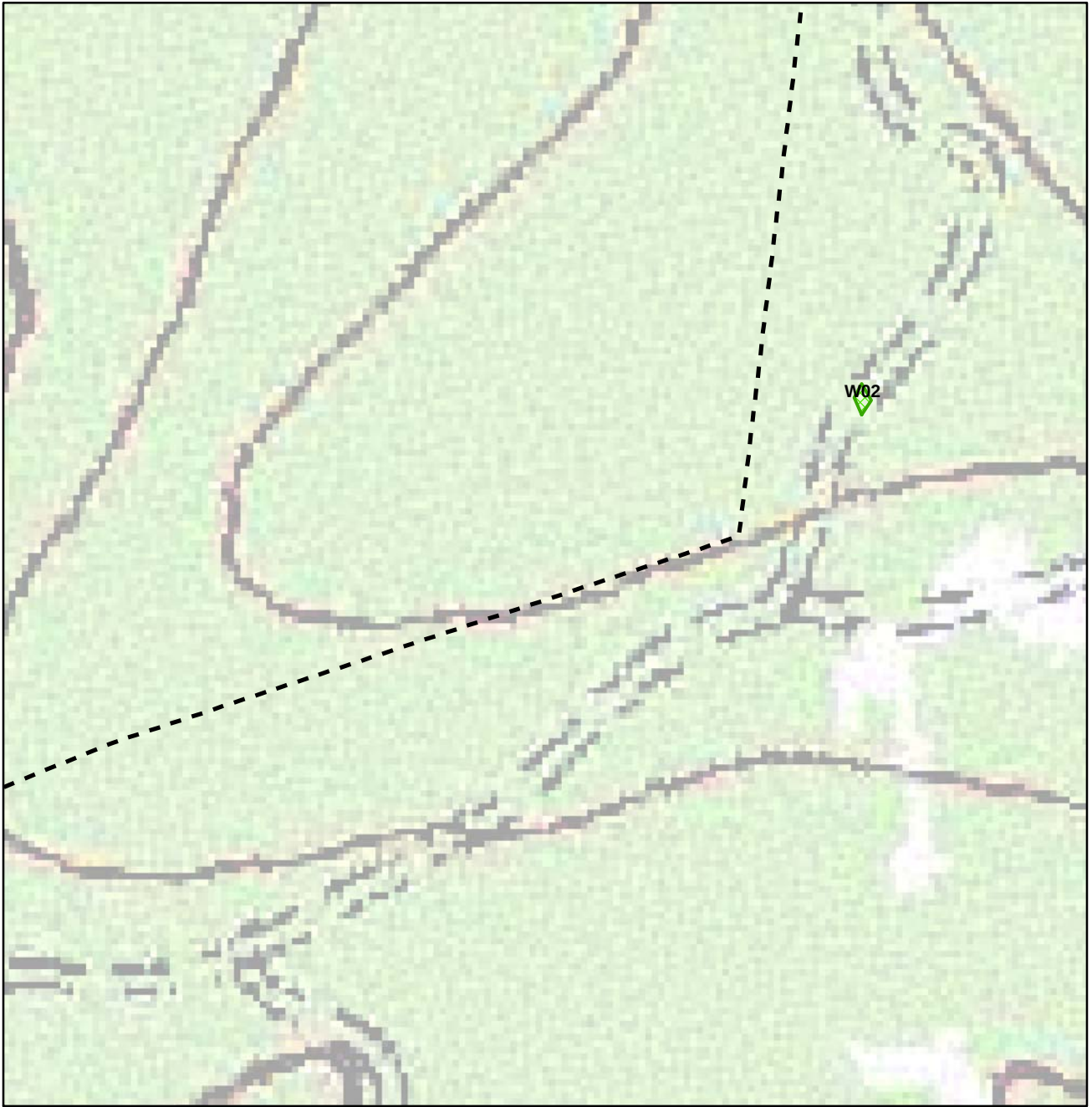
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 3 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



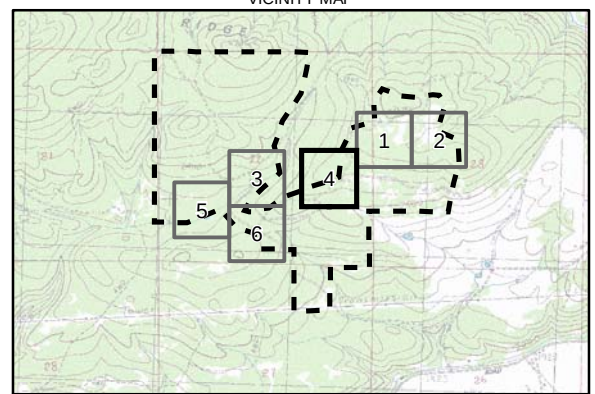
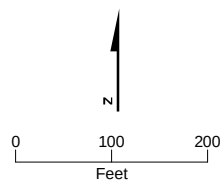
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 4 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

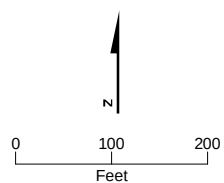


LEGEND

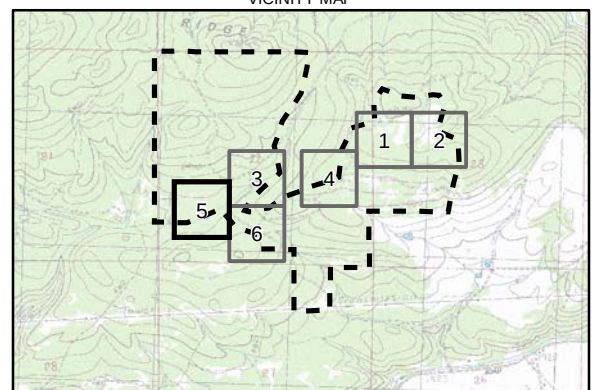
- Stream
- Wetland Boundary
- Emergent Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

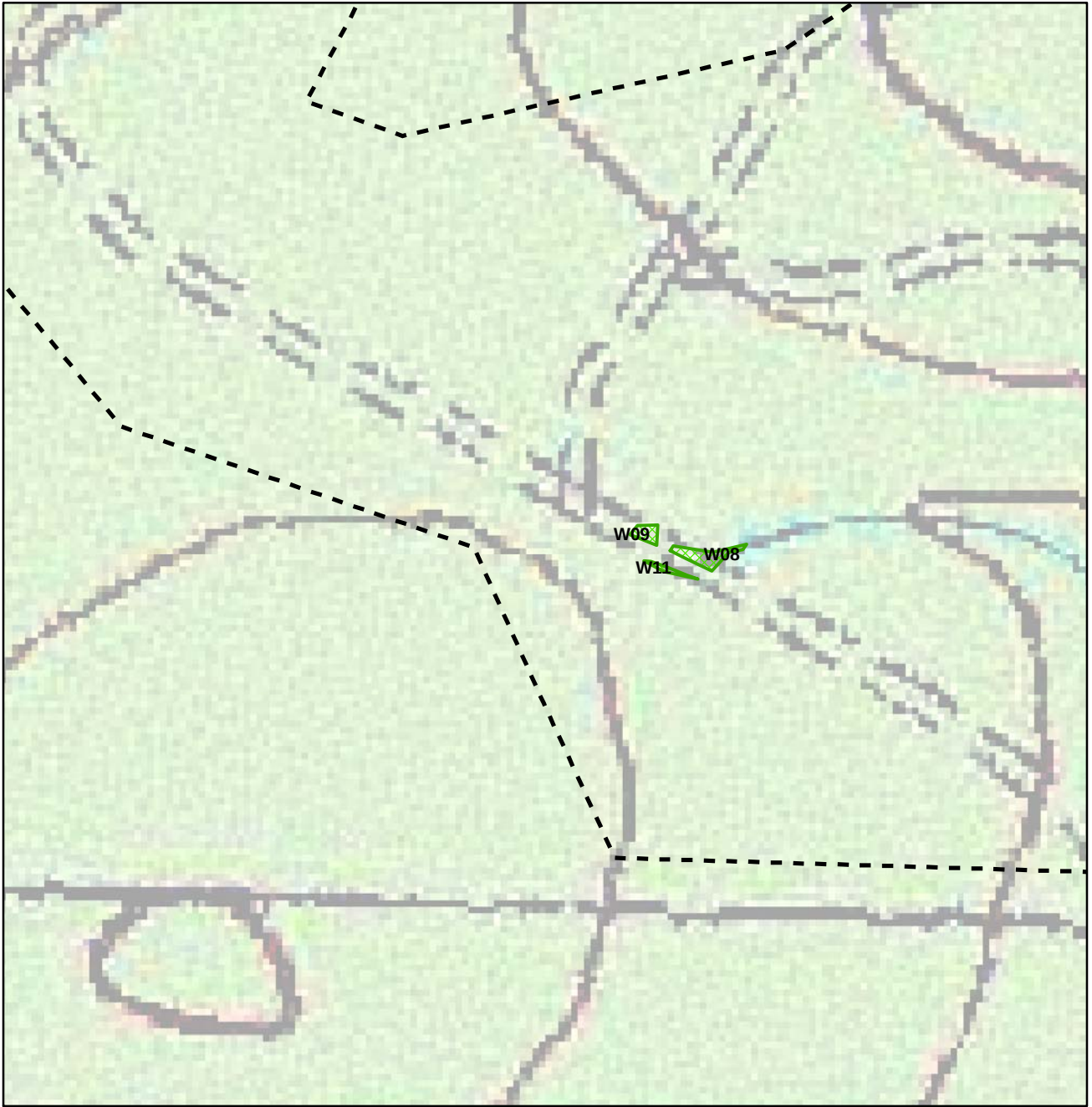


VICINITY MAP



Appendix D Figure 5 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



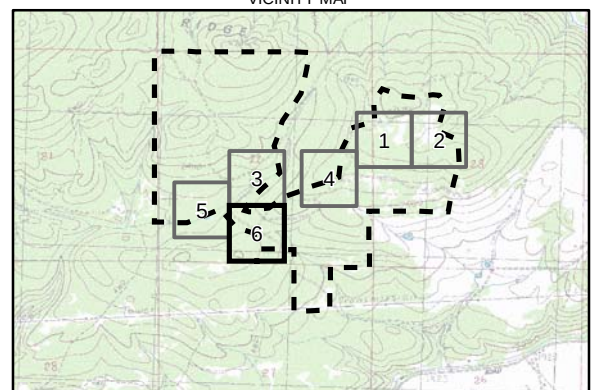
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

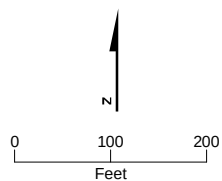
Note:

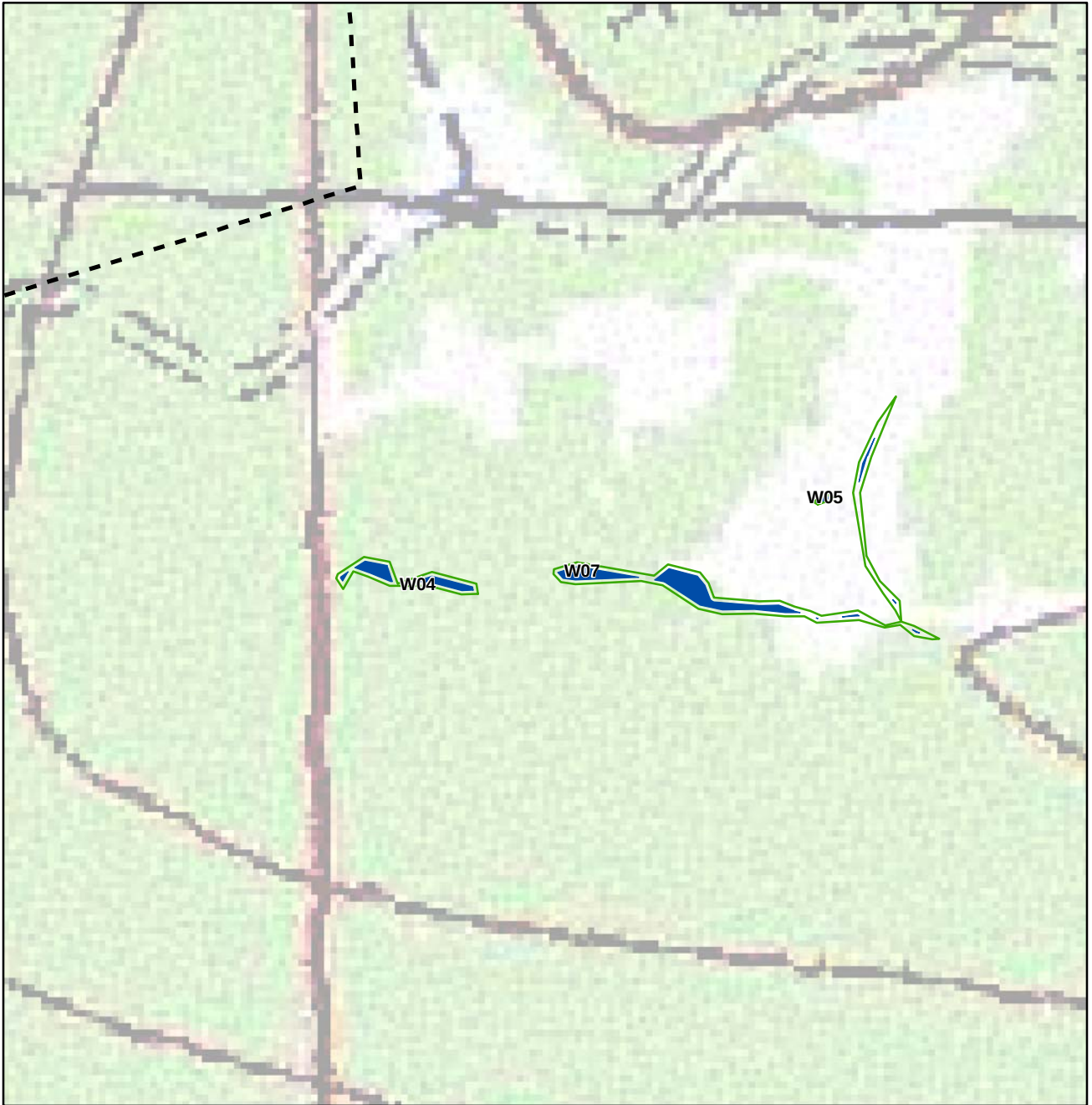
1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 6 Cowardin Vegetation Classes

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



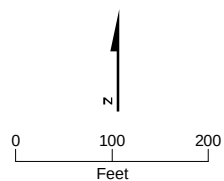


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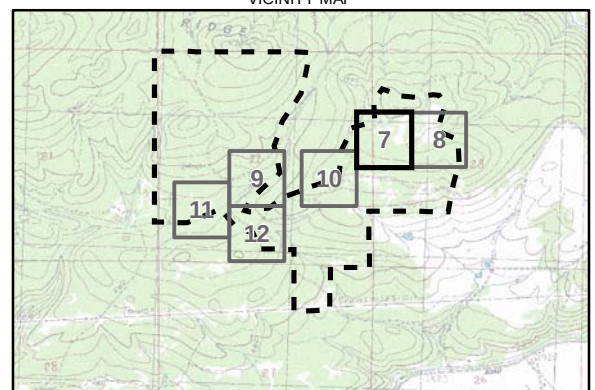
-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

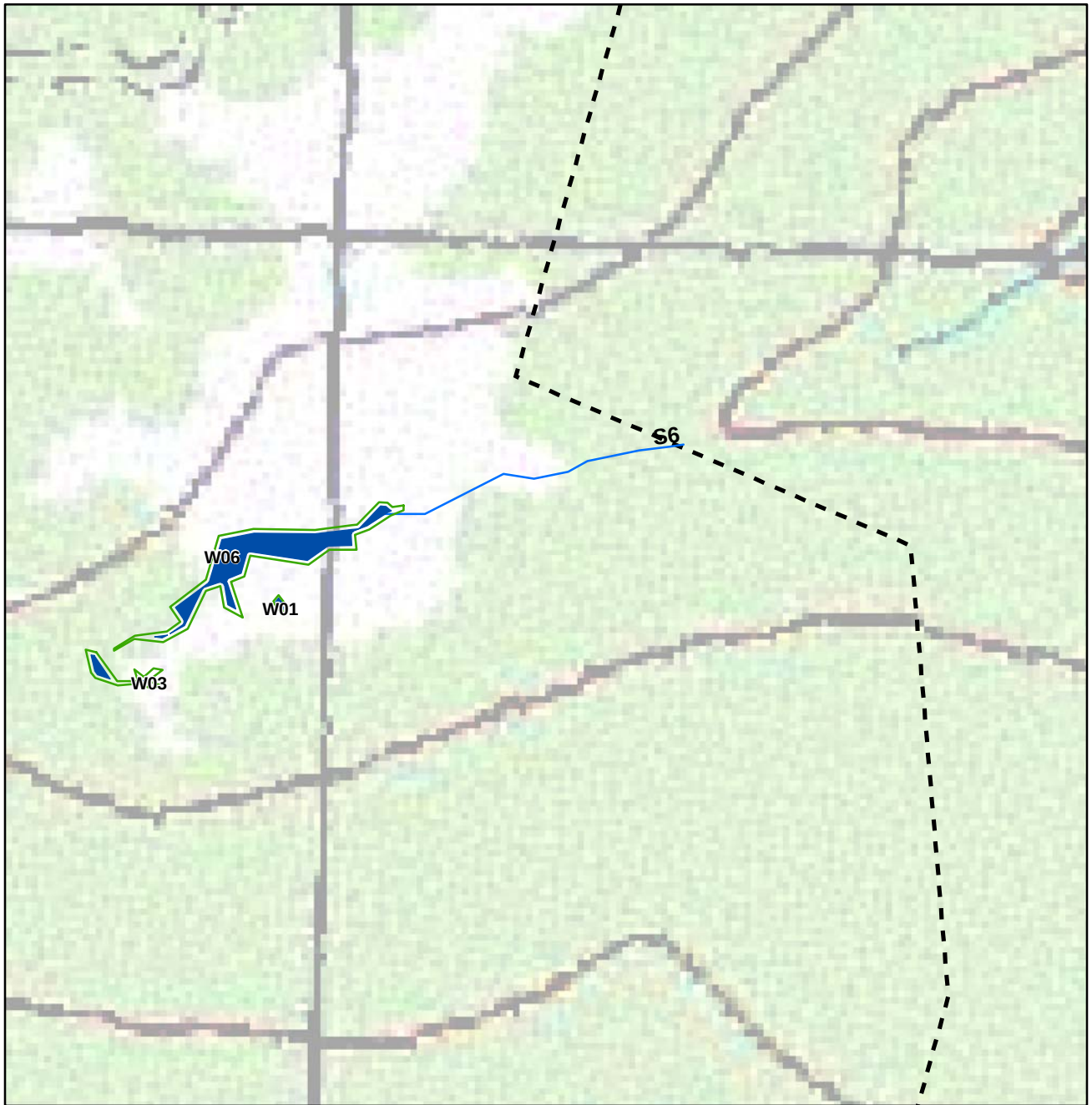


VICINITY MAP



Appendix D Figure 7 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



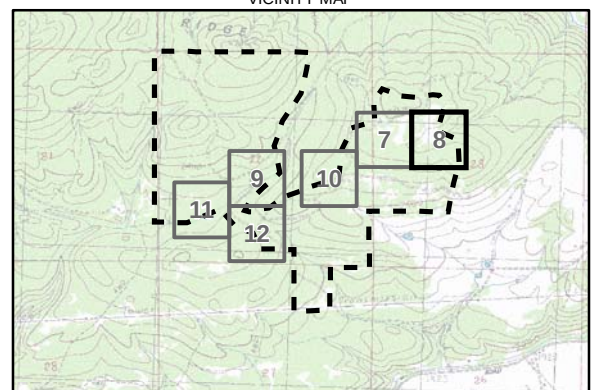
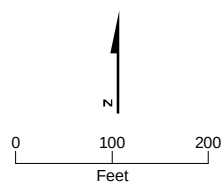
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

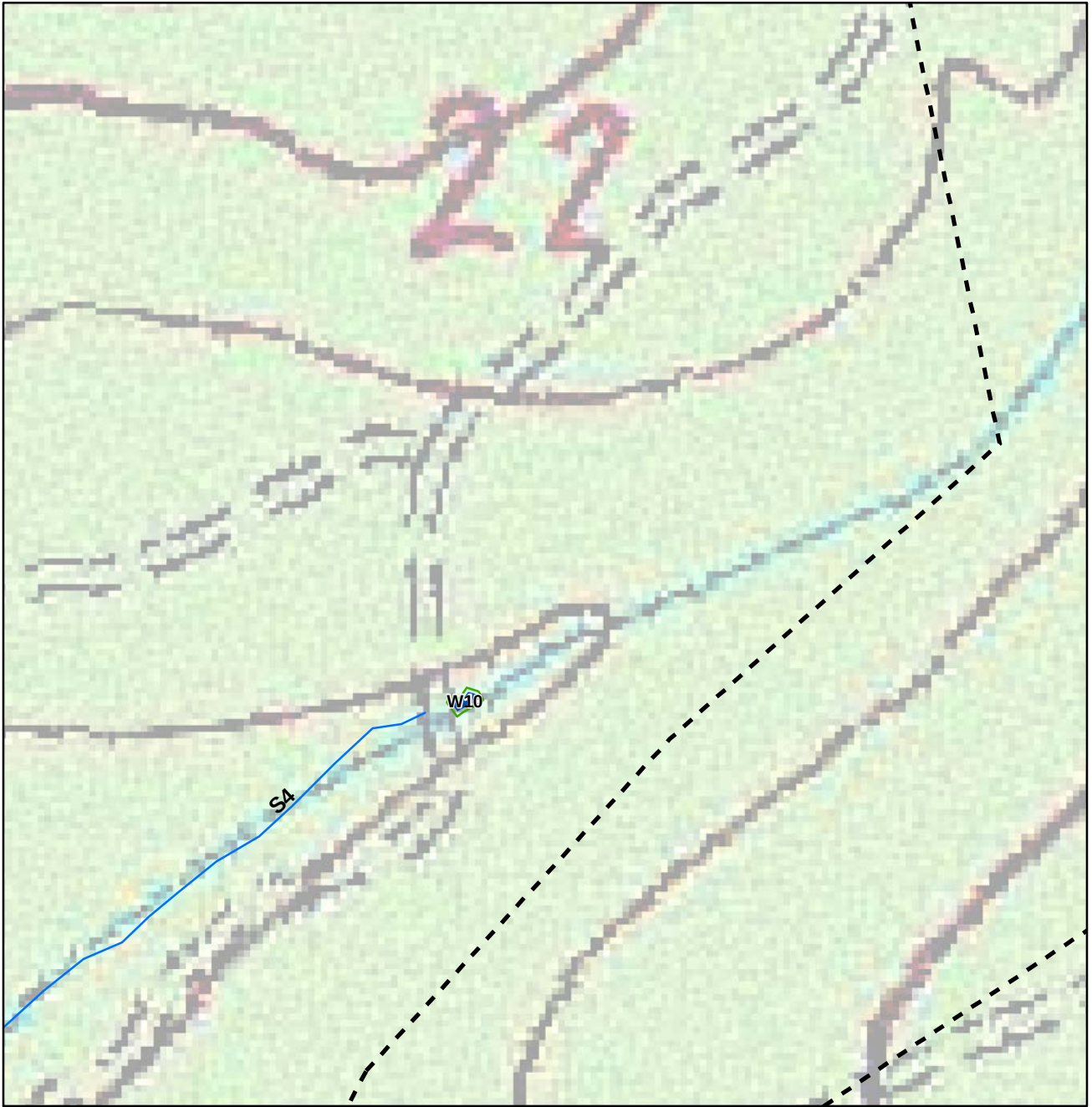
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 8 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



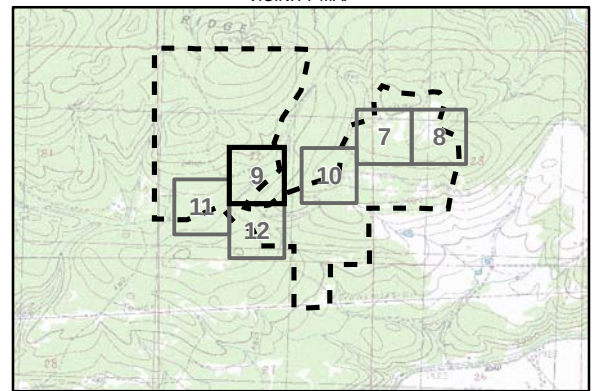
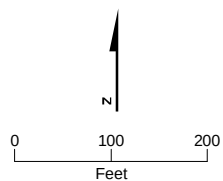
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

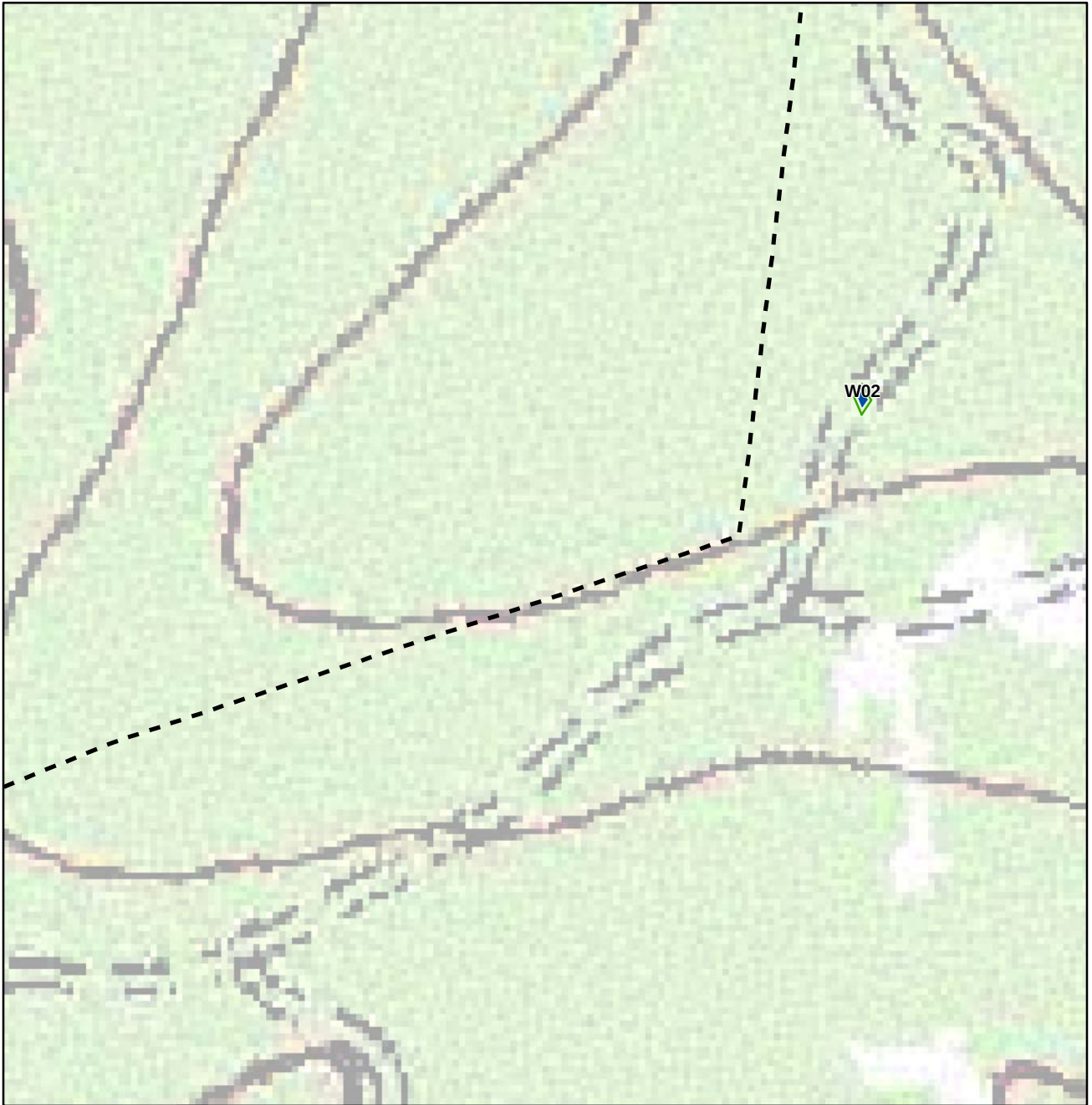
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 9 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



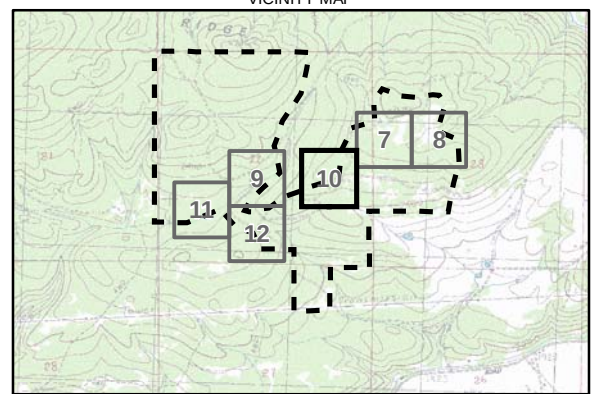
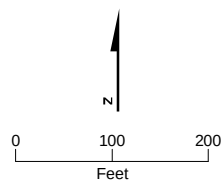
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

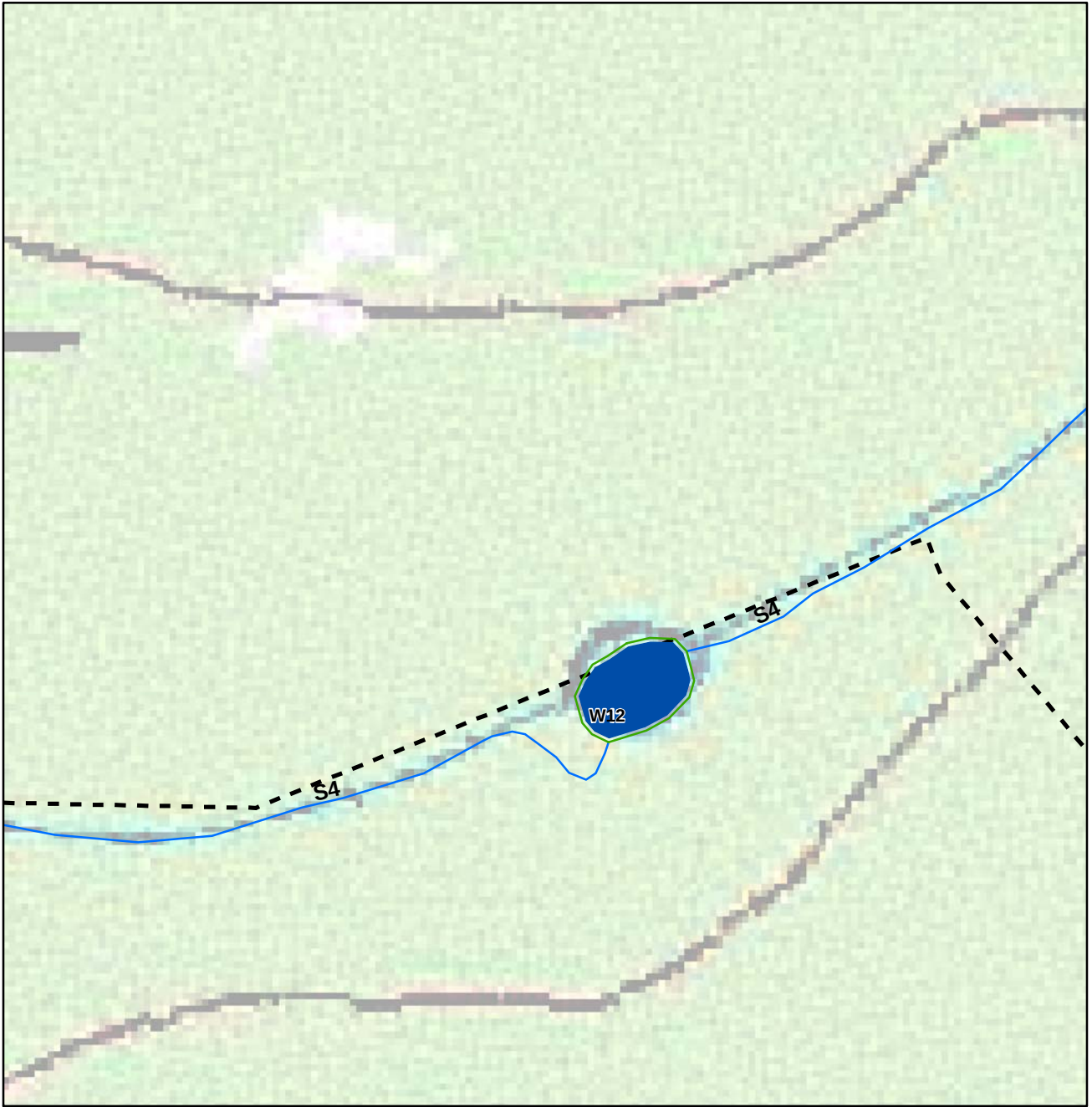
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 10 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

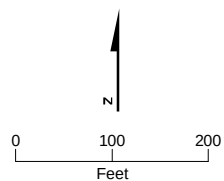


LEGEND

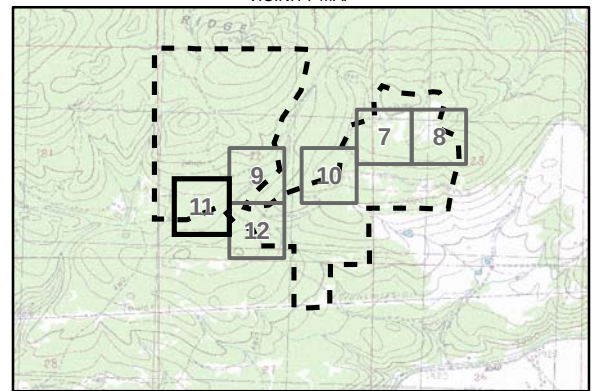
-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

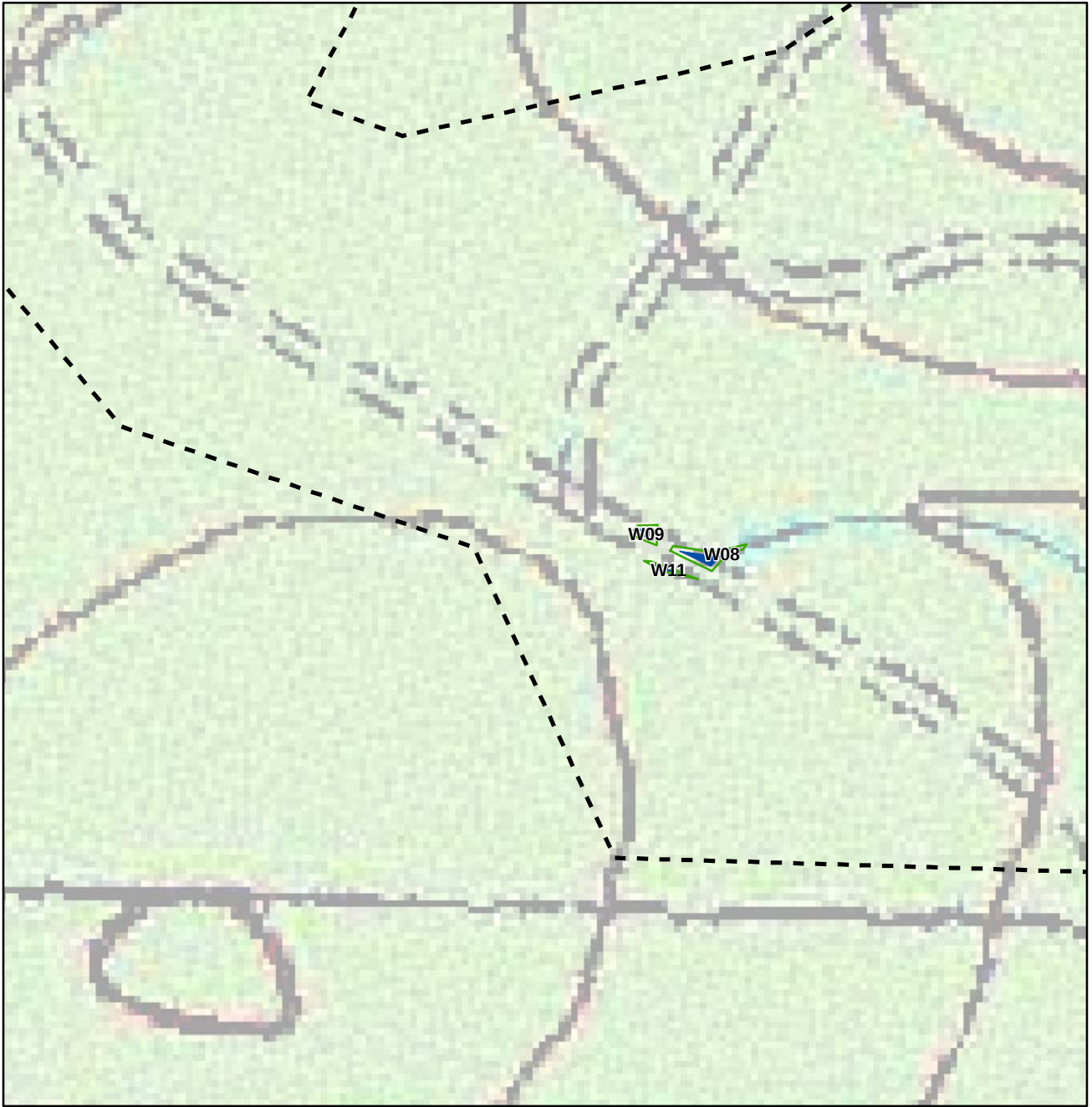


VICINITY MAP



Appendix D Figure 11 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



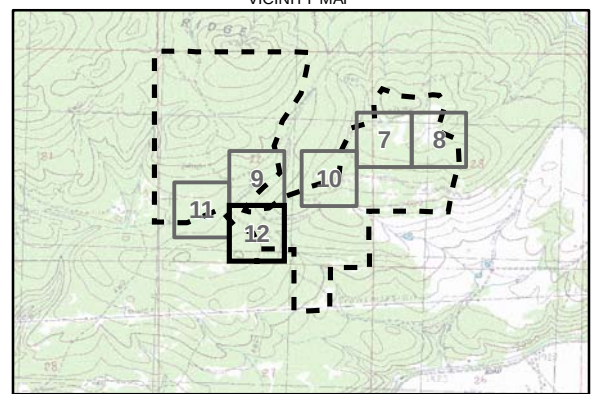
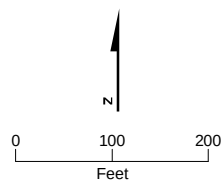
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

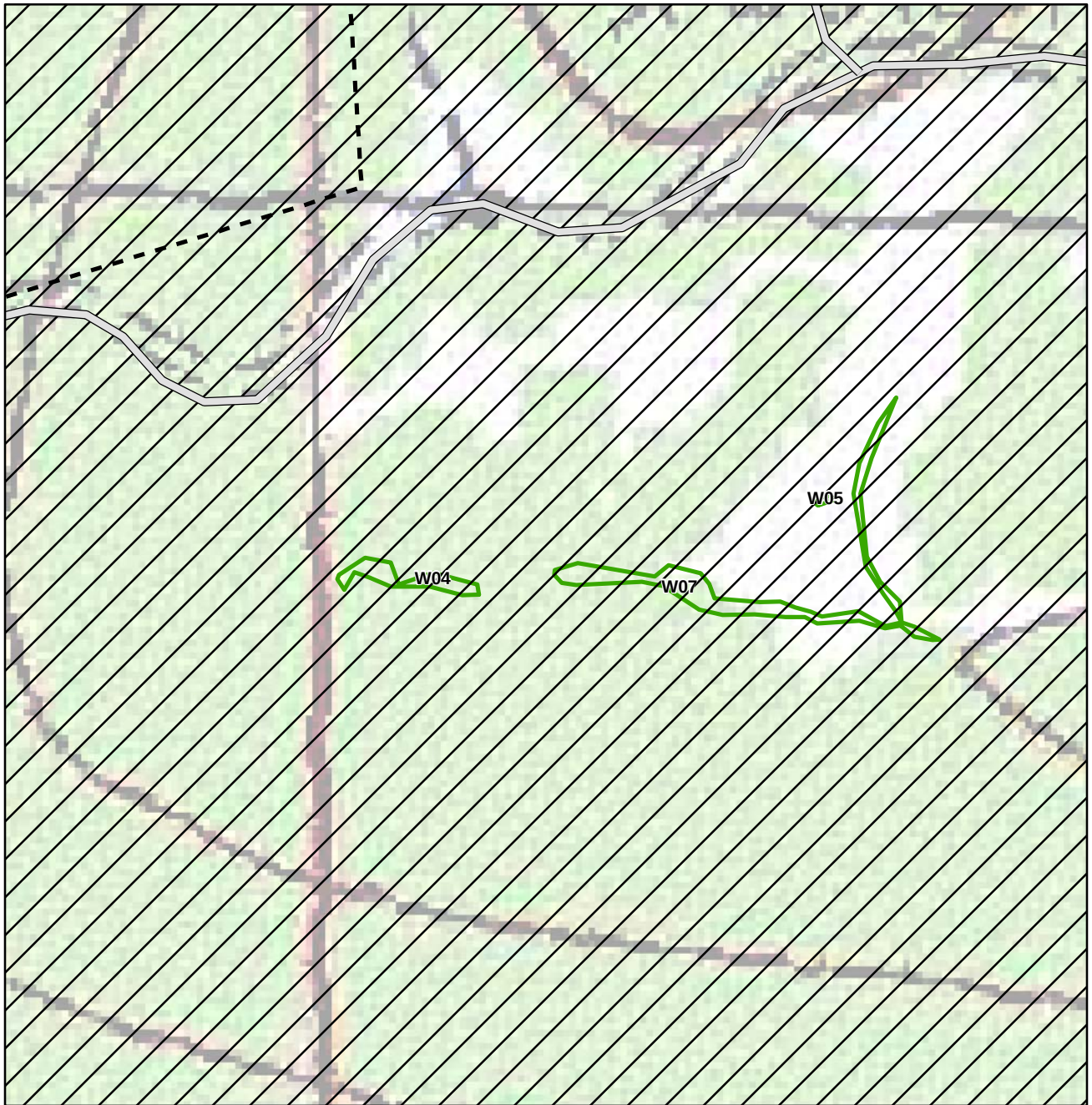
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 12 Hydroperiods

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



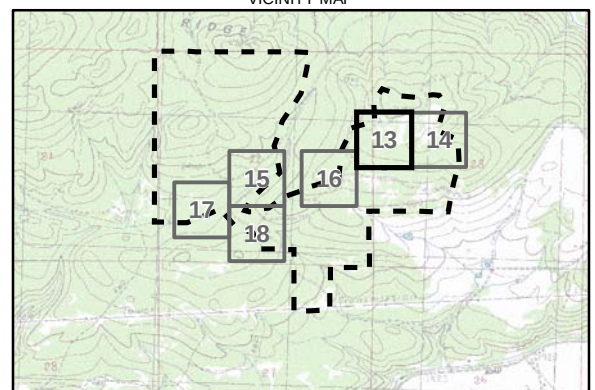
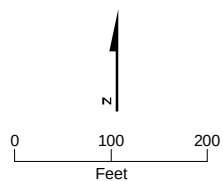
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

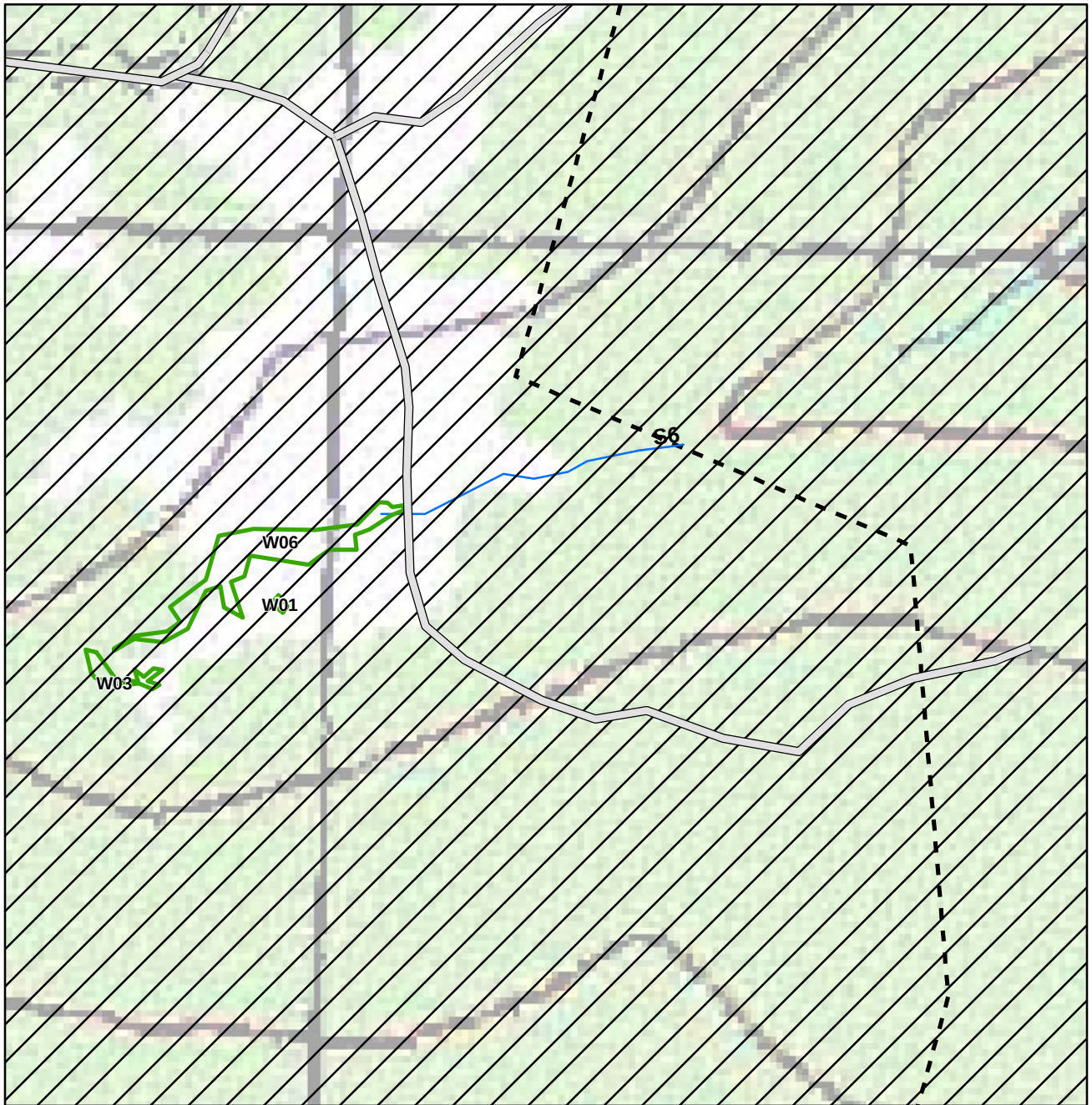
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 13 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



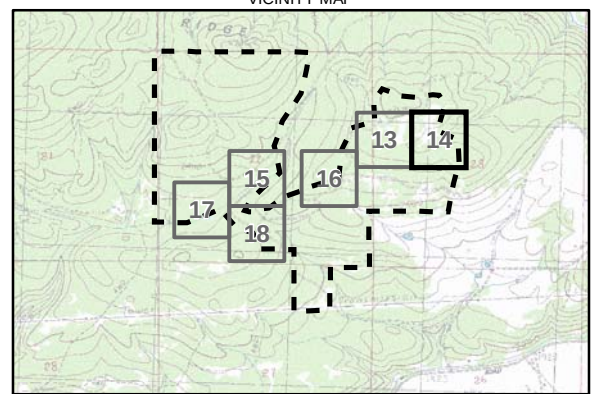
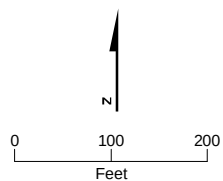
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

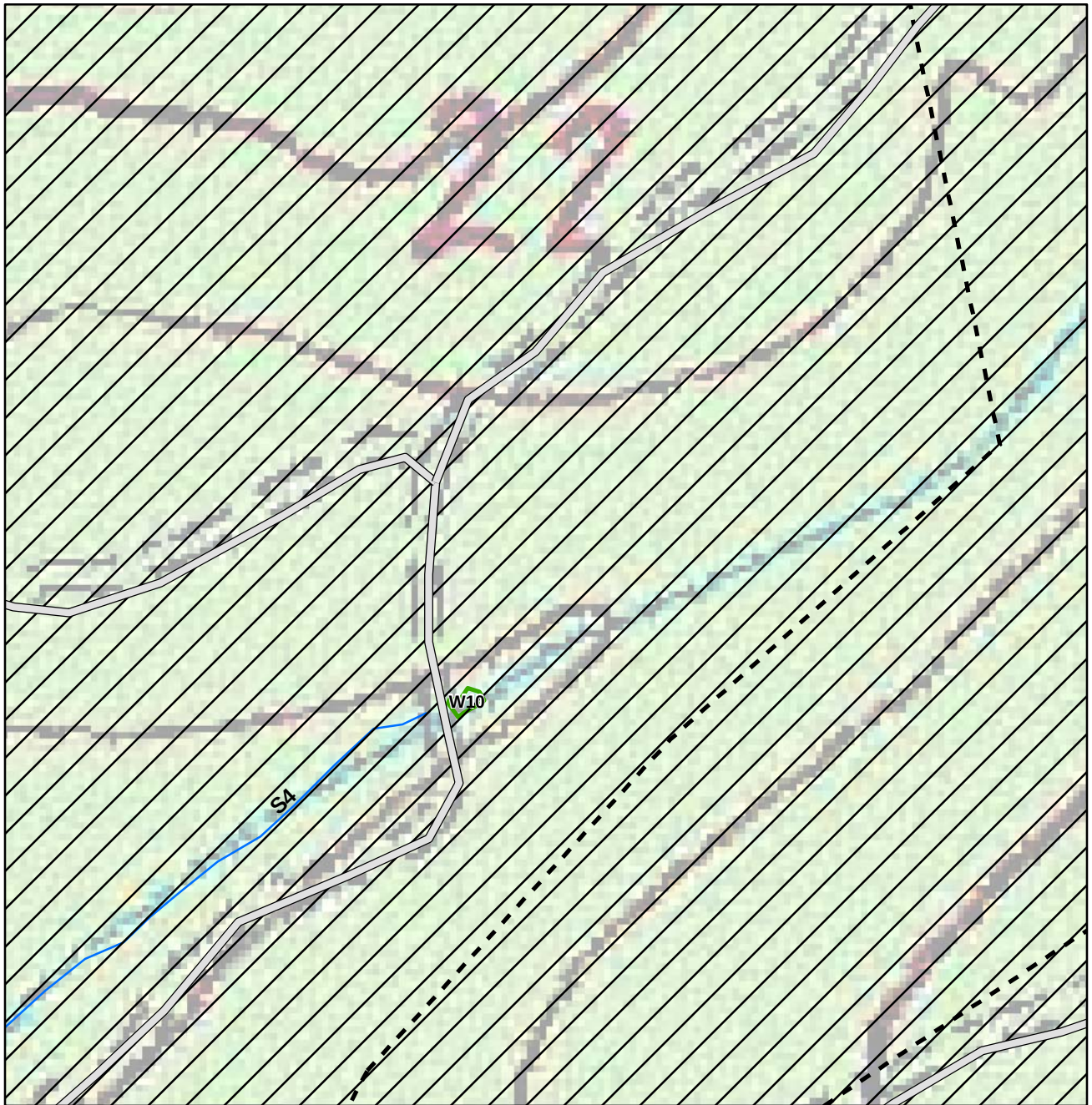
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 14 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

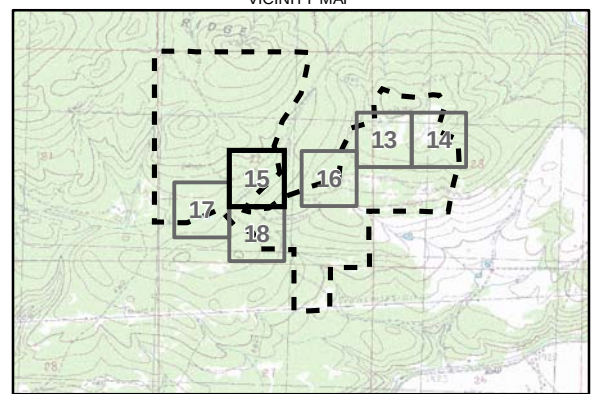
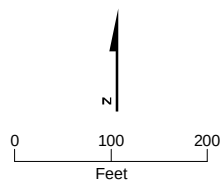


LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

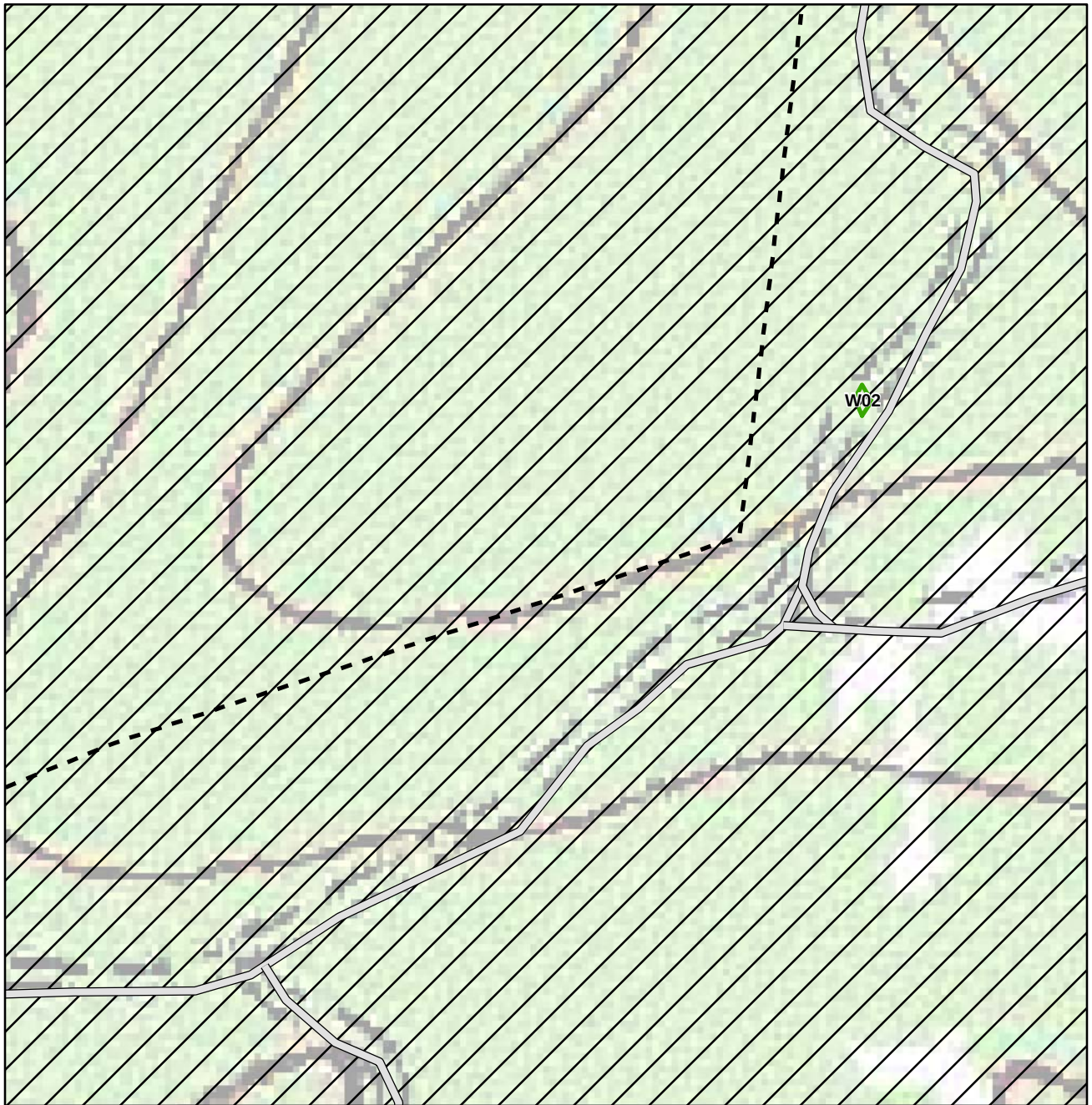
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 15 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



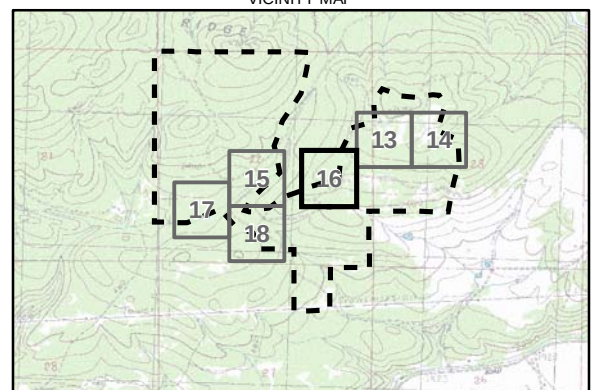
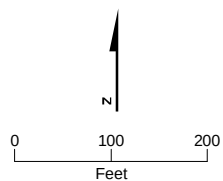
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

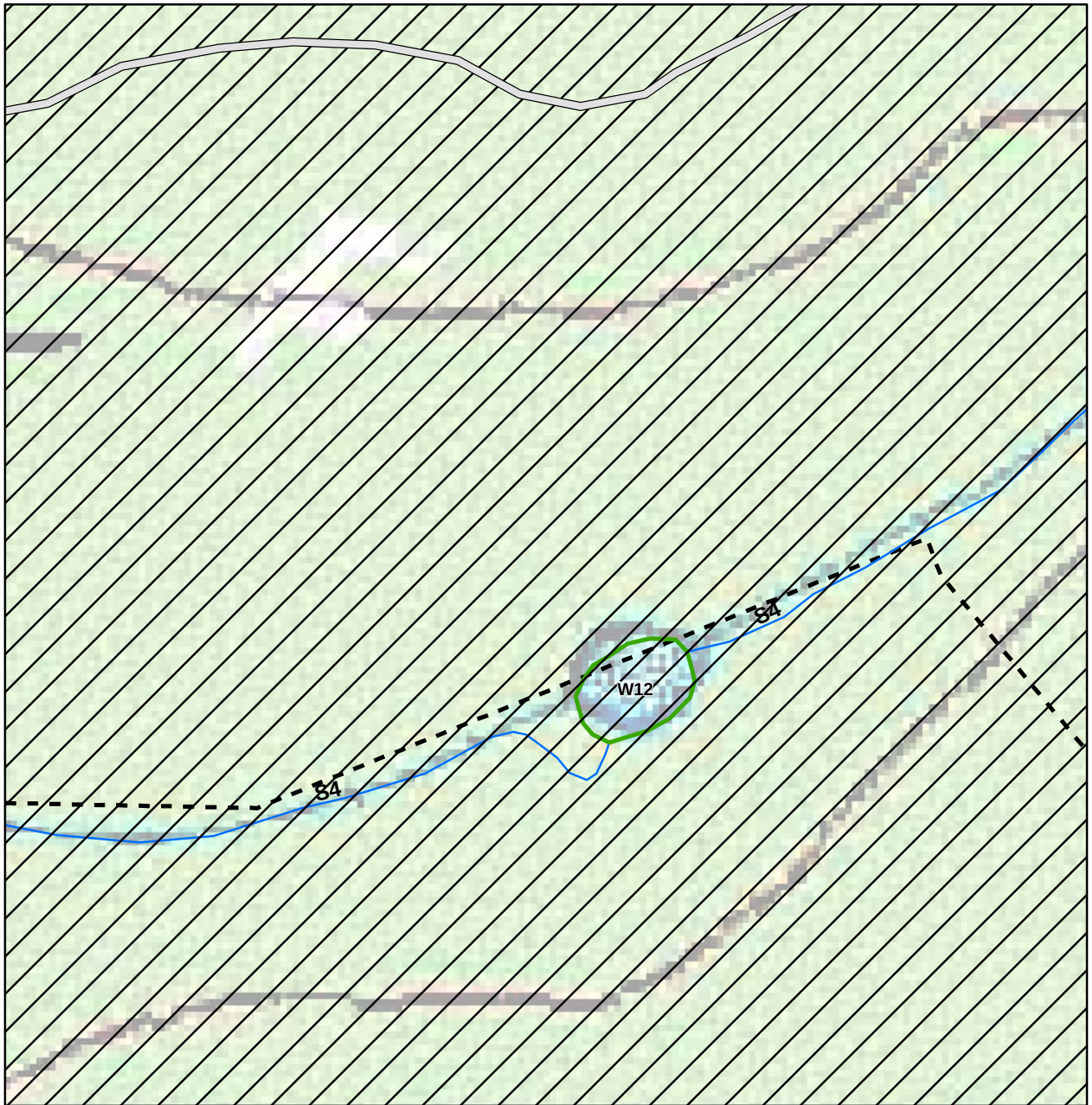
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 16 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



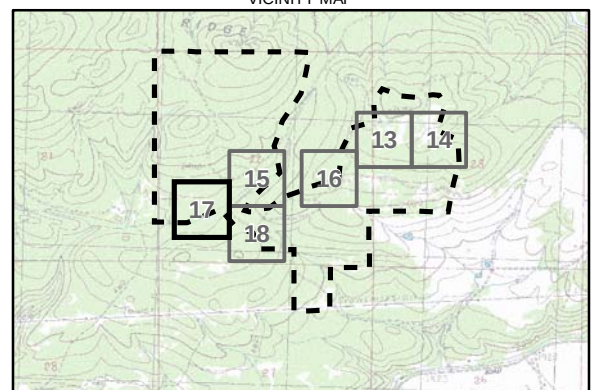
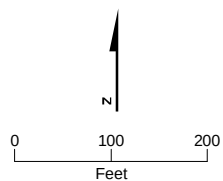
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

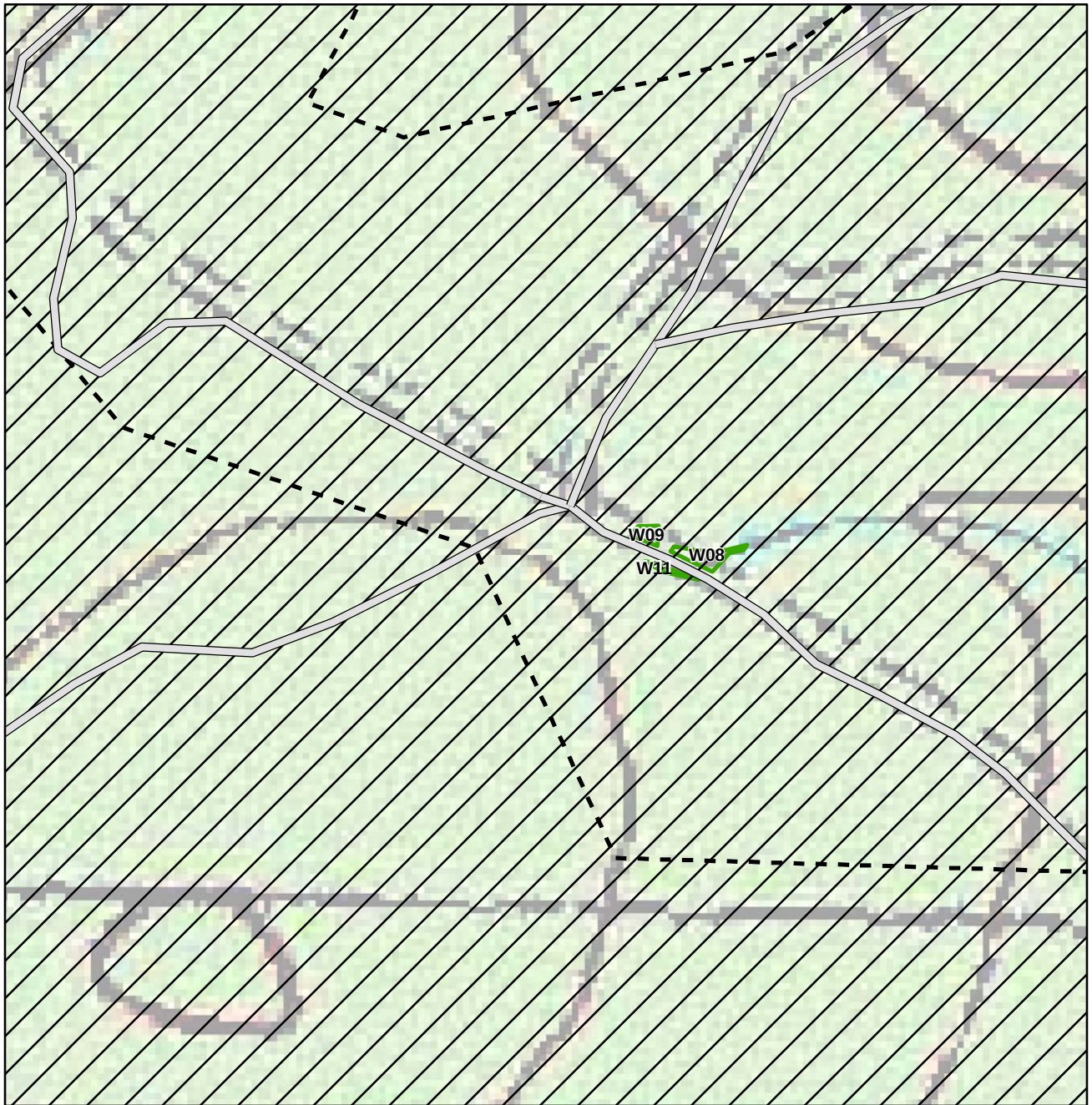
Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 17 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



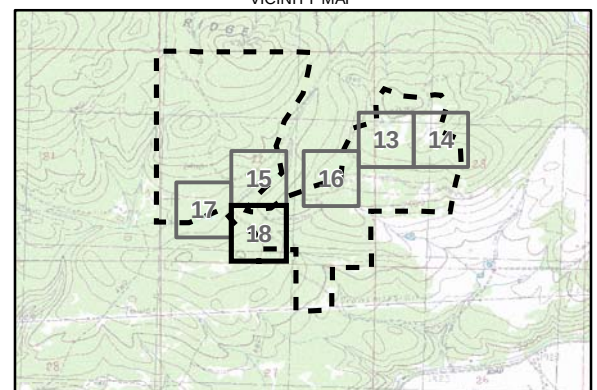
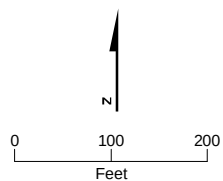
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



Appendix D Figure 18 Wetland Buffers

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX E

Washington State Department of Ecology Function Assessment Forms

Summary of Function Assessments

Wetland Name: W1-W7 **AU ID#:** W1-W7 (patchwork of wetlands)
Date: 6/9/09 - 6/10/09 **T/S/R:** 20N522/16E
Investigator Name: Forrest Parsons / Sel Shaich **Size of AU:** 0.6 acre
Kating Kapanais

Wetland Classification:

Depressional Long-duration ☐ Depressional Short-duration ☒
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
Water Quality Functions		
Removing Sediment	8	2
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	7	1
Removing Metals & Toxic Organics	6	0
Water Quantity Functions		
Reducing Downstream Erosion and Flooding	4	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	5	8
Habitat for Invertebrates	9	8
Habitat for Amphibians	4	8
Habitat for Aquatic Birds	3	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	2	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

Does not apply

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

Does not apply

Description of areas that were not directly observed and explanation as to why:

Does not apply

General Comments:

Refer to wetland report for
maps and photos
Refer to wetland rating forms for
hydrop periods.

Summary of Function Assessments

Wetland Name: W8, W9, W11 **AU ID#:** W8, W9, W11 (patchwork of wetlands)
Date: 6/9/09, 6/10/09, 6/16/09, 6/17/09 **T/S/R:** 20N/522/16E
Investigator Name: Forrest Parsons / Joel Shaich **Size of AU:** 0.05 acre
Rahim Karamtas

Wetland Classification:

Depressional Long-duration ☐ Depressional Short-duration ☒
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	3
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	8	2
Removing Metals & Toxic Organics	7	3
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	1	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	3	7
Habitat for Invertebrates	8	8
Habitat for Amphibians	4	8
Habitat for Aquatic Birds	2	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	2	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

Does not apply

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

Does not apply

Description of areas that were not directly observed and explanation as to why:

Does not apply

General Comments:

Refer to wetland report for maps and photos.
Refer to wetland rating forms (Appendix D) for hydro periods

Summary of Function Assessments

Wetland Name: W10 **AU ID#:** W10
Date: 6/9/09, 6/10/09, 6/17/09, 6/16/09 **T/S/R:** 20N/S22/R16E
Investigator Name: Forrest Parsons / Joe Shaich / Kahina Kappantais **Size of AU:** 0.02 acre

Wetland Classification:

Depressional Long-duration ☐ Depressional Short-duration ☒
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	5
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	8	5
Removing Metals & Toxic Organics	7	7
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	1	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	6	7
Habitat for Invertebrates	9	8
Habitat for Amphibians	6	8
Habitat for Aquatic Birds	3	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	4	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

N/A

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

N/A

Description of areas that were not directly observed and explanation as to why:

N/A

General Comments:

Summary of Function Assessments

Wetland Name: W12 **AU ID#:** W12
Date: 7/7/09 **T/S/R:** 20N/523/R16E
Investigator Name: Peggy O'Neill / Nichole Seidell **Size of AU:** 0.3 acre

Wetland Classification:

Depressional Long-duration ☒ Depressional Short-duration ☐
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	1
Removing Nutrients/Nitrogen	3	0
Removing Nutrients/Phosphorous	7	0
Removing Metals & Toxic Organics	4	0
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	6	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled Moderate
Recharging Groundwater	7	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	7	9
Habitat for Invertebrates	7	10
Habitat for Amphibians	6	9
Habitat for Aquatic Birds	7	Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled Moderate
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat 17	8
Richness of Native Plants	7	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	7	5

Rationale for dividing wetland into multiple assessment units

N/A

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

N/A

Description of areas that were not directly observed and explanation as to why:

N/A

General Comments:

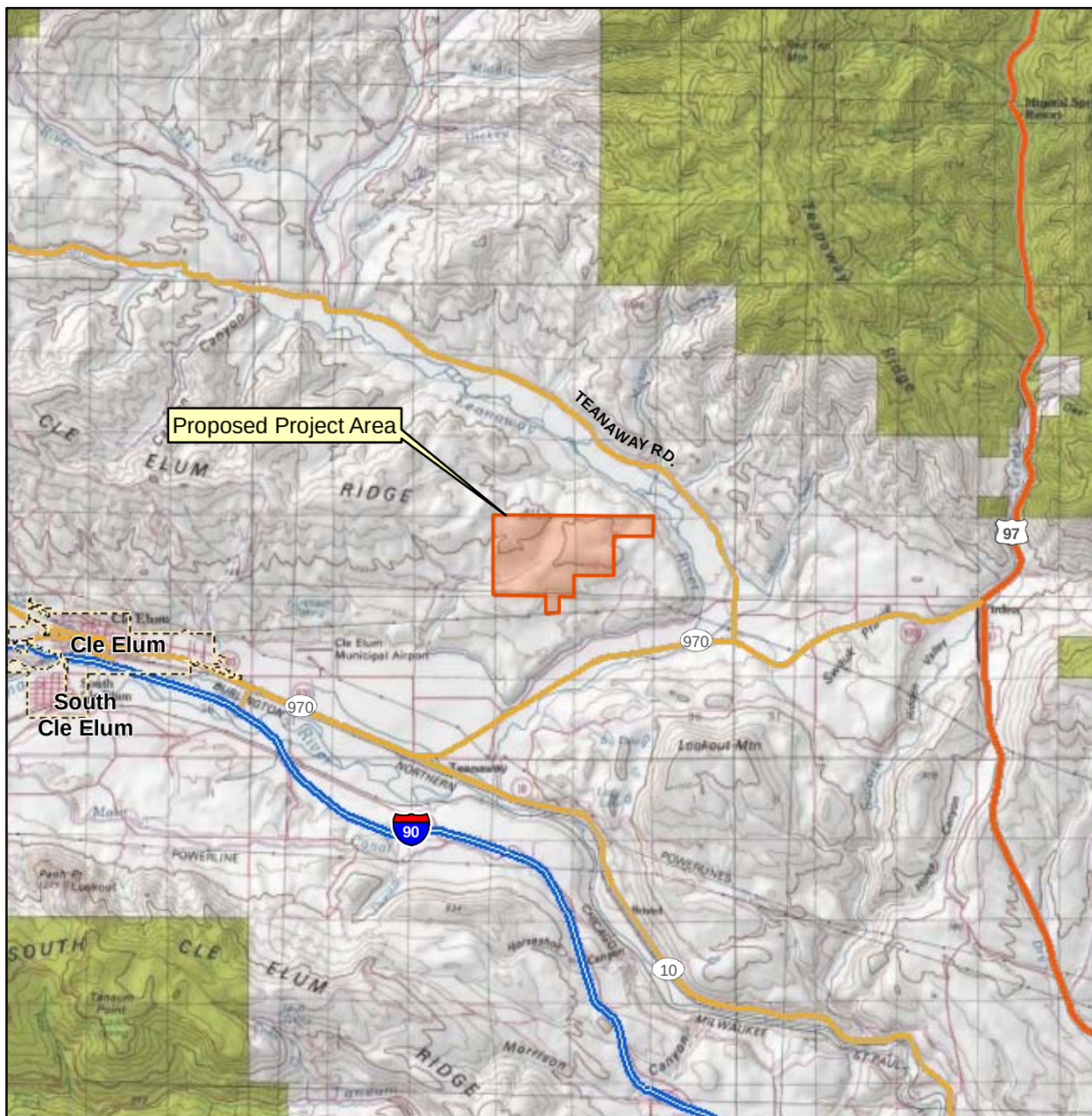
Refer to wetland report and wetland rating forms for photographs and maps.

ATTACHMENT C

Cultural Resources Report
*(privileged and confidential: restricted
distribution)*

ATTACHMENT D

Figures Referenced in Text



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

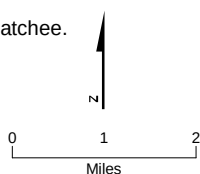
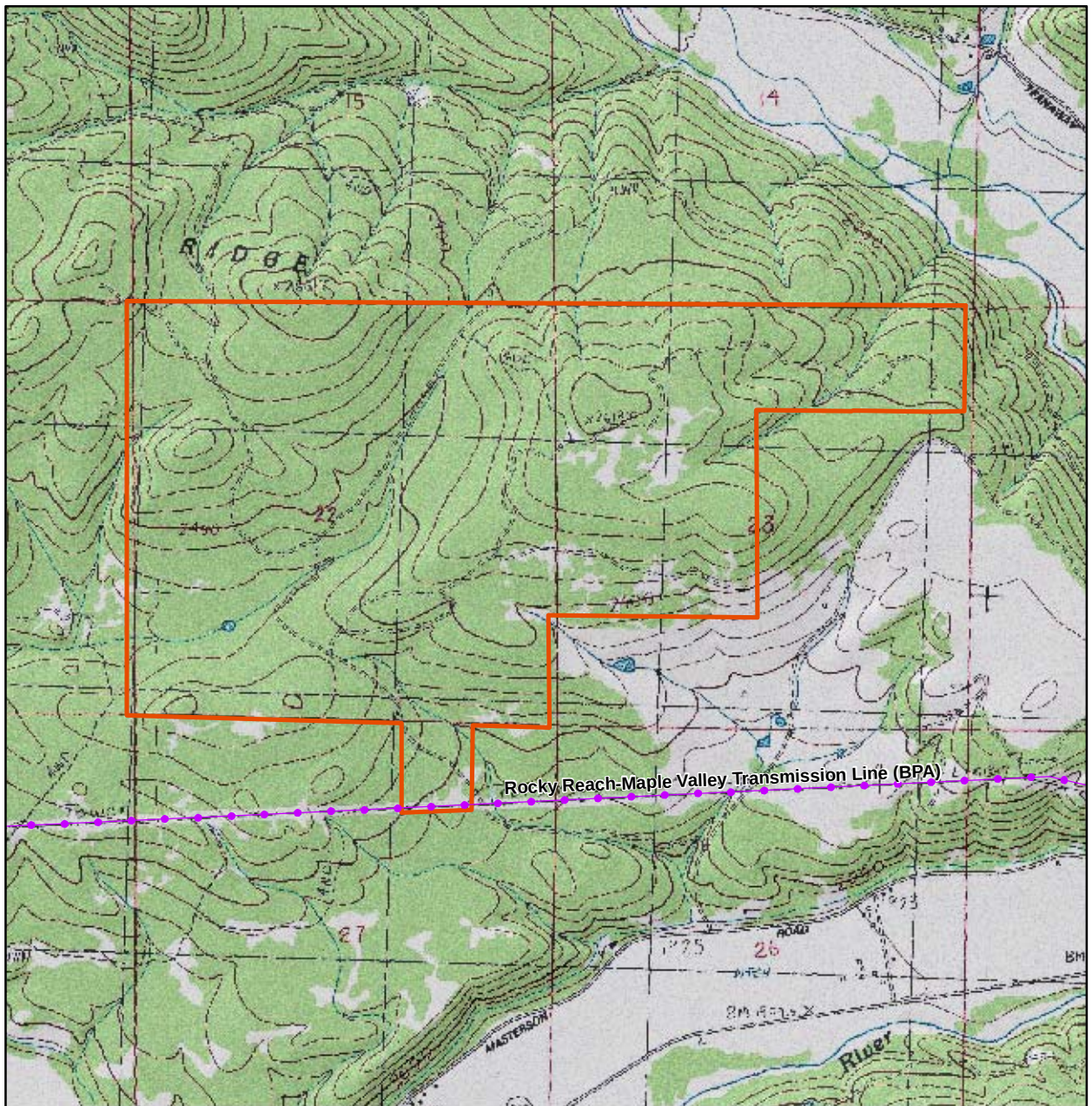


FIGURE 1
Vicinity Map

Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Existing BPA Transmission Line
- Proposed Project Area

Note:

1. USGS 24K Quadrangle: Teanaway.

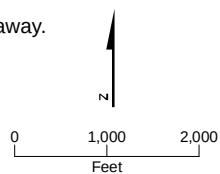
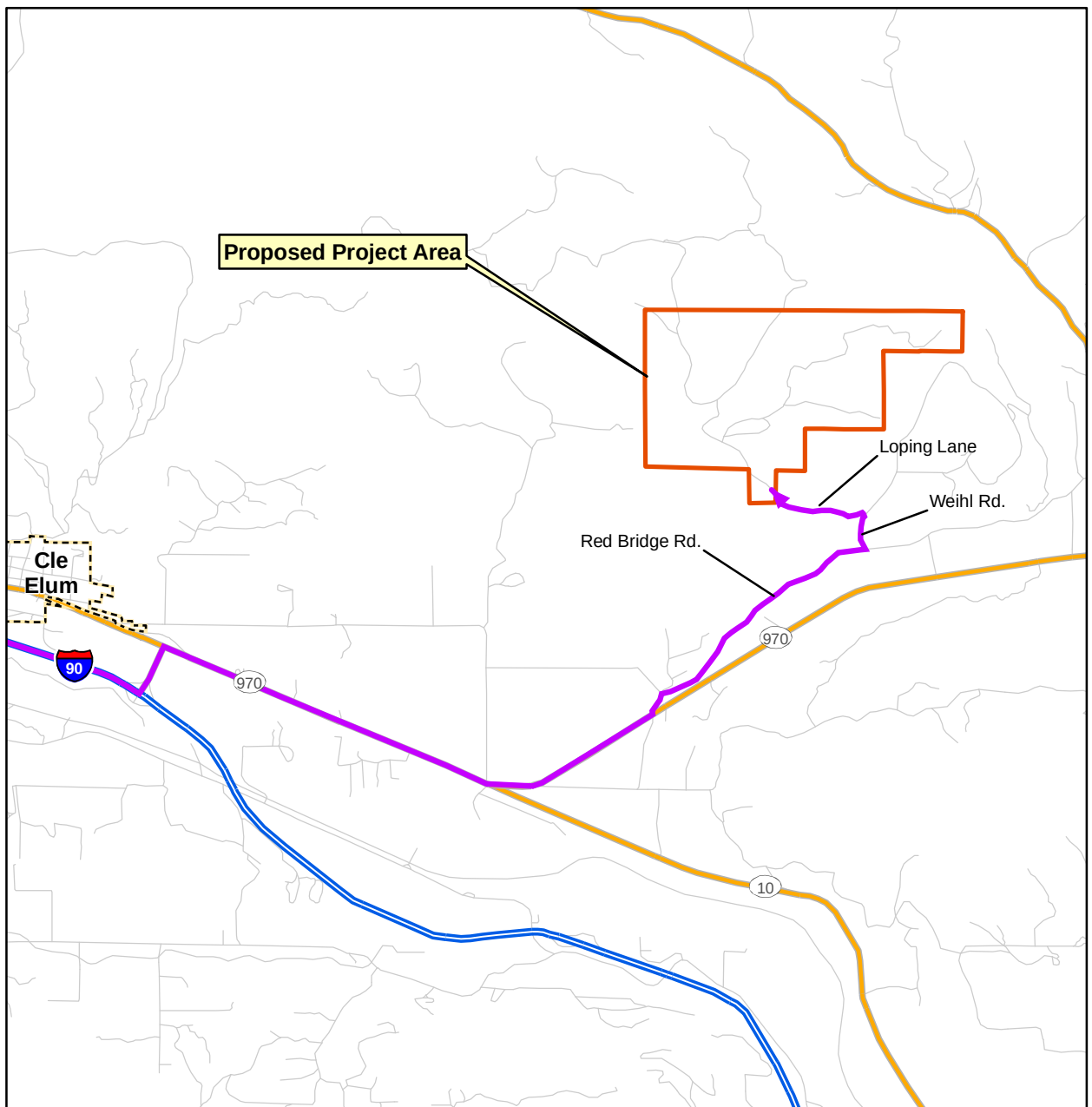


FIGURE 2
U.S. Geological Survey Topographic Map
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Proposed Project Area
- Site Access Route
- City Boundary
- Interstate
- Highway
- Major Road
- Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

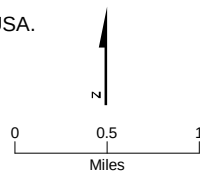
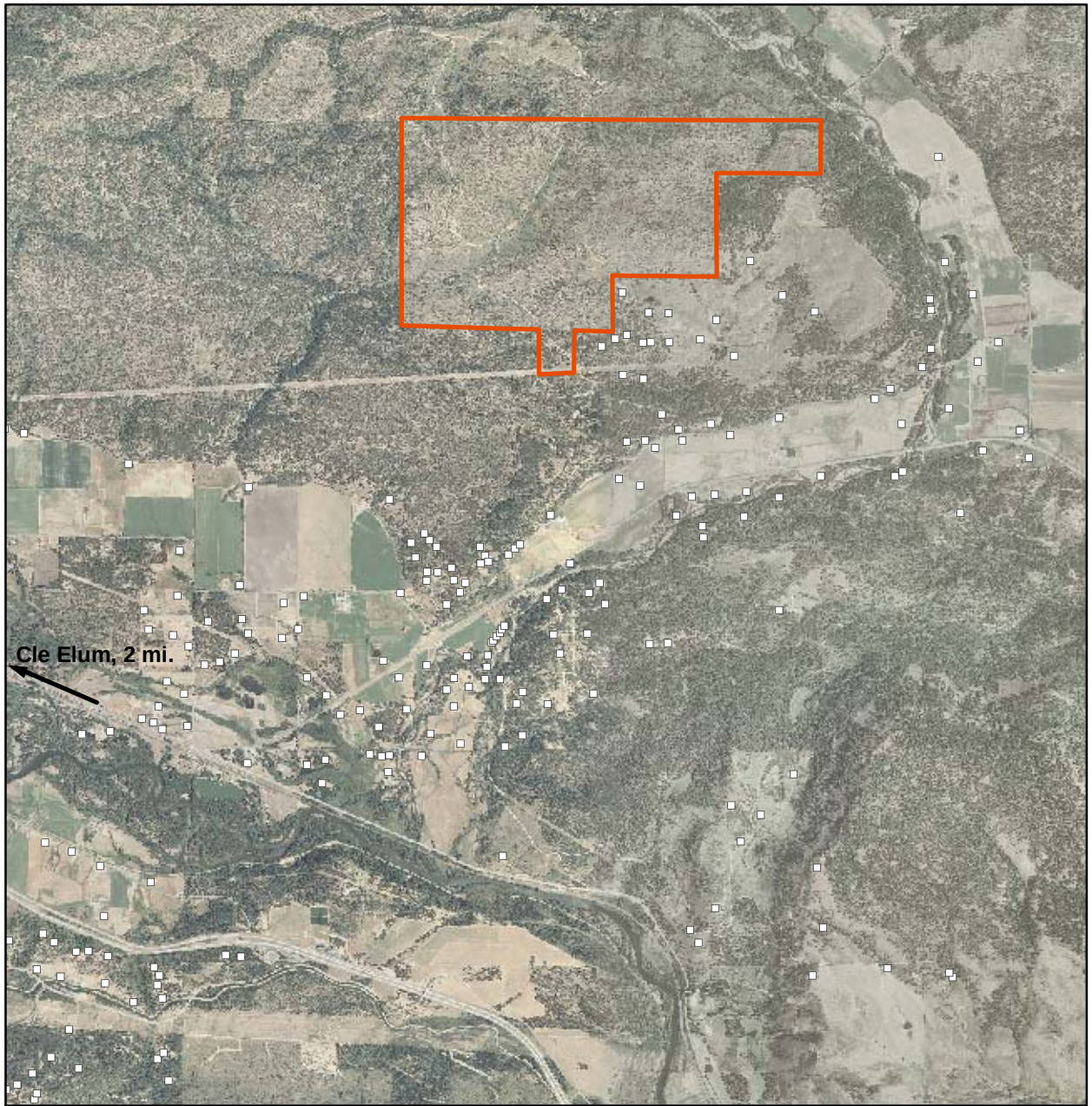


FIGURE 3
Site Access Map
 Teanaway Solar Reserve
 Kittitas County, Washington

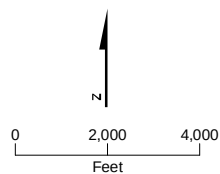


LEGEND

-  Proposed Project Area
-  Identified Structure

Notes:

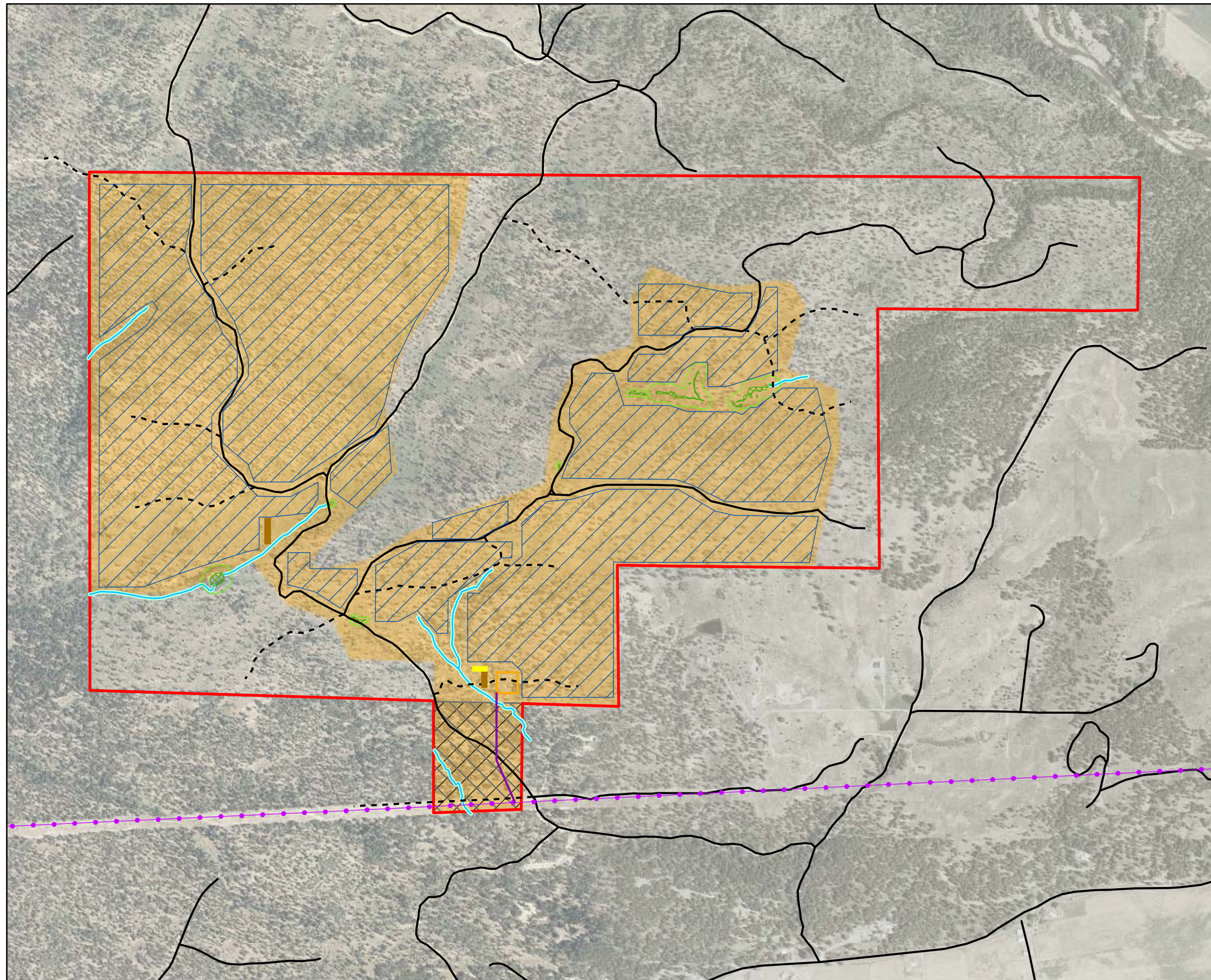
1. Aerial Imagery: 2006 1m NAIP.
2. Structures identified from aerial, not ground verified.



VICINITY MAP



FIGURE 4
Identified Structure Map
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  Surveyed Area (580 acres)
-  Proposed Powerline Route to Grid
-  Potential Module Placement Area
-  Proposed O&M Facility
-  Proposed Substation
-  Proposed Switchgear
-  Transmission and Access Corridor
-  Existing Transmission Line
-  Road
-  Minor Dirt Road
-  Wetland
-  Wetland Buffer
-  Stream
-  Stream Buffer

Note:
1. Aerial Imagery: 2006 1m NAIP.

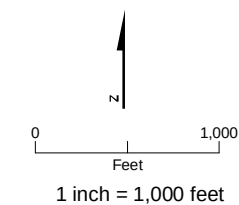
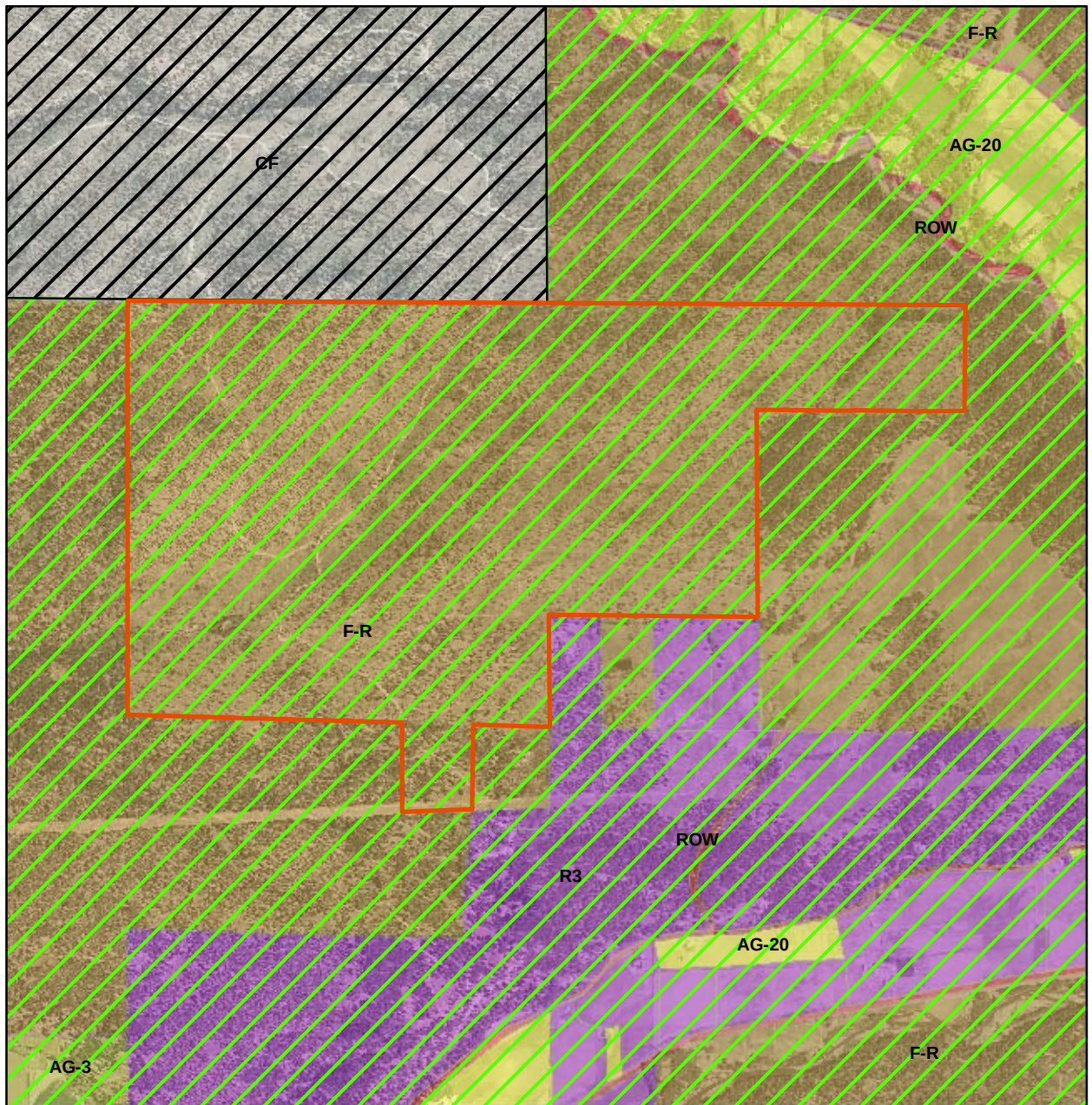


FIGURE 5
Conceptual Site Layout
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

 Proposed Project Area

Land Use

 COMMERCIAL FOREST

 RURAL

Zoning

 AG-20, Agricultural 20

 AG-3, Agricultural 3

 CF, Commercial Forest

 F-R, Forest & Range

 R3, Rural 3

 ROW, Right-of-Way

Note:

1. Aerial Imagery: 2006 1m NAIP.

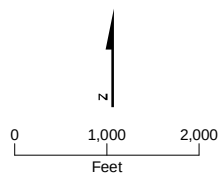
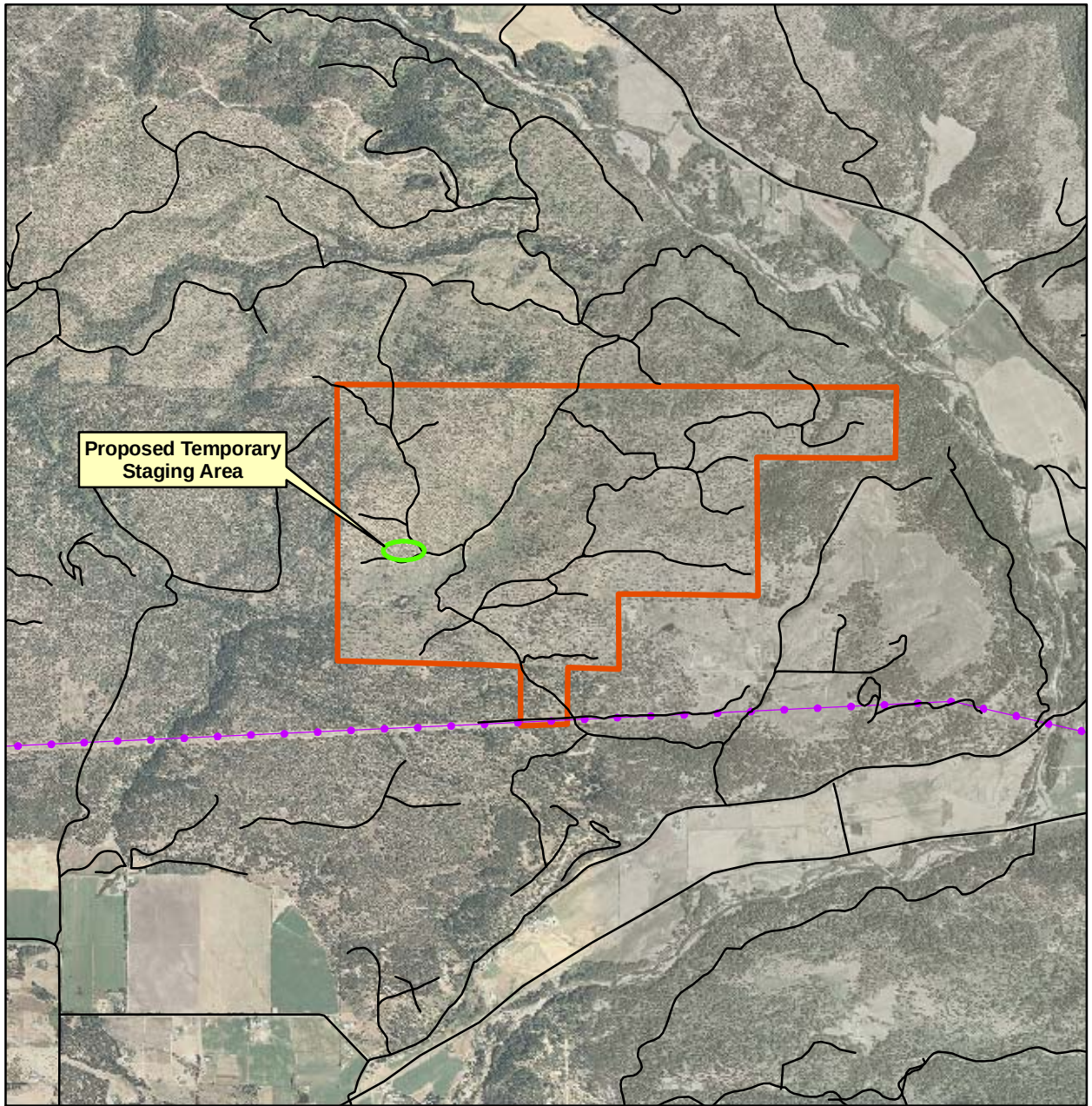


FIGURE 6
Land Use/Zoning Map
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Proposed Project Area
-  Proposed Temporary 5-Acre Staging Area
-  Road
-  Existing BPA Transmission Line

Note:

1. Aerial Imagery: 2006 1m NAIP.

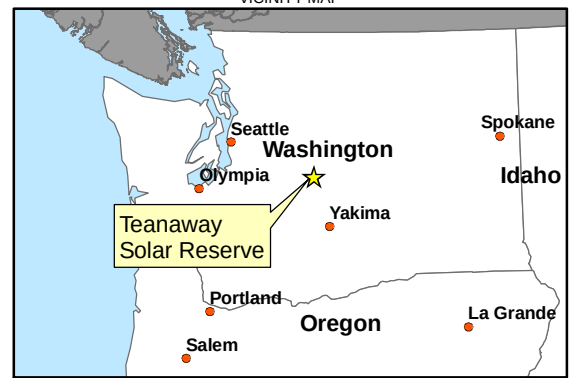
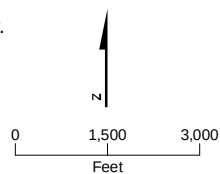
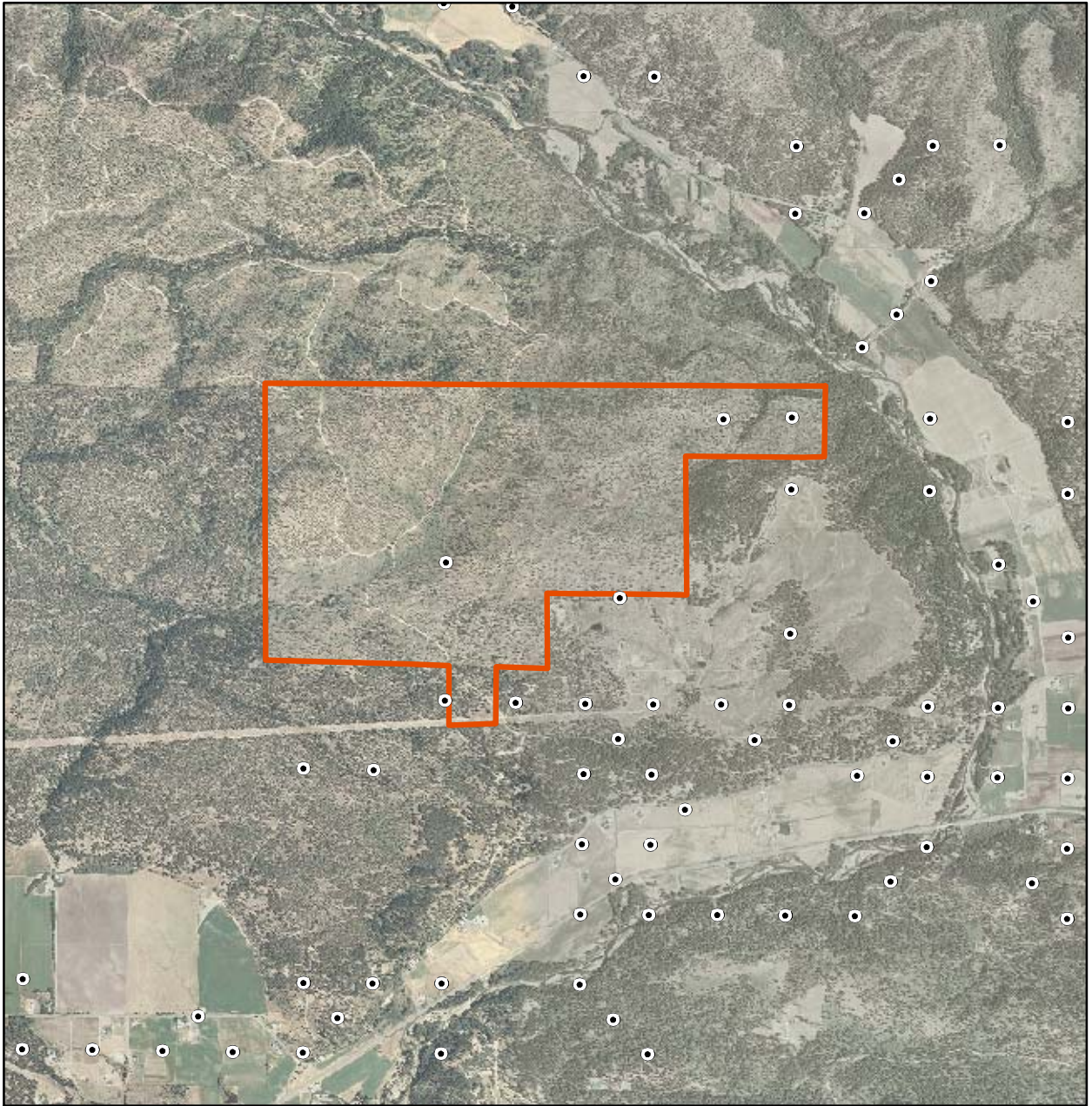


FIGURE 7
Staging Area Map
 Teanaway Solar Reserve
 Kittitas County, Washington

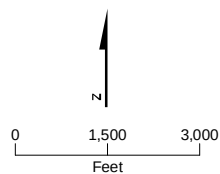


LEGEND

- Well Location
- Proposed Project Area

Notes:

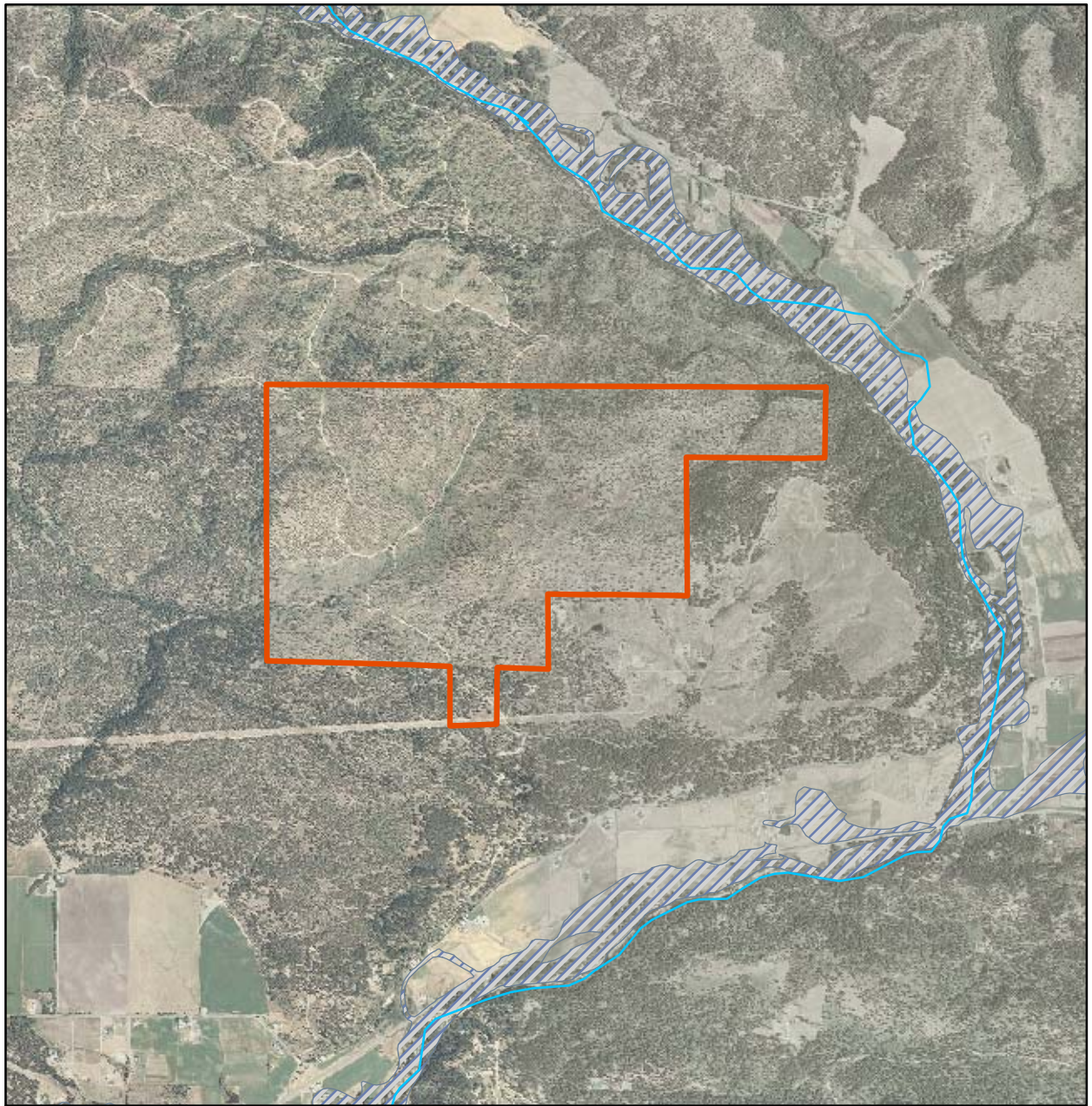
1. Well Log Data: Washington State Department of Ecology Water Resources Program.
2. Aerial Imagery: 2006 1m NAIP.



VICINITY MAP



FIGURE 8
Designated Critical Areas:
Aquifer Recharge Areas
 Teanaway Solar Reserve
 Kittitas County, Washington

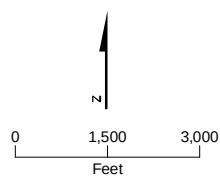


LEGEND

-  Proposed Project Area
-  FEMA 100-year Flood Zone
-  Shoreline Management Act Stream
(450 feet from proposed project area)

Notes:

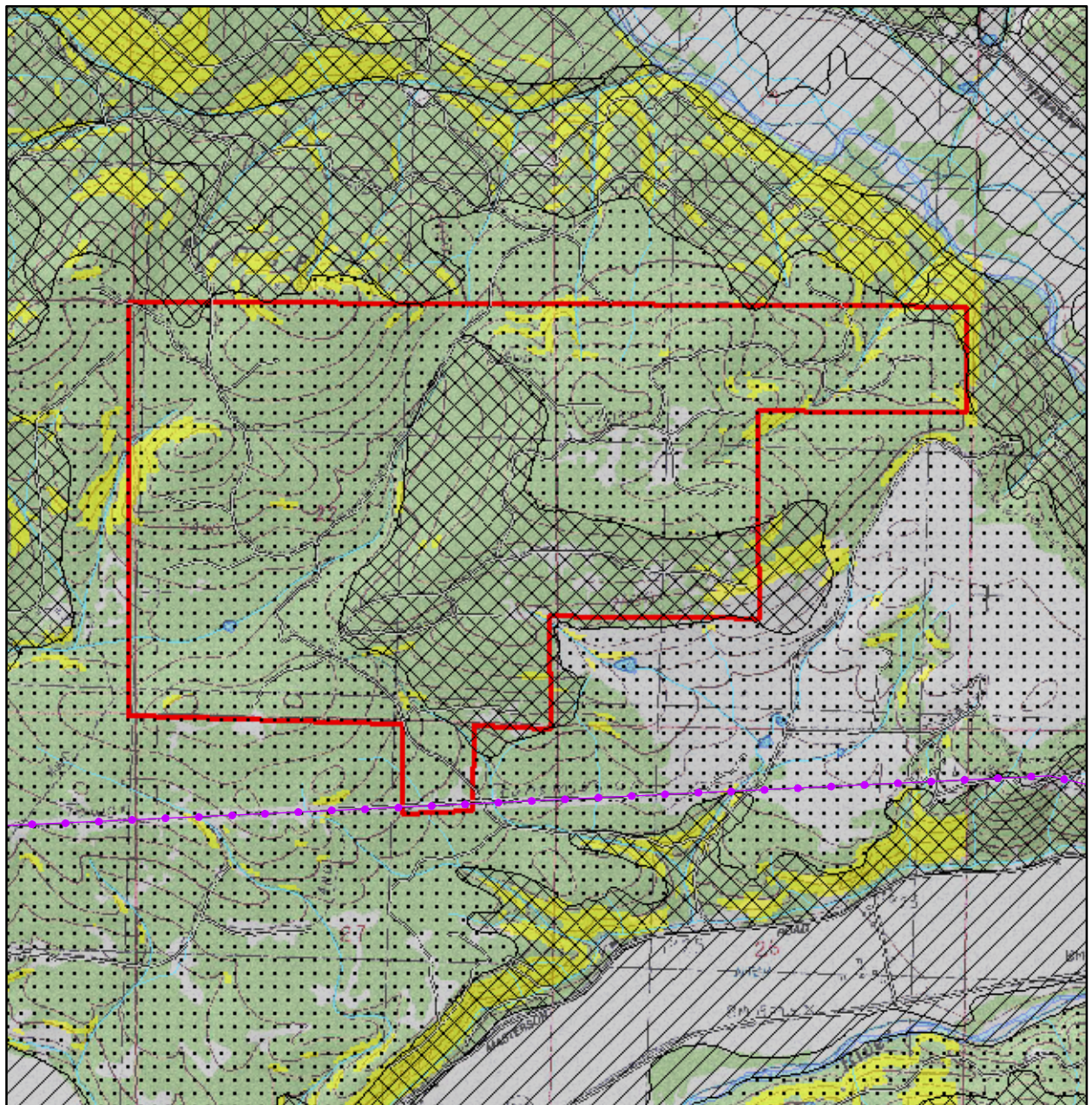
1. Flood Data: Federal Emergency Management Agency Flood Insurance Rate Map.
2. Stream Data: Washington Department of Ecology.
3. Aerial Imagery: 2006 1m NAIP.



VICINITY MAP



FIGURE 9
Designated Critical Areas: FEMA Federal Insurance Rate Map for Kittitas County
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

Existing BPA	Slope
Transmission Line	0 - 25% (not symbolized)
Road	25%+
Proposed Project Area	Soil Susceptibility to Erosion
Stream	Slight
Waterbody	Moderate
	Severe

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. Soils Data: Soil Survey Geographic (SSURGO) Database.

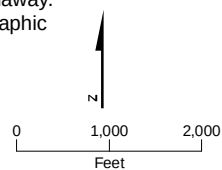


FIGURE 10
Designated Critical Areas: Erosion-Prone Soils and Geologic Hazards

Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT E

Photographs of Solar Equipment

Photo Plates

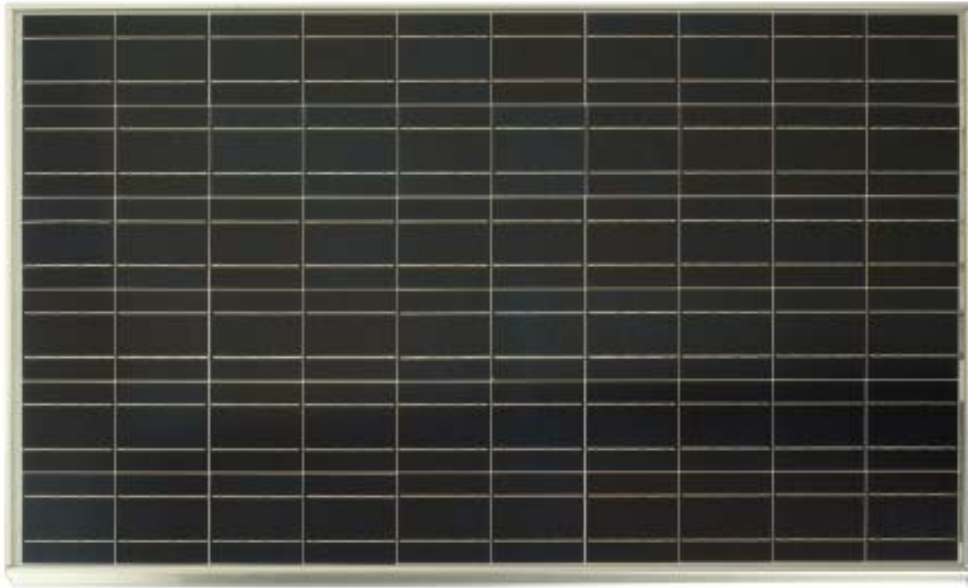


Photo Plate 1: Representative Solar Module (Source: Sharp Electronics Corporation)



Photo Plate 2: Single-Axis Tracking System by RayTracker



Photo Plate 3: Top of Pole-Mount Tracking System Holding Eight Solar Modules by Ignite Solar



Photo Plate 4: Proposed Fixed Tilt Mounting Structure (Source: Conergy)

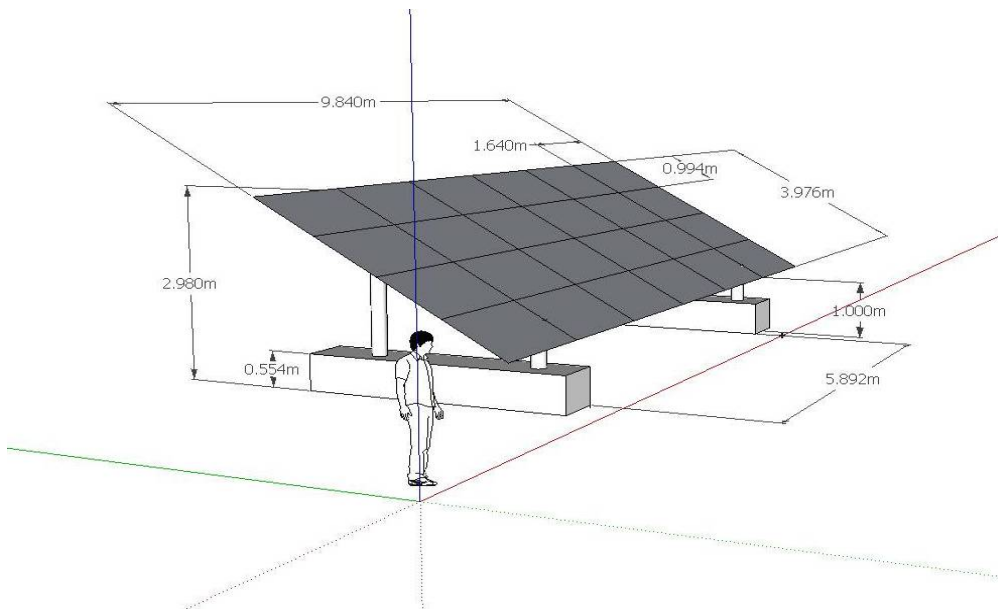


Photo Plate 5: Representative Mounting Structure with Dimensions



Photo Plate 6: Representative Mounting Structure, Cutaway View (Source: Conergy)



Photo Plate 7: Use of Timber Construction Materials in a Ground-Mounted Solar System



Photo Plate 8: Outdoor Compatible Commercial Inverters (Source: Xantrex)



Photo Plate 9: Example of 2-MW Inverter Building with Transformer (Source: Xantrex/Schneider Electric)



Photo Plate 10: Staging Area for a Solar Facility



Photo Plate 11: Example of Cabling Being Installed in Trenches for Interconnection to Grid



Photo Plate 12: Example of Cabling Being Installed in Trenches for Interconnection to Grid

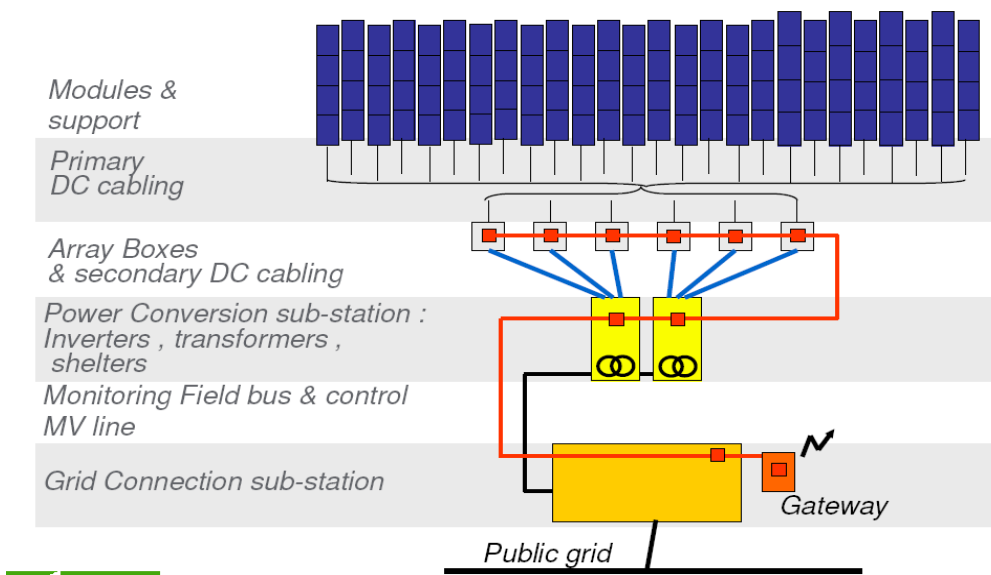


Photo Plate 13: Typical Cabling Diagram for a Photovoltaic System (Source: Xantrex/Schneider Electric)

ATTACHMENT F

**Zone of Visual Influence Technical
Memorandum**

Teanaway Solar Reserve Potential Visual Impact Simulation

PREPARED FOR: Howard Trott, Teanaway Solar Reserve, LLC

PREPARED BY: Mark Greenig, CH2M HILL

COPIES: Nichole Seidell, CH2M HILL

DATE: August 14, 2009

The purpose of this technical memorandum is twofold: (1) provide background documentation for the conclusions presented in the Aesthetics section of the Expanded SEPA Checklist, and (2) assist Kittitas County in evaluating the potential visual impacts associated with the proposed project.

The first step in evaluating the potential visual impacts associated with the proposed project was to determine areas from which the project could potentially be visible. To achieve this goal, a geographic information system- (GIS) based visibility assessment, called a Zone of Visual Influence (ZVI) analysis, was conducted. Environmental Systems Research Institute (ESRI) ArcGIS software was used for the analysis. The ZVI data were overlaid on a map of the general proposed project area in order to graphically depict areas from which the project would be potentially visible. Figure 1 shows a conceptual layout of the project. Figure 2 illustrates the potential visibility of solar panels in four areas of the project site. Four maps (Figures 3 to 6) were developed to show the potential visibility of solar panels in each of the four areas (as depicted in Figure 1).

The software that was used to produce the ZVI measured 10-meter digital elevation models that were derived from multiple sources. These sources consisted of 7.5' (1:24,000) U.S. Geological Survey (USGS) topographic quadrangle maps, elevation manuscripts, and aerial photographs. The elevation models represent ground elevations.

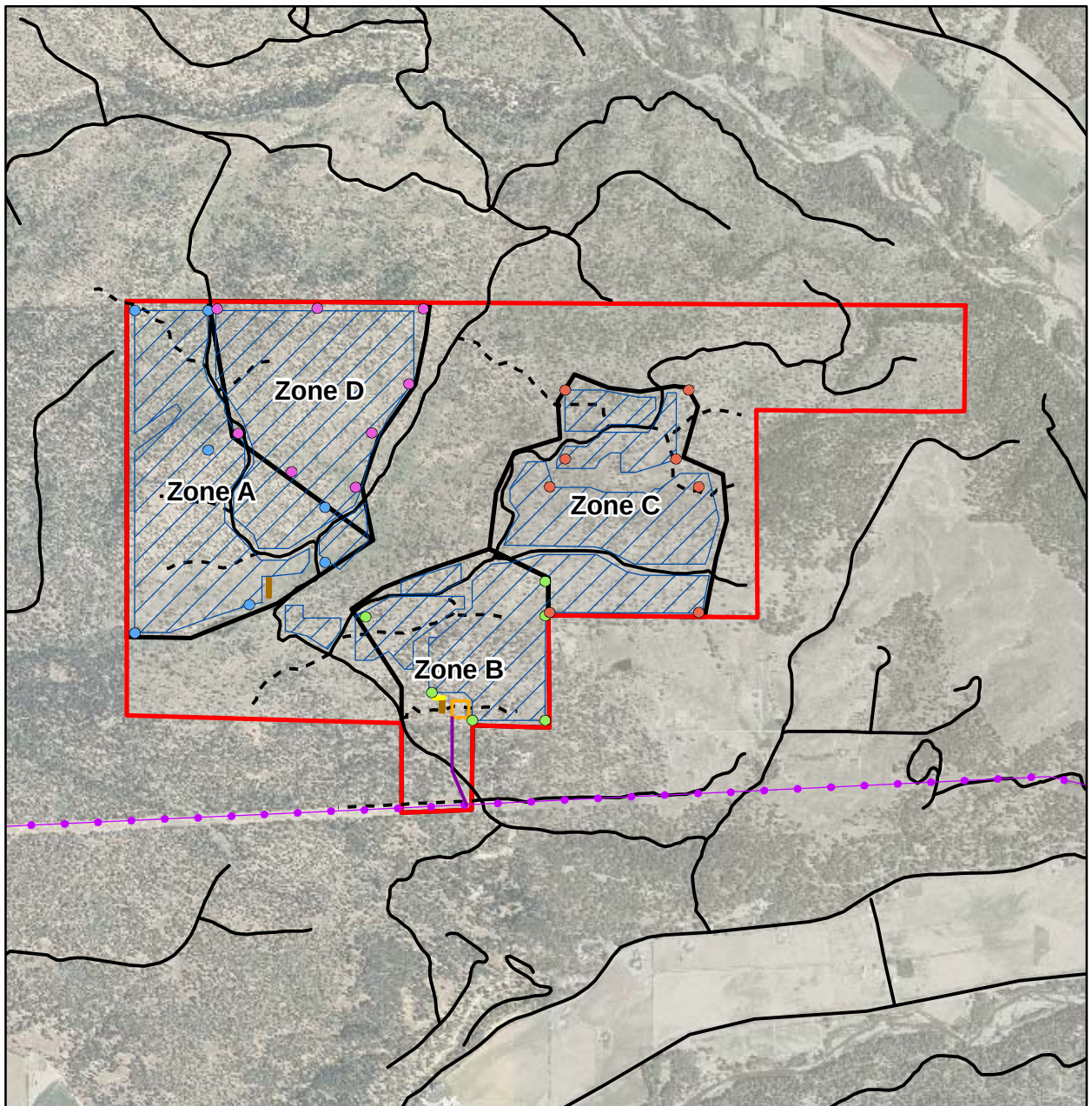
The ZVI model calculated lines of sight between points that represent solar panels 10 feet above the adjacent terrain and ground areas from which they would be potentially visible. The model did not take into account the presence of trees, buildings, or other features, so in some areas where project visibility is indicated, views will be screened by trees, vegetation, or other structures. In addition, the ZVI model is a line-of-sight model that does not account for attenuating factors such as distance, haze, humidity, background landscape, or weather, which would make the project invisible or barely visible from certain locations under many atmospheric or weather conditions.

The ZVI maps indicate areas from which the proposed project would be potentially visible. To get a better idea of how visible the project would be, four locations were selected from around the project area to represent the "seen" area. Photographs were taken from each location to depict existing views and conceptual depictions of how the project would appear from each location were developed.

Despite being identified as an area from which the project would be potentially visible (see Figures 1 through 6), it was difficult to find publically accessible locations on the northwest facing slopes of Lookout Mountain from which the project site can be seen. Based on several site visits and discussions with neighbors in the area on July 26, 2009, many if not most, of the residences on the slopes of Lookout Mountain have views towards the project site that are obscured or at least partially screened by trees. Two areas were found that did have views of the project area. One area (Location 1) is on private property and the second (Location 2) is on a public road. Both of these locations are approximately 1.5 miles from the closest edge of the project. Location 1 is in a pasture above a residence and Location 2 is near the intersection of Ridgewater Drive and Lambert Road. These locations were chosen to depict some of the closest elevated residential areas that could have views of the project. Figure 7a depicts the existing view towards the project from Location 1 and Figure 7b is a conceptual depiction of what the view might look like if the project were constructed. Figures 8a and 8b illustrate similar views and conceptual depictions from Location 2.

It should be noted that some residences on the north side of State Route (SR) 970 are closer to the project site than the residences on the northwest face of Lookout Mountain. However, it appears that most will not see the project clearly because they “face away” from the project, are located below it, or seem to be screened from it by vegetation and terrain.

Locations 3 and 4 were selected to represent views of the project from areas south of Interstate 90 (I-90). Location 3 is approximately 3.5 miles to the southwest of the project and Location 4 is approximately 4 miles to the southwest. Location 3 is alongside Watson Cutoff Road just below the intersection with Upper Peoh Point Road. Location 4 is on Watson Cutoff Road at a lower elevation than Location 3 and is approximately 0.2 mile from I-90. Both of these locations were identified in the ZVI maps to be within the seen area of the project. Figure 9a depicts the existing view towards the project from Location 3 and Figure 9b is a conceptual depiction of what the view might look like with the project in place. Figures 10a and 10b illustrate similar views and conceptual depictions from Location 4.



VICINITY MAP

LEGEND

	Proposed Project Area		Proposed Powerline Route to Grid
	ZVI Zone		Proposed Potential Module Location
	ZVI Points		Proposed O&M Facility
	Zone A		Proposed Substation
	Zone B		Proposed Switchgear
	Zone C		Road
	Zone D		Minor Dirt Road
			Existing Transmission Line

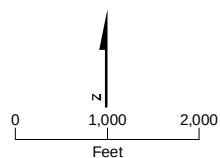
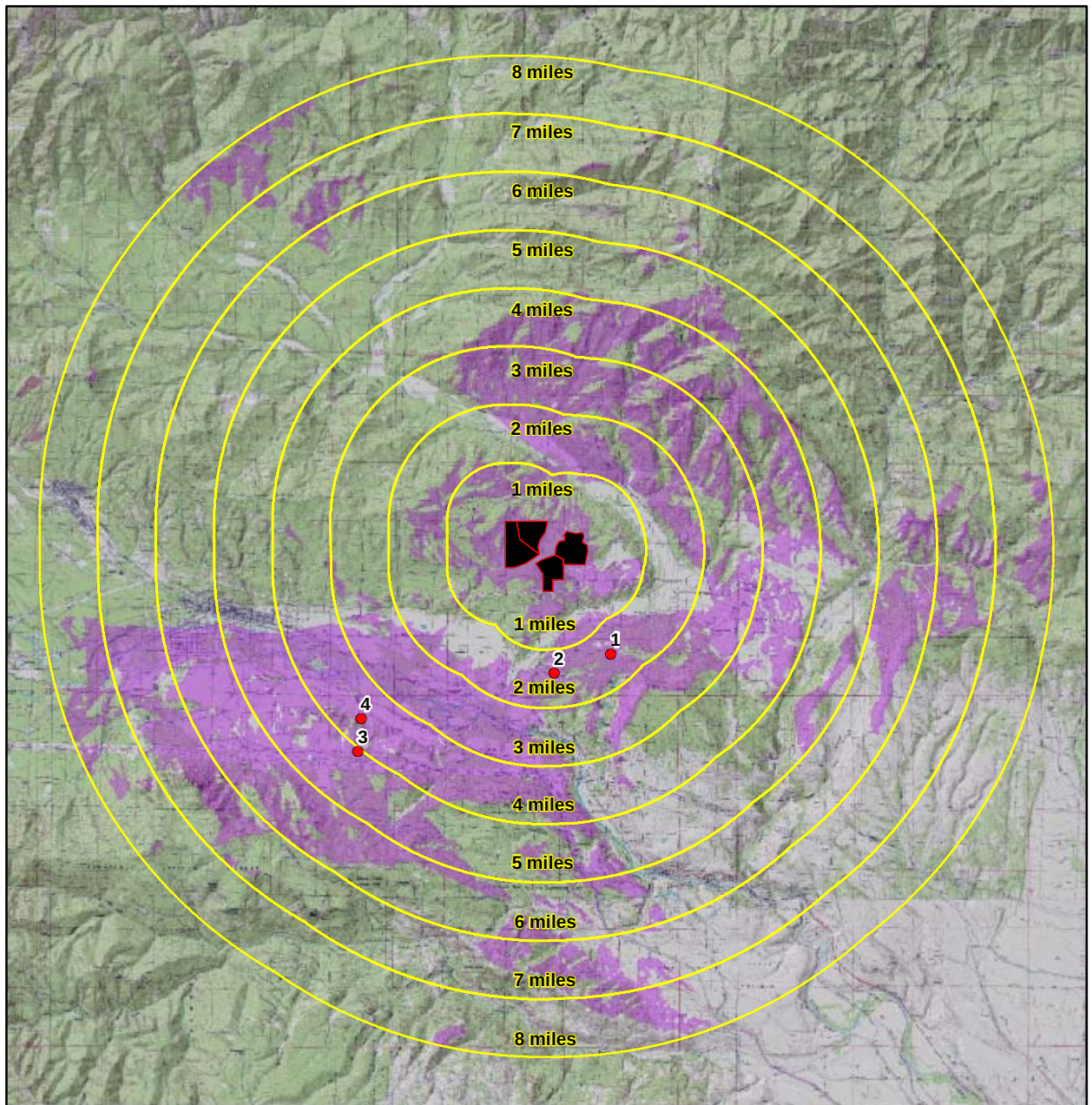
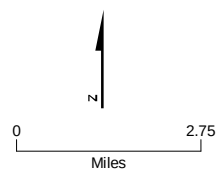


FIGURE 1
ZVI Analysis Zone Points
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

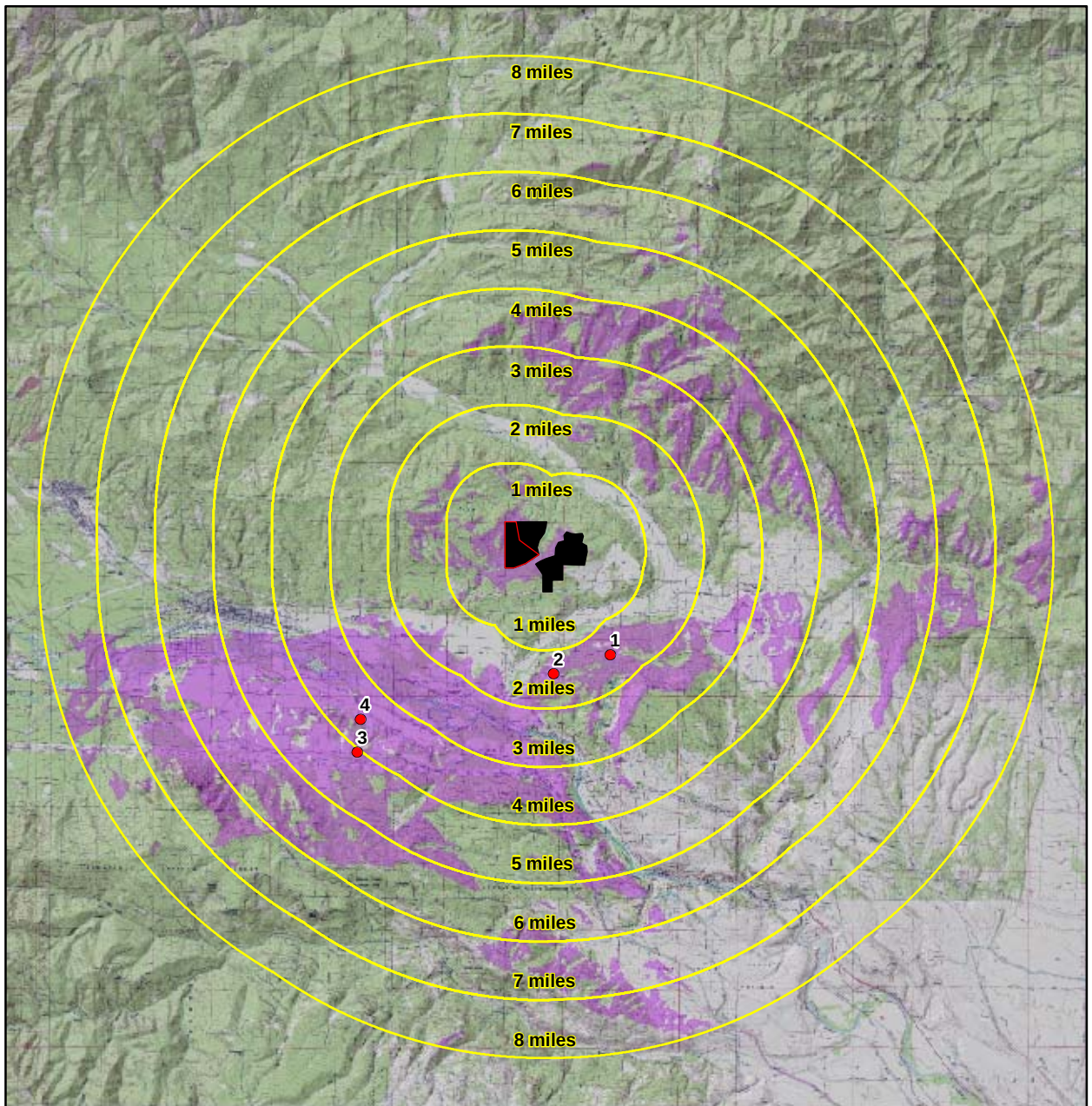
- Simulation Viewpoint
- Area Considered in ZVI
- ZVI Zone
- Distance from Project Area
- Zone of Potential Visual Influence



VICINITY MAP

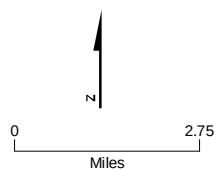


FIGURE 2
Zone of Visual Influence-All Zones
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

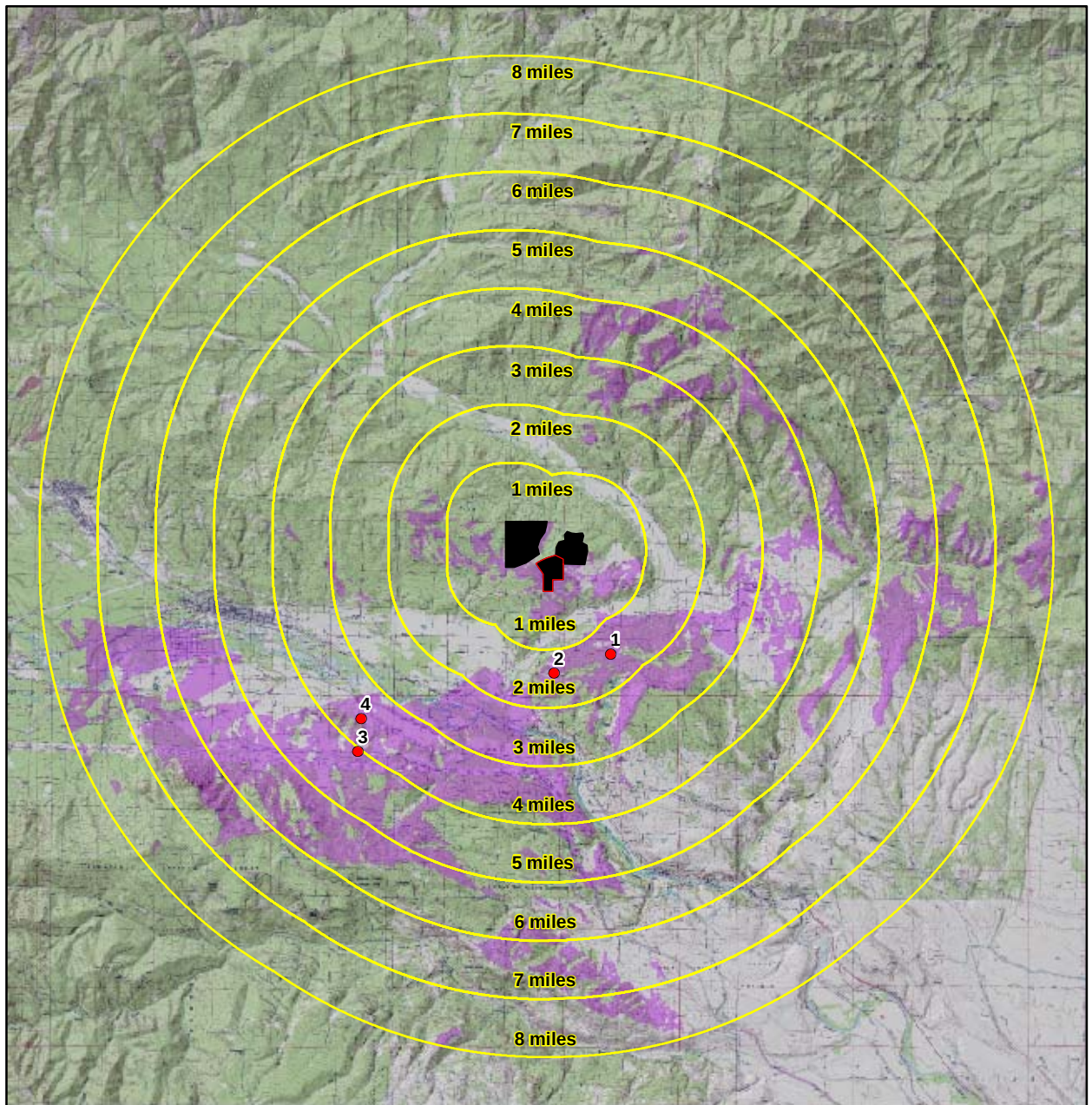
- Simulation Viewpoint
- Area Considered in ZVI
- ZVI Zone
- Distance from Project Area
- Zone of Potential Visual Influence



VICINITY MAP

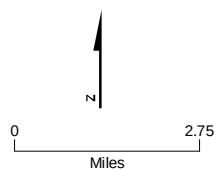


FIGURE 3
Zone of Visual Influence-Zone A
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

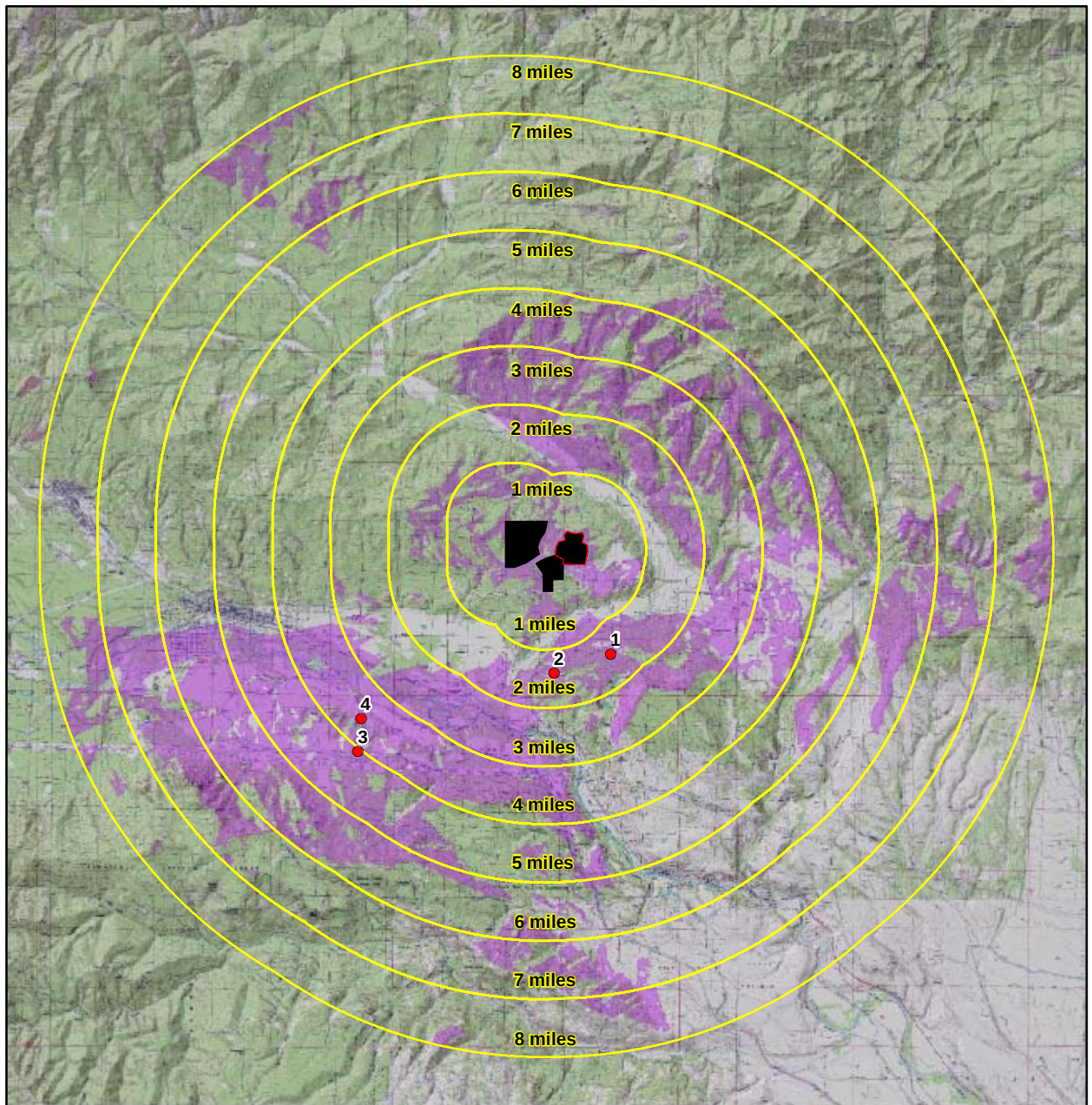
- Simulation Viewpoint
- Area Considered in ZVI
- ZVI Zone
- Distance from Project Area
- Zone of Potential Visual Influence



VICINITY MAP

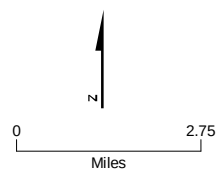


FIGURE 4
Zone of Visual Influence-Zone B
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

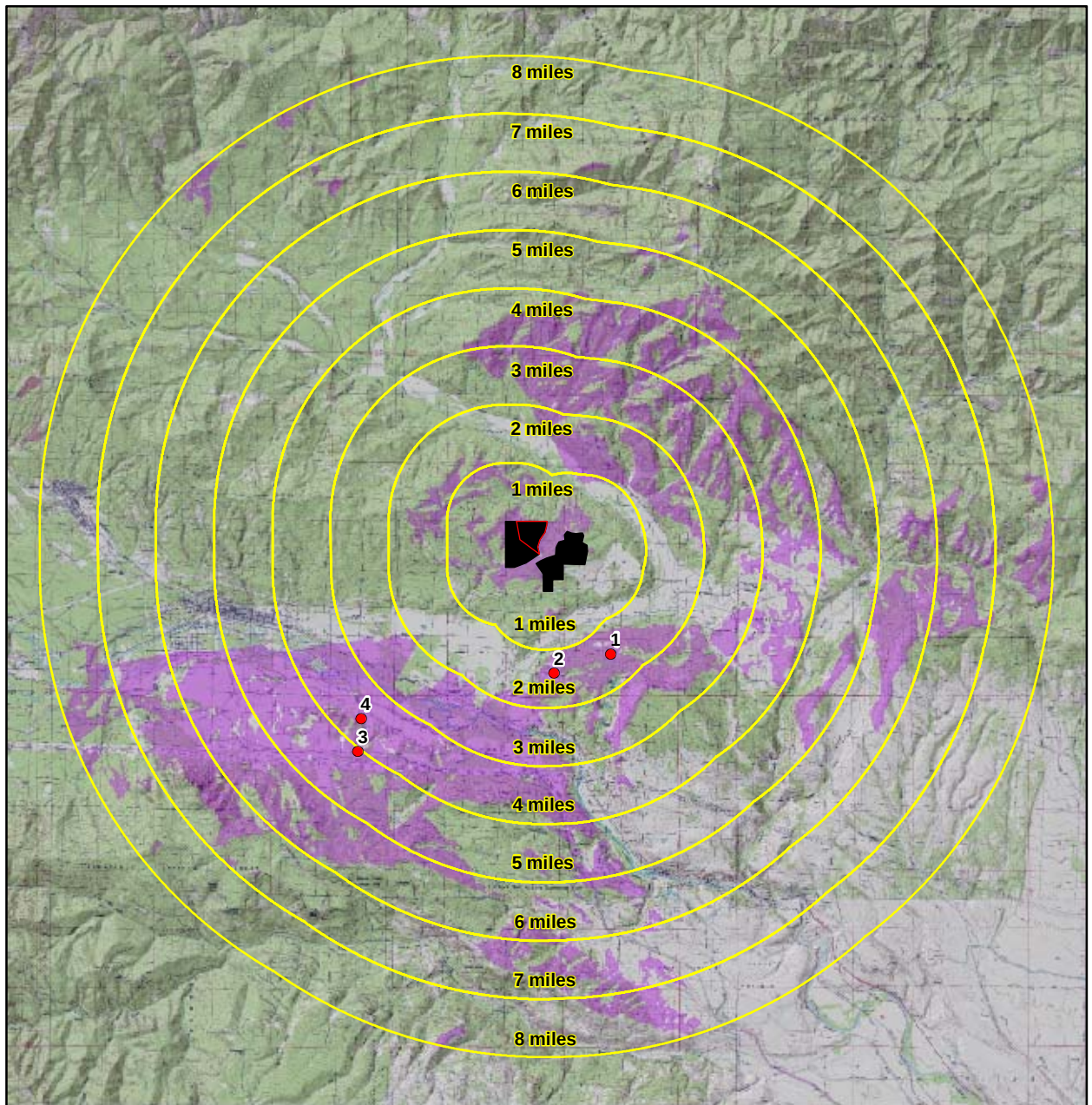
- Simulation Viewpoint
- Area Considered in ZVI
- ZVI Zone
- Distance from Project Area
- Zone of Potential Visual Influence



VICINITY MAP

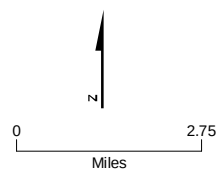


FIGURE 5
Zone of Visual Influence-Zone C
 Teanaway Solar Reserve
 Kittitas County, Washington



LEGEND

- Simulation Viewpoint
- Area Considered in ZVI
- ZVI Zone
- Distance from Project Area
- Zone of Potential Visual Influence



VICINITY MAP



FIGURE 6
Zone of Visual Influence-Zone D
 Teanaway Solar Reserve
 Kittitas County, Washington

Location 1 — Residence 1/4 Mile West of Lambert Road



Figure 7a
Existing View Looking West at Project Site



Figure 7b
Conceptual Depiction of View with Project

Location 2 — Ridgewater Drive



Figure 8a
Existing View Looking West at Project Site



Figure 8b
Conceptual Depiction of View with Project

Location 3 — Watson Cutoff Road (Upper)



Figure 9a
Existing View Looking Northeast at Project Site



Figure 9b
Conceptual Depiction of View with Project

Location 4 — Watson Cutoff Road (Lower)



Figure 10a
Existing View Looking Northeast at Project Site



Figure 10b
Conceptual Depiction of View with Project