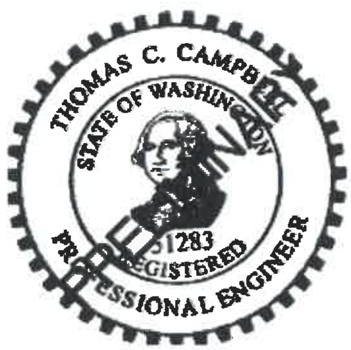
Westside Solar Project
Preliminary Stormwater Site Plan

October 2019



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List of Abbreviations and Acronyms

Applicant	Westside Solar, LLC
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
Ecology	Washington State Department of Ecology
ESC	Erosion and Sediment Control
KCC	Kittitas County Code
NPGIS	Non-Pollution-Generating Impervious Surface
O&M	Operations and Maintenance
PGIS	Pollution-Generating Impervious Surface
Project	Westside Solar Project
PV	photovoltaic
SSP	Stormwater Site Plan
SWMMEW	2019 Stormwater Management Manual for Eastern Washington
SWPPP	Stormwater Pollution Prevention Plan

1 Project Overview

1.1 Proposed Improvements

Westside Solar, LLC (the Applicant) is proposing to construct and operate the Westside Solar Project (Project), a utility-scale photovoltaic (PV) solar power production facility with a nameplate capacity of 4.999 megawatts. The Project would be located in Kittitas County, Washington, off of Westside Road, and comprise six parcels (Kittitas County tax parcel identification numbers 19440, 19441, 19442, 10577, 10579, and 10580) totaling approximately 46 acres.

1.2 Design Criteria

This Preliminary Stormwater Site Plan (SSP) is provided to comply with the requirements for a Preliminary Stormwater Submittal, as described in Section 12.06 of the Kittitas County Code (KCC) with respect to Stormwater Management Standards and Guidance. Kittitas County has adopted the 2019 Stormwater Management Manual for Eastern Washington (SWMMEW) (Ecology 2019).

1.3 Project Location

The Project site is located in Kittitas County, Washington, southwest of the town of South Cle Elum. The approximate location of the Project is shown on Figure 1-1.

Figure 1-1 Approximate Location of the Westside Solar Project

Location: Westside Road, Kittitas County, Washington State
Section, Township, Range: Section 33, 20 North, 15 East
Tax Account Number: 19440, 19441, 19442, 10577, 10579, and 10580
Size: 2,010,213 square feet (46.1 acres)
Zoning: Agricultural 5, Rural Residential

2 Conditions Summary

2.1 Existing Conditions

The Project site is located in a rural, relatively flat area of Kittitas County, Washington, along Westside Road (see Figure 1-1). The site is bounded to the south by Westside Road, to the north by the John Wayne Iron Horse trail, and to the east and west by low-density, rural residential development and pasture land. The greatest topographic relief occurs along the southern portion of the site near Westside Road, where the elevation changes approximately 28 feet over a distance of approximately 100 feet. The remainder of the site is flat to gently sloping (<3%).

Due to the relatively flat nature of the site and lack of noticeable surface water flow paths across much of the Project site, no areas were identified as locations for high erosion and sediment deposition. There are, however, areas on the site that have been identified as critical areas. As shown in the attached Stormwater Exhibit (Appendix B), a pond located in the northwest portion of the site and wetlands along the southern boundary of the site have been identified as critical areas.

No streams are mapped on the property, and site drainage is generally via sheet flow and shallow subsurface flow, with offsite drainage towards the Yakima river. Three drainage sub-basins were delineated onsite and are depicted in Appendix B (Stormwater Exhibit). Drainage Basin 1 drains by sheet flow and shallow subsurface flow towards a pond on the northwest corner of the site. This pond has an outlet that flows northward via a culvert underneath the John Wayne Iron Horse Trail and through an unnamed stream towards the Yakima River. Drainage Basin 2 drains via sheet flow and shallow subsurface flow towards a small pond offsite near the northeast corner of the site. The offsite pond has no observed outlet. Drainage Basin 3 drains offsite to the east via sheet flow and a defined channel feature within the forested wetland on the southern portion of the site. The feature appears to continue as a constructed surface flow channel to the east-northeast towards the city of South Cle Elum and to its ultimate outlet at the Yakima River.

2.2 Site Soils

The Project site contains four different soil types, according to the Natural Resources Conservation Service (NRCS 2019): Patnish-Mippon-Nyzel complex, Quicksell loam, xerofluvents, and Roslyn ashy sandy loam. Appendix C contains the Custom Soil Resource Report for the Project site, which shows the distribution of the soil types throughout the site and the percentage of the site that contains each of the four soil types.

2.3 Developed Conditions

The Project is a utility-scale solar energy facility that will consist of PV solar panels on single-axis tracking racks supported by driven piles. The racking system will run in rows north to south and will rotate east to west to follow the sun each day. A security fence will surround the perimeter of the proposed solar arrays. A vegetated/unpaved 20-foot internal accessway will be maintained between the perimeter fence and proposed arrays.

An existing unpaved road provides the current landowners with seasonal access from Westside Road. The current access road does not meet the requirements of the Kittitas County Code or 2015 International Fire Code for site access. The Project will need to provide an improved all-weather access for the purposes of constructing and maintaining the Project. The new access driveway will be designed to comply with the Kittitas County Code and the 2015 International Fire Code. The Applicant is currently determining the least impactful location for the access driveway. The two access driveway alternatives, referred to as Option A and Option B, are shown in Appendix B and referenced in this report.

Option A shows a crossing at the narrowest point in Wetland 1. This option would include only a small area of wetland impacts, but could require more earthwork, as compared with Option B, to comply with maximum slope requirements in the Kittitas County Code and 2015 International Fire Code. Option B would improve the existing gravel road in the location of the current unpaved access road. Option B would require a greater area of wetland impacts than Option A; however, since this area has already been graded in the past, it would require less earthwork to comply with the maximum allowable slopes. Only one driveway in the final project design will be constructed, based on consultation with county, state, and federal permitting authorities. Either option will be improved with crushed gravel surfacing to provide access to the Project site as well as interconnection equipment.

Utility construction will include electrical wiring, inverters, transformers, and other equipment required to interconnect the Project to the existing power lines at the site. Interconnection equipment will be constructed on gravel pads with individual pieces of equipment supported on concrete foundations. The Project will not include a water system, sewage disposal, or any buildings. Proposed improvements are shown in the Stormwater Exhibit, provided as Appendix B.

3 Applicable Core Elements

As outlined in Chapter 2 of the SWMMEW, there are eight Core Elements of stormwater management. Not all Core Elements apply to every project and, depending on the type and size of a project, different combinations of the eight Core Elements may apply. This section of the Preliminary SSP describes each Core Element and provides a response explaining how each Core Element will be addressed, if it is applicable to the Project. If it is not applicable to the Project, the response provides a rationale explaining why the Core Element does not apply.

Core Element #1: Preparation of Stormwater Site Plans
All projects, including those proposed by local jurisdictions and agencies, that are subject to Core Elements #2 through #8 are expected to complete an SSP. The SSP shall demonstrate the project's compliance with the applicable Core Elements.

Response: A Preliminary SSP has been prepared for the Project in accordance with Section 12.06.06 of the KCC. The preliminary SSP includes the site plan and this report. A final SSP will be prepared and submitted as part of the final construction permit application package.

Core Element #2: Construction Stormwater Pollution Prevention
All new development and redevelopment projects are responsible for preventing erosion and discharge of sediment and other pollutants into surface waters of the State and must consider each of the 13 elements of pollution prevention to determine which controls are appropriate for the project.

Response: The 13 elements of a Stormwater Pollution Prevention Plan (SWPPP) are addressed in Section 3.1 of this report. A full construction SWPPP will be prepared for the Project site before construction begins.

Core Element #3: Source Control of Pollution
Following construction, projects shall apply all known, available, and reasonable source control best management practices (BMPs). Source control BMPs shall be selected, designed, and maintained according to the 2019 SWMMEW. Source control BMPs installed to satisfy this Core Element require long-term maintenance to ensure successful operation.

Response: If required, applicable source control BMPs will be included in the Project's Operations and Maintenance (O&M) manual as a part of the final stormwater submittal.

Core Element #4: Preservation of Natural Drainage Systems
Natural drainage patterns shall be maintained, and discharges from the project site shall occur at the natural location, to the maximum extent practicable. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downstream receiving waters and downgradient properties. All outfalls require energy dissipation.

Response: Natural drainage patterns will be maintained in their existing configuration. Project site drainage will be managed through full dispersion within vegetated areas onsite, per BMP F6.42 – Full Dispersion in the 2019 SWMMEW.

Core Element #5: Runoff Treatment
Projects must treat at least 90% of the average annual runoff volume generated by the pollution-generating surfaces at a project site. Proper O&M of runoff treatment BMPs is essential to protecting receiving waters over the long term. Non-pollution-generating impervious surface (NPGIS) areas are exempt from basic treatment requirements, unless the runoff from these areas is not separated from the runoff generated from pollution-generating impervious surface (PGIS) areas.

Response: The access road to the Project site can be classified as "infrequently used maintenance access roads" due to the infrequent visits that maintenance staff will be making to the site. Therefore, the access roads fall under the definition of an NPGIS. No construction of PGIS is proposed on the site; therefore, the surface area of PGIS at the Project site is under 5,000 square feet and Core Element #5 does not apply to the Project.

Core Element #6: Flow Control
Projects must provide flow control to mitigate, to the maximum extent practicable, the impacts of increased stormwater runoff volumes and flow rates on streams in eastern Washington. Wherever possible, infiltration is the preferred method of flow control for runoff. Discharges to wetlands should maintain the hydrology (depth and duration of inundation) of the existing condition in order to protect the unique vegetation and other characteristics necessary to support existing and designated uses.

Response: The Project site is divided into three drainage basins, as shown on the Stormwater Exhibit (Appendix B). All three basins meet the guidelines for BMP F6.42 – Full Dispersion in the 2019 SWMMEW due to the ratio of impervious surfaces to vegetated areas. Table 4-2, provided in Section 4.2, specifies the proposed impervious surface and vegetated areas within each drainage basin.

Core Element #7: Operation and Maintenance
When structural BMPs are required, projects shall operate and maintain the facilities in accordance with an O&M manual that is prepared in accordance with

the provisions in Chapter 5 and 6 of the 2019 SWMMEW. The O&M manual shall address all proposed stormwater facilities and BMPs and identify the party (or parties) responsible for maintenance and operation. The O&M manual must also address the long-term funding mechanism that will support proper O&M.

Response: No structural BMPs are anticipated to be required as a part of the proposed Project. If required, an O&M manual will be prepared and submitted as a part of the final stormwater submittal. A copy of the O&M manual will be retained onsite or within reasonable access to the Project site and will be transferred with the site to any new owner.

Core Element #8: Local Requirements

All projects, regardless of size, shall meet additional local requirements for flood control, discharges to wetlands, protection of sensitive areas, basin plans, aquifer protections, or special water quality requirements based on a Total Maximum Daily Load or water cleanup plan, or for any other purpose.

Response: This SSP satisfies the requirements of a preliminary stormwater submittal, as described in Title 12.06 of the KCC. This SSP will be updated to satisfy the requirements of the final stormwater submittal with the final construction permit application package.

A flow chart illustrating the selection of applicable Core Elements for the Project is provided as Figure 3-1.

3.1 Preliminary Construction Stormwater Pollution Prevention Plan

All erosion and sediment control measures shall be governed by the requirements of the local jurisdiction. In conjunction with Core Element #1 and Core Element #2, project proponents must consider each of the 13 elements of pollution prevention outlined in Chapter 7 of the SWMMEW to determine which controls are appropriate for a project. All 13 elements are listed below, along with action items for the proposed Project to address each element.

A temporary Erosion and Sediment Control (ESC) plan will be prepared to assist the Project in complying with these requirements. The ESC plan will be included with the final construction permit submittal.

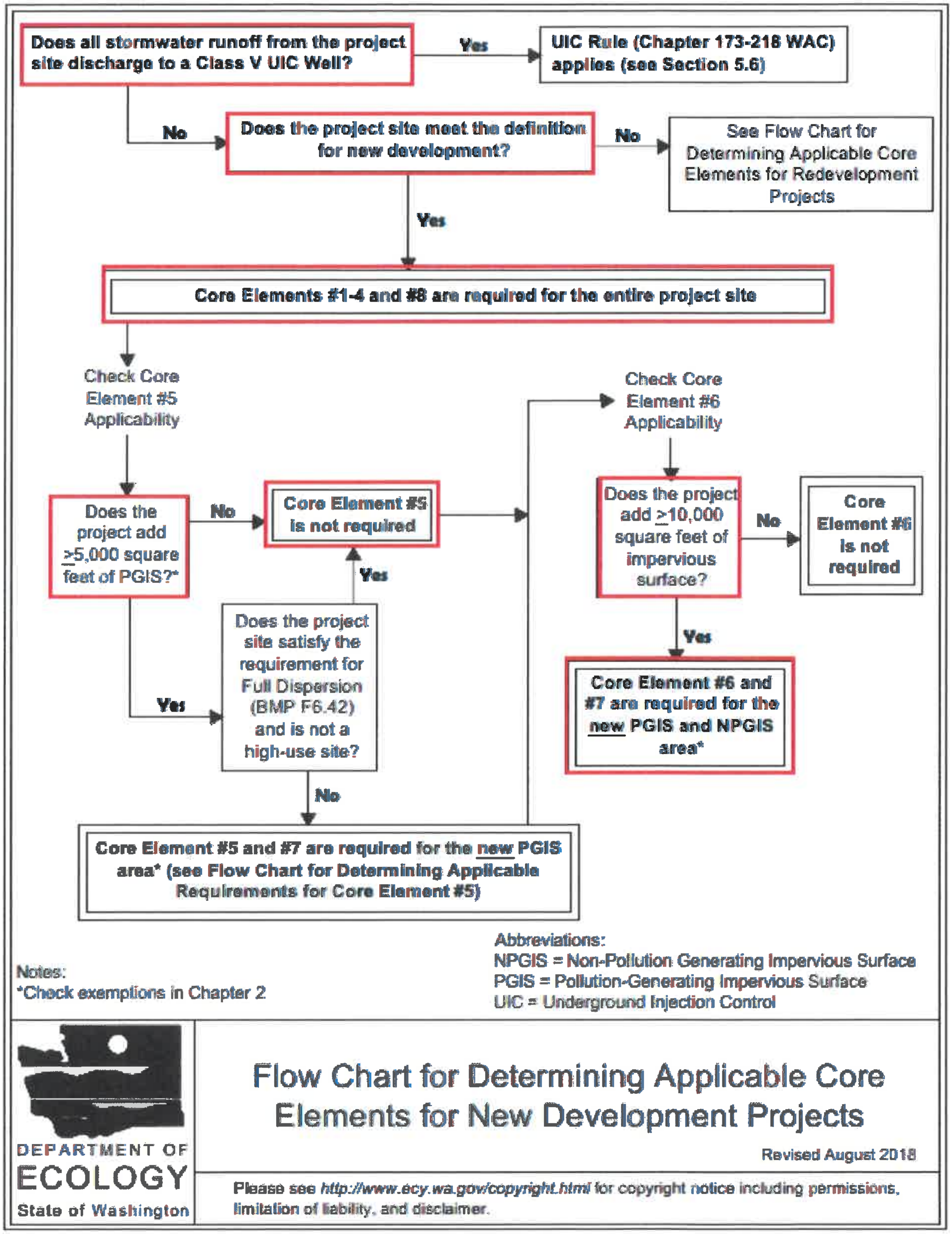


Figure 3-1 Selection of Applicable Core Elements
(red boxes indicate items that apply to the Project)

Element 1: Preserve Vegetation/Mark Clearing Limits

- Prior to beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.
- The duff layer, native top soil, and natural vegetation shall be retained in an undisturbed state, to the maximum degree practicable.

Element 2: Establish Construction Access

- Limit construction vehicle access and exit to one route, if possible.
- Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs to minimize tracking of sediment onto public roads.
- Locate wheel wash or tire baths onsite if the stabilized construction entrance is not effective in preventing tracking sediment onto public roads.
- If sediment is tracked offsite, clean the affected roadway thoroughly at the end of the day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or picking it up and transporting it to a controlled sediment disposal area.
- Conduct street washing only after sediment is removed in accordance with the above bullet.
- Control street wash wastewater by pumping it back onsite, or otherwise prevent it from discharging into the systems tributary to waters of the State.

Element 3: Control Flow Rates

- Protect properties and receiving waters downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the site during construction.

Element 4: Install Sediment Controls

- Design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants.
- Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs shall be functional before other land-disturbing activities take place.
- Minimize sediment discharges from the site. The design, installation, and maintenance of erosion and sediment controls must address factors such as: the amount, frequency, intensity, and duration of precipitation; the nature of resulting stormwater runoff; and soil characteristics, including the range of soil particle sizes expected to be present onsite.

Element 5: Stabilize Soils

- Stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide, early application of gravel base on areas to be paved, and dust control.
- Control stormwater volume and velocity within the site to minimize soil erosion.
- Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
- Soils must not remain exposed and unworked for more than the time periods set forth below to prevent erosion:
  - During the regional dry season (July 1–September 30): 10 days
  - During the regional wet season (October 1–June 30): 5 days
- Stabilize soils at the end of the shift before a holiday or weekend, if needed, based on the weather forecast.
- Stabilize soil stockpiles from erosion, protect them with sediment trapping measures and, where possible, locate the stockpiles away from storm drain inlets, waterways, and drainage channels.
- Minimize the amount of soil exposed during construction activity.
- Minimize the disturbance of steep slopes.
- Minimize soil compaction and, unless infeasible, preserve topsoil.

Element 6: Protect Slopes

- Design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing the continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).
- Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

Element 7: Protect Drain Inlets

- Protect all storm drain inlets made operable during construction so that stormwater runoff shall not enter the conveyance system without first being filtered or treated to remove sediment.
- Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

Element 8: Stabilize Channels and Outlets

- Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

Element 9: Control Pollutants

- Design, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants.
- Handle and dispose of all pollutants, including waste materials and demolition debris that occur onsite, in a manner that does not cause contamination of stormwater.
- Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. Onsite fueling tanks must include secondary containment (i.e., placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest take within the containment structure). Double-walled tanks do not require additional secondary containment.
- Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.
- Discharge wheel wash or tire bath wastewater into a separate onsite treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland application, or to the sanitary sewer, with local sewer district approval.
- Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemicals to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.
- Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping, and mixer washout waters.
- If necessary, adjust the pH of stormwater to prevent violations of water quality standards.
- Ensure that washout of concrete trucks is performed offsite or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground or into storm drains, open ditches, streets, or streams. Do not dump excess concrete onsite, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.

- Obtain written approval from the Washington State Department of Ecology (Ecology) before using chemical treatment, other than carbon dioxide or dry ice, to adjust pH.

Element 10: Control Dewatering

- Discharge clean, non-turbid dewatering water, such as well-point ground water, to system tributary to, or directly into, surface waters of the State, as specified in Element #8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Note that "surface waters of the State" may exist on a construction site as well as offsite (e.g., a creek running through a site).
- Handle highly turbid or otherwise contaminated dewatering water separately from stormwater.
- Other treatment or disposal options may include: (1) infiltration; (2) transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute waters of the State; (3) Ecology-approved onsite chemical treatment or other suitable treatment technologies; (4) sanitary or combined sewer discharge with local sewer district approval, if there is no other option; and(5) use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.

Element 11: Maintain BMPs

- Maintain and repair all temporary and permanent erosion and sediment control BMPs, as needed, to ensure continued performance of their intended function in accordance with BMP specifications.
- Remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

Element 12: Manage the Project

- Phase construction activities to the maximum degree practicable and take into account seasonal work limitations.
- Inspect, maintain, and repair all BMPs as needed to ensure continued performance of their intended function. Projects regulated under the Construction Stormwater General Permit must conduct site inspections and monitoring in accordance with Special Condition S4 of the Construction Stormwater General Permit.
- Maintain, update, and implement the SWPPP.
- Projects that disturb 1 or more acres must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). By the initiation of construction, the SWPPP must identify the CESCL or inspector, who must be present onsite or on-call at all times.

- The CESCL must have the skills to assess the:
  - Site conditions and construction activities that could impact the quality of stormwater; and
  - Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.
- The CESCL must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. They must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.
- Based on the results of the inspection, construction site operators must correct the problems identified by:
  - Reviewing the SWPPP for compliance with the 13 construction SWPPP elements and making appropriate revisions within 7 days of the inspection.
  - Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs and addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, the construction site operator may request an extension within the initial 10-day response period.
  - Documenting BMP implementation and maintenance in the site log book (sites larger than 1 acre).
- The CESCL must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The CESCL or inspector may reduce the inspection frequency for temporary stabilized, inactive sites to once every calendar month.

Element 13: Protect Low Impact Development BMPs

- Not applicable; no Low Impact Development BMPs are proposed at the site.

4 Permanent Stormwater Control Plan

4.1 Existing Site Hydrology

Existing pervious and impervious areas within each drainage basin are summarized in Table 4-1. An existing conditions exhibit is attached as Appendix A. Drainage basins are shown in the Stormwater Exhibit (Appendix B.)

Table 4-1 Existing Pervious and Impervious Areas within each Drainage Basin

Drainage Basin #	Total Area (SF)	Impervious Area: Gravel Road (SF)	Impervious Area: Pile Foundations & Equipment Pads (SF)	Pervious Area: Wetland Area (SF)	Pervious Area: Vegetated Area (SF)	Ratio of Impervious Area to Vegetated Area
1	252,698	0	0	85,729	166,969	0%
2	532,550	0	0	0	532,550	0%
3	1,227,824	1,598	0	379,557	846,669	0%
TOTAL	2,013,072	1,598		2,011,474		

4.2 Developed Site Hydrology

Proposed pervious and impervious areas within each drainage basin are summarized in Table 4-2. No change to the configuration of existing drainage basins is proposed as a result of the planned development.

Proposed improvements are shown in the Stormwater Exhibit (Appendix B.) For the purposes of calculating impervious surface areas onsite, PV panels were treated as disconnected or ineffective impervious surface and not counted towards impervious surface totals. The PV panels are supported on piles and rotate throughout the day, minimizing disturbance to soil and vegetation beneath the panels and allowing rainfall on each panel to infiltrate at the ground surface. The footprint area of piles, gravel equipment pads, and gravel access roads are counted toward impervious areas within each basin.

Table 4-2 Proposed Pervious and Impervious Areas within each Drainage Basin with Driveway Option A

Drainage Basin #	Total Area (SF)	Impervious Area		Pervious Area		Ratio of Impervious Area to Vegetated Area
		Gravel Road (SF)	Pile Foundations & Equipment Pads (SF)	Wetland Area (SF)	Vegetated Area (SF)	
DB-1	252,698	0	349	85,729	166,620	0.21%
DB-2	532,550	0	4,570	0	527,980	0.87%
DB-3	1,227,824	33,877	5,985	378,606	809,356	5%
TOTAL	**2,013,072**	**44,781**		**1,968,291**		

Table 4-3 Proposed Pervious and Impervious Areas within each Drainage Basin with Driveway Option B

Drainage Basin #	Total Area (SF)	Impervious Area		Pervious Area		Ratio of Impervious Area to Vegetated Area
		Gravel Road (SF)	Pile Foundations & Equipment Pads (SF)	Wetland Area (SF)	Vegetated Area (SF)	
DB-1	252,698	0	349	85,729	166,620	0.21%
DB-2	532,550	0	4,570	0	527,980	0.87%
DB-3	1,227,824	40,231	5,985	370,018	811,590	6%
TOTAL	**2,013,072**	**51,135**		**1,961,937**		

4.3 Hydrologic Modeling

Hydrologic modeling is not included as a part of the Preliminary stormwater submittal. The Project proposes to match existing hydrologic conditions.

4.4 Flow Control System

Stormwater in each of the three basins onsite will be managed via Full Dispersion, as described in BMP F6.42 – Full Dispersion in the 2019 SWMMEW in the 2019 SWMMEW. Tables 4-2 and 4-3 show the ratio of impervious area to vegetated area within each basin for each of the two access driveway options. No basin exceeds an impervious to vegetated area ratio of 10%; therefore, all basins are eligible for Full Dispersion. Note that for the purpose of determining eligibility for Full Dispersion, wetland areas were not counted toward the vegetated area totals.

4.5 Water Quality System

The proposed gravel access road to the Project site can be classified as "infrequently used maintenance access roads" per the SWMMEW, due to the infrequent visits that maintenance staff will be making to the site. Therefore, the access roads fall under the definition of an NPGIS. Per Core Requirement #5 of the 2019 SWMMEW, the threshold for water quality treatment is 5,000 square feet of PGIS. The Project is exempt from the water quality treatment requirement, as no PGIS is proposed to be constructed onsite.

4.6 Conveyance System Analysis and Design

Per KCC 12.06, conveyance systems shall be analyzed and designed to manage the 25-year peak flow. Sizing of conveyance elements associated with the final access driveway design will be included with the Final Stormwater Submittal. No changes to the existing drainage patterns or increase in runoff rates are proposed as a result of the planned development. At the time of preparation of this report, no record of drainage complaints exists for the Project site. It is therefore expected that management of onsite stormwater via Full Dispersion and maintaining existing infiltration and drainage patterns onsite will be adequate to manage the 25-year peak flow.

5 References

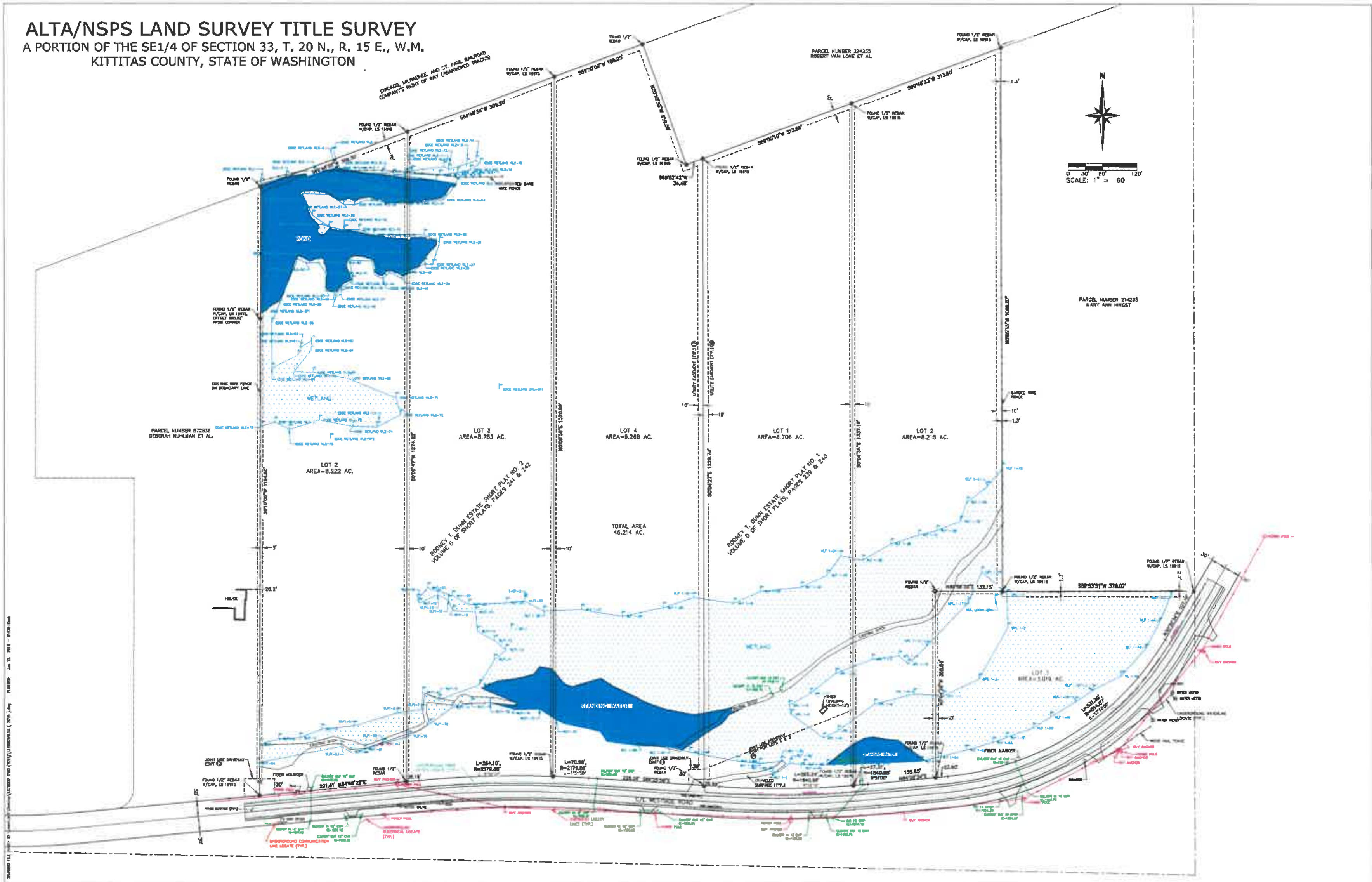
Ecology (Washington State Department of Ecology). 2019. *2019 Stormwater Management Manual for Eastern Washington*. Water Quality Program, Aug. 2019. fortress.wa.gov/ecy/publications/documents/1810044.pdf.

NRCS (Natural Resources Conservation Service). 2019. Custom Soil Resource Report, 12 June 2019.

A Existing Conditions Exhibit

ALTA/NSPS LAND SURVEY TITLE SURVEY

A PORTION OF THE SE1/4 OF SECTION 33, T. 20 N., R. 15 E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON



SURVEYED BY: SRW		CHECKED BY:	
DRAWN BY: SRW		APPROVED BY:	
DATE	BY	REVISION	CK'D	APPR.

NOTES:

PRELIMINARY

ALTA/NSPS LAND TITLE SURVEY

LOTS 1-3 RODNEY T DUNN ESTATE SHORT PLAT NO. 1
& LOTS 2-4 RODNEY T DUNN ESTATE SHORT PLAT NO. 2

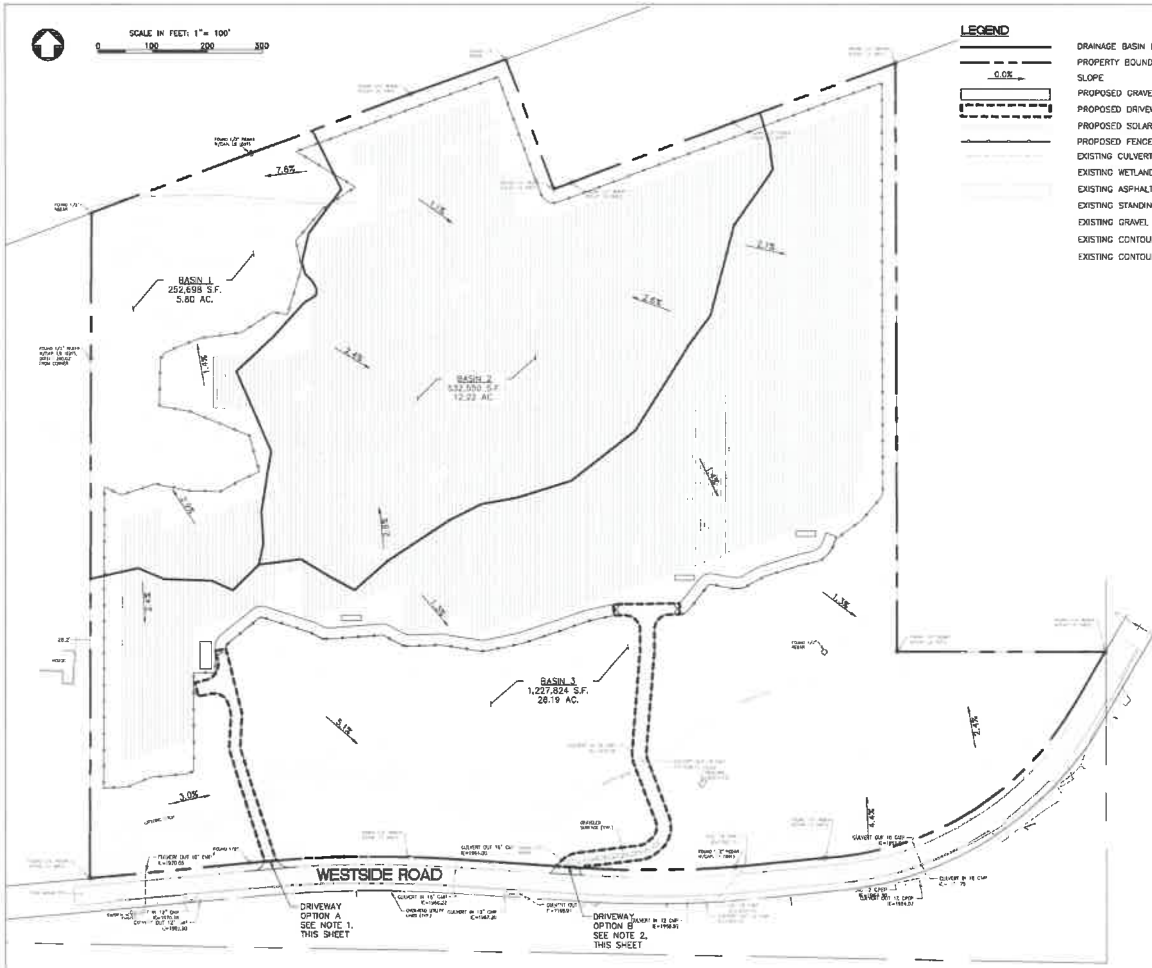
KITTITAS COUNTY WASHINGTON

SCALE: 1"=60' | DATE: 6/13/19 | APSSM PROJECT NO.: 1376002 | ACAD NAME: 1376002ALTA (2015).dwg

SHEET 2 OF 2

B

Stormwater Exhibit



LEGEND

- DRAINAGE BASIN BOUNDARY
- PROPERTY BOUNDARY
- 0.0% SLOPE
- PROPOSED GRAVEL SURFACE
- PROPOSED DRIVEWAY OPTION
- PROPOSED SOLAR PANELS
- PROPOSED FENCE
- EXISTING CULVERT
- EXISTING WETLAND
- EXISTING ASPHALT PAVEMENT
- EXISTING STANDING WATER
- EXISTING GRAVEL SURFACE
- EXISTING CONTOURS (2')
- EXISTING CONTOURS (10')

PROPOSED CONDITIONS - DRIVEWAY OPTION A

DRAINAGE BASIN #	TOTAL AREA (SF)	IMPERVIOUS AREA - ROAD (SF)	IMPERVIOUS AREA - PILES & EQUIPMENT PADS (SF)	WETLAND AREA (SF)	VEGETATED AREA (SF)	RATIO OF IMPERVIOUS TO VEGETATION AREA	NATIVE VEGETATION AREA	REQUIRED VEGETATION AREA FOR FULL DISPERSION	FULL DISPERSION
1	252,698	0	[illegible]	[illegible]	169,670	[illegible]	66%	1%	Yes
2	532,550	0	[illegible]	0	527,000	0.87%	99%	1%	Yes
3	1,227,824	[illegible]	5,965	[illegible]	[illegible]	[illegible]	66%	[illegible]	Yes
TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

PROPOSED CONDITIONS - DRIVEWAY OPTION B

DRAINAGE BASIN #	TOTAL AREA (SF)	IMPERVIOUS AREA - ROAD (SF)	IMPERVIOUS AREA - PILES & EQUIPMENT PADS (SF)	WETLAND AREA (SF)	VEGETATED AREA (SF)	RATIO OF IMPERVIOUS TO VEGETATION AREA	NATIVE VEGETATION AREA	REQUIRED VEGETATION AREA FOR FULL DISPERSION	FULL DISPERSION
1	[illegible]	0	[illegible]	[illegible]	169,620	[illegible]	66%	1%	Yes
2	532,550	0	4,570	0	527,980	0.87%	99%	1%	Yes
3	1,227,824	18,251	5,995	[illegible]	911,550	6%	69%	56%	Yes
TOTAL	[illegible]	18,251	[illegible]	[illegible]	1,5[illegible]6,190				

EXISTING CONDITIONS

DRAINAGE BASIN #	TOTAL AREA (SF)	IMPERVIOUS AREA - ROAD (SF)	IMPERVIOUS AREA - PILES & EQUIPMENT PADS (SF)	WETLAND AREA (SF)	VEGETATED AREA (SF)
1	252,698	0	0	[illegible]	[illegible]
2	532,550	0	0	0	532,550
3	1,227,824	1,596	0	[illegible]	[illegible]
TOTAL	[illegible]	1,596	0	[illegible]	[illegible]

DRAINAGE NOTES

1. DRIVEWAY OPTION A – 10,005 S.F. TOTAL DRIVEWAY SURFACE AREA
2. DRIVEWAY OPTION B – 18,885 S.F. TOTAL DRIVEWAY SURFACE AREA
3. THE PURPOSE OF THIS DRAINAGE PLAN IS FOR A CONDITIONAL USE PERMIT SUBMITTAL FOR REVIEW AND APPROVAL BY KITTITAS COUNTY IN ACCORDANCE WITH KCC 17.61C.070(1) AND PRELIMINARY STORMWATER SUBMITTAL REQUIREMENTS PER KCC 12.06.060(A)
4. NO CHANGES TO THE CONFIGURATION OF EXISTING DRAINAGE BASINS IS PROPOSED AS A RESULT OF THE SITE IMPROVEMENTS.
5. STORMWATER WILL BE MANAGED ON SITE BY FULL DISPERSION (BMP F6.42 – 2019 SWMMEW). CALCULATION OF IMPERVIOUS SURFACE RATIOS IS PROVIDED IN THE 'PROPOSED CONDITIONS' TABLES ABOVE. NOTE THAT WETLAND AREAS IN EACH BASIN WERE NOT COUNTED TOWARDS VEGETATED AREA TOTALS FOR THE PURPOSES OF DETERMINING IMPERVIOUS SURFACE RATIOS.
6. THE FOOTPRINT AREA OF PILES, GRAVEL EQUIPMENT PADS, AND GRAVEL ACCESS ROAD ARE COUNTED TOWARDS IMPERVIOUS AREAS WITHIN EACH BASIN.
7. IMPERVIOUS SURFACE AREAS OF THE SOLAR ARRAYS ARE CALCULATED AS THE AREA OF THE PILE FOUNDATIONS FOR EACH ARRAY. PV PANELS WERE TREATED AS DISCONNECTED OR INEFFECTIVE IMPERVIOUS SURFACE AND NOT COUNTED TOWARDS IMPERVIOUS SURFACE TOTALS. SOIL AND VEGETATION BENEATH THE PANELS WILL BE MAINTAINED IN EXISTING CONDITIONS, ALLOWING RAINFALL ON EACH PANEL TO INFILTRATE AT THE GROUND SURFACE.
8. NO POLLUTION GENERATING IMPERVIOUS SURFACES ARE PROPOSED AS PART OF THE SITE IMPROVEMENTS. WATER QUALITY TREATMENT IS NOT REQUIRED.

HEELSTONE
RENEWABLE ENERGY

ecology and environment, inc.
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APPROVED BY: T. CAMPBELL

WESTSIDE SOLAR PROJECT
WESTSIDE ROAD – KITTITAS COUNTY, WA

DRAINAGE PLAN

C200

PROJECT: 1009951.001.05 | SCALE: NOTED | CAD FILE NO: WSS_C200 | DATE ISSUED: 10/16/19 CONDITIONAL USE

C NRCS Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Kittitas County Area, Washington

June 12, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

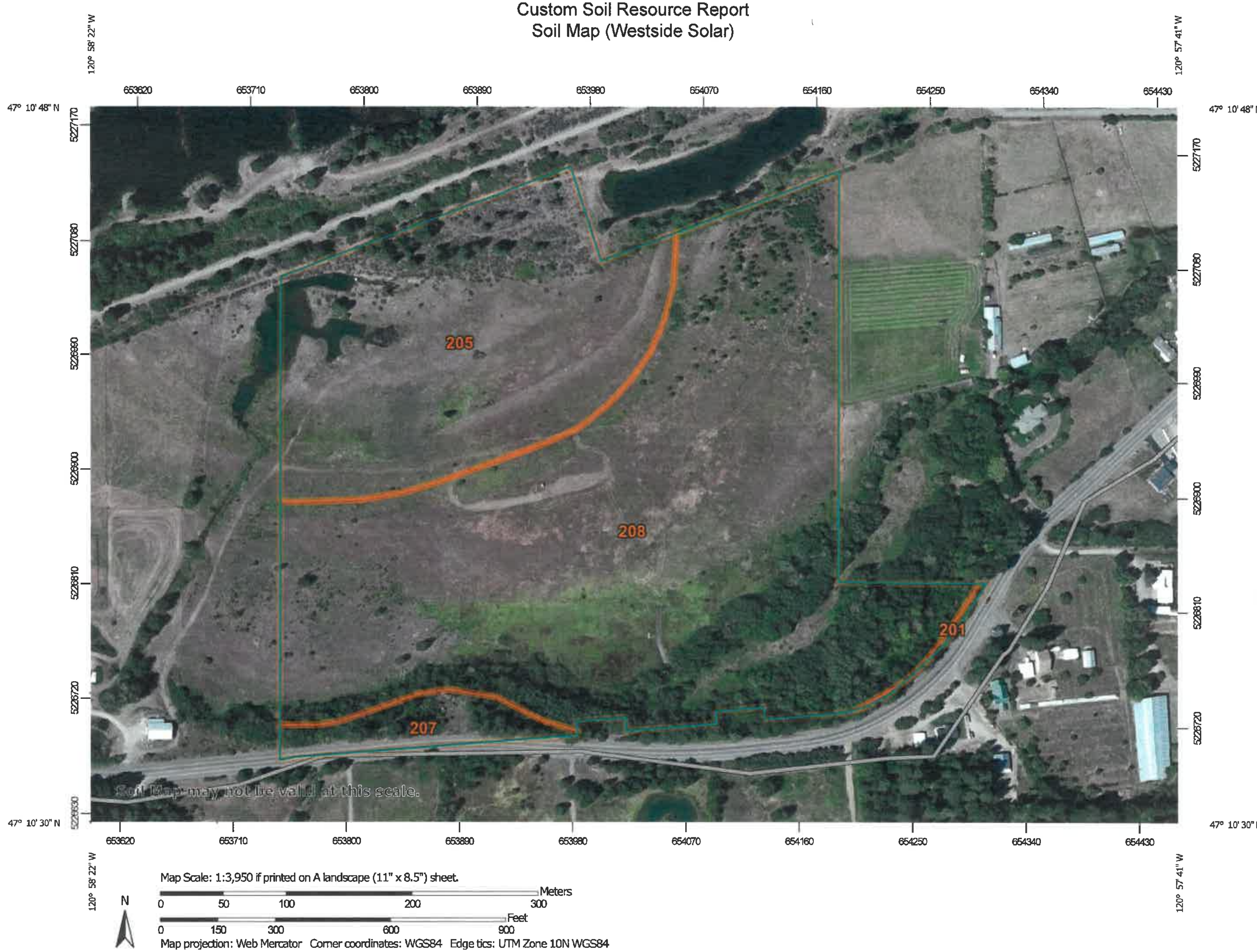
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map (Westside Solar)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kittitas County Area, Washington
Survey Area Data: Version 11, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 25, 2010—Oct 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Westside Solar)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
201	Roslyn ashy sandy loam, 0 to 5 percent slopes	0.1	0.2%
205	Xerofluvents, 0 to 5 percent slopes	13.9	29.9%
207	Quicksell loam, 0 to 5 percent slopes	1.7	3.7%
208	Patnish-Mippon-Myzel complex, 0 to 3 percent slopes	30.8	66.2%
Totals for Area of Interest		**46.5**	**100.0%**

Map Unit Descriptions (Westside Solar)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Kittitas County Area, Washington

201—Roslyn ashy sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ktv
Elevation: 1,900 to 2,400 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 85 to 115 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Roslyn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Roslyn

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Glacial drift with a mantle of loess and volcanic ash

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 8 inches: ashy sandy loam
H2 - 8 to 15 inches: ashy sandy loam
H3 - 15 to 37 inches: loam
H4 - 37 to 49 inches: gravelly loam
H5 - 49 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Other vegetative classification: grand fir/common snowberry/pinegrass (CWS336)
Hydric soil rating: No

Minor Components

Nard

Percent of map unit: 10 percent
Hydric soil rating: No

Volperie

Percent of map unit: 5 percent
Hydric soil rating: No

205—Xerofluvents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2kv0
Elevation: 500 to 2,500 feet
Mean annual precipitation: 7 to 50 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerofluvents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerofluvents

Setting

Landform: Flood plains, stream terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
H1 - 2 to 20 inches: sandy loam
H2 - 20 to 23 inches: loamy sand
H3 - 23 to 60 inches: extremely cobbly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 36 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Other vegetative classification: Douglas-fir/elk sedge (CDG132)
Hydric soil rating: No

Minor Components

Racker

Percent of map unit: 10 percent
Hydric soil rating: No

Aquolls

Percent of map unit: 5 percent
Landform: Flood plains
Ecological site: WET ALKALI MEADOW 6-10 PZ (R007XY603WA)
Hydric soil rating: Yes

207—Quicksell loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2kv2
Elevation: 1,800 to 3,100 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Quicksell and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quicksell

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 20 inches: clay loam
H3 - 20 to 43 inches: clay
H4 - 43 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to abrupt textural change
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 5 to 15 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Douglas-fir/common snowberry/pinegrass (CDS638)
Hydric soil rating: No

Minor Components

Swauk

Percent of map unit: 10 percent
Hydric soil rating: No

Roslyn

Percent of map unit: 5 percent
Hydric soil rating: No

Teanaway

Percent of map unit: 5 percent
Hydric soil rating: No

208—Patnish-Mippon-Myzel complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2lgj
Elevation: 1,800 to 4,800 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Patnish and similar soils: 40 percent
Mippon and similar soils: 30 percent
Myzel and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Patnish

Setting

Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium mixed with volcanic ash in the upper part

Typical profile

H1 - 0 to 7 inches: ashy loam
H2 - 7 to 14 inches: ashy loam

H3 - 14 to 27 inches: loam
H4 - 27 to 35 inches: very gravelly sandy loam
H5 - 35 to 60 inches: extremely cobbly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 25 to 35 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 35 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 3c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Other vegetative classification: Douglas-fir/common snowberry/pinegrass (CDS638)
Hydric soil rating: No

Description of Mippon

Setting

Landform: Stream terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 12 inches: very cobbly loam
H2 - 12 to 18 inches: very gravelly sandy loam
H3 - 18 to 60 inches: extremely cobbly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 27 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 35 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Other vegetative classification: Douglas-fir/common snowberry/pinegrass (CDS638)
Hydric soil rating: No

Description of Myzel

Setting

Landform: Alluvial fans, flood plains
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Alluvium with an influence of volcanic ash in the upper part

Typical profile

H1 - 0 to 6 inches: ashy sandy clay loam
H2 - 6 to 22 inches: ashy sandy clay loam
H3 - 22 to 38 inches: ashy sandy clay loam
H4 - 38 to 57 inches: sandy clay loam
H5 - 57 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 35 to 57 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Other vegetative classification: Douglas-fir/common snowberry/pinegrass (CDS638)
Hydric soil rating: No

Minor Components

Xerofluvents

Percent of map unit: 5 percent
Hydric soil rating: No

References

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