



CONSULTANTS IN THE EARTH AND ENVIRONMENTAL SCIENCES

GROUNDWATER MONITORING WORK PLAN

**CAFO GENERAL PERMIT WAG015020
SKYRIDGE FARMS DAIRY
Skyridge Farms LLC
Sunnyside, Washington**

October 4, 2023

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**GROUNDWATER MONITORING WORK PLAN
CAFO GENERAL PERMIT WAG015020
SKYRIDGE FARMS DAIRY
4701 Scoon Road
Sunnyside, Washington**

Reference:

IES Project No. SRF-2301.001

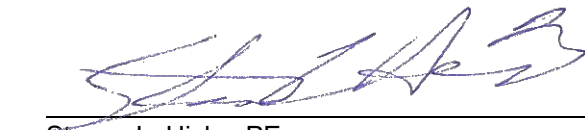
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DISTRIBUTION LIST

NAME**ORGANIZATION**

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ACRONYMS AND ABBREVIATIONS

ac	acre
ac-ft	acre-feet
AMSL	Above Mean Sea Level
ASTM	American Society for Testing and Materials
bgs	below ground surface
BOD	Biochemical Oxygen Demand
°C	degrees Celsius
CAFO	Concentrated Animal Feeding Operation
CAR	Certified Analytical Report
cf	cubic feet
cfs	cubic feet per second
cm	centimeter
cm/s	centimeters per second
CPS	Conservation Practice Standard
CSM	Conceptual Site Model
cy	cubic yard
DNMP	Dairy Nutrient Management Plan
DO	Dissolved Oxygen
DQO	Data Quality Objective
DTW	depth to water
<i>E. coli</i>	<i>Escherichia coli</i>
EB	Equipment Blank
Ecology	Washington State Department of Ecology
eFOTG	electronic Field Office Technical Guide
EPA	United States Environmental Protection Agency
°F	degrees Fahrenheit
FB	Field Blank
FD	Field Duplicate
ft	feet
ft/d	feet per day
gal	gallon
GCL	Geosynthetic Clay Liner
GP	General Permit
gpd	gallons per day
HDPE	High Density Polyethylene
HSP	Health and Safety Plan

ACRONYMS AND ABBREVIATIONS



IES	Inland Earth Sciences Corporation
in	inch
in/hr	inches per hour
kg	kilogram
L	liter
lb	pound
lbs/ac	pounds per acre
lbs/t	pounds per ton
LRL	Laboratory Reporting Limit
IWMP	Irrigation Water Management Plan
MDL	Method Detection Limit
MPPP	Manure Pollution Prevention Plan
MCL	Maximum Contaminant Level
m	meter
meq/L	milliequivalents per liter
mS/cm	millisiemens per centimeter
µg	microgram
µg/L	micrograms per liter
µm	micrometer
mg	milligram
mg/L	milligrams per liter
mgd	million gallons per day
mil	thousandths of an inch (e.g., “60 mil” is equal to 60 thousandths of an inch, or 0.060-inch)
mL	milliliter
mm	millimeter
mV	millivolt
NAPT	North American Proficiency Testing
NAVD88	North American Vertical Datum 1988
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
MSDS	Material Safety Data Sheets
NTU	Nephelometric Turbidity Unit
ORP	Oxidation-Reduction Potential



ACRONYMS AND ABBREVIATIONS

PARCC	Precision, Accuracy, Representativeness, Comparability, and Completeness
pcf	pounds per cubic foot
PE	Polyethylene
PS	Polystyrene
PVC	Polyvinyl Chloride
ppm	parts-per-million
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCW	Revised Code of Washington
RID	Roza Irrigation District
SAP	Sampling and Analysis Plan
sf	square feet
SM	Standard Method
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasures
SU	Standard Unit
SWD	State Waste Discharge
SYCD	South Yakima Conservation District
TOC	top of casing
TKN	Total Kjeldahl Nitrogen
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WA	Washington State
WAC	Washington Administrative Code
WGS84	World Geodetic System 1984
WSDA	Washington State Department of Agriculture
WSP	Waste Storage Pond
yd	yard
yr	year



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REVISION HISTORY

<u>VERSION</u>	<u>DATE</u>	<u>REVISIONS</u>
1.0	October 5, 2023	Initial Work Plan to Ecology



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1 INTRODUCTION

1.1 Purpose

A Manure Pollution Prevention Plan (MPPP) is required by Special Condition S4.A of the Washington State Department of Ecology (Ecology) Concentrated Animal Feeding Operation (CAFO) National Pollutant Discharge Elimination System (NPDES) And State Waste Discharge (SWD) General Permit (the "Permit") for any facility obtaining coverage under the Permit. Special Condition S4.A.4.d.i of the Permit requires a CAFO located within a **Nitrate Priority Area** to complete the requirements of Permit Special Condition S5.D *Groundwater Monitoring*. A medium or large CAFO located in a **Nitrate Priority Area** that is categorized as *moderate*, *moderately high*, *high*, or *very high* priority must prepare a Groundwater Monitoring Work Plan (the "Plan"), install a groundwater monitoring network, and conduct groundwater monitoring according to the procedures presented in Permit Special Condition S5.D.1. This Plan is provided to Ecology as required by Permit Special Condition S5.D.1.a *Develop the Work Plan*. The Plan was developed in accordance with the Permit requirements and associated guidance, including Ecology Publication No. 93-36 *Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems* (Ecology, 1993) and Ecology Publication No. 96-02 *Implementation Guidance for the Groundwater Quality Standards* (Ecology, 2005).

1.2 Facility Description

The Skyridge Farms Dairy (the "Facility") is located at 4701 Scoon Road, Sunnyside, Washington, one mile north of the Scoon Road and Phipps Road intersection and approximately four miles north of Sunnyside (Figure 1). The Facility is a Washington State Department of Agriculture (WSDA) Licensed Milk Producer **actively covered under Ecology CAFO NPDES and SWD General Permit (the "Combined Permit") WAG015020**. The Facility is approximately 715 acres in area and is generally situated within:

- The south half of the southwest quarter *south of the Roza Main Canal* of Section 35, Township 11 North, Range 22 East, Willamette Meridian (S $\frac{1}{2}$, SW $\frac{1}{4}$, S. 35, T. 11N, R. 22E, W.M.), and;
- The east half of Section 2 (E $\frac{1}{2}$, S. 2);
- The west half of the northwest quarter of Section 1 (W $\frac{1}{2}$, NW $\frac{1}{4}$, S. 1), and;
- The south half of Section 1 (S $\frac{1}{2}$, S. 1) *except the southeast quarter of the southwest quarter* (SE $\frac{1}{4}$, SW $\frac{1}{4}$);

of Township 10 North, Range 22 East, Willamette Meridian (T. 10N, R. 22E, W.M.), of Yakima County, Washington (Figure 2). The approximate geographic coordinates of the Facility (centroid) are 46.381932°N, 120.014677°W (WGS84).

The topography in the Facility area consists of undulating ground with numerous parallel draws that are oriented north to south. Overall topographic relief in the area is nearly level to gently sloping from north to south (Figure 2) towards Sunnyside and the Yakima River. The local topography varies from nearly level to gently sloping. The general Facility elevation ranges from 950 feet AMSL in the south to 1,100 feet AMSL in the north. Land uses in the Facility vicinity are primarily agricultural crop production interspersed with other dairy facilities and occasional residential housing units (Figure 3). The closest surface water body is the Roza Irrigation District (RID) Main Canal (the "Roza Main Canal"), an irrigation water supply



canal, located adjacent to the northern boundary of the Facility (Figure 3). The Roza Main Canal ultimately discharges unused irrigation flow to the Yakima River via Corral Creek, at a point approximately two miles west-northwest of Benton City, Washington on the north bank of the river. The Facility is located within a *very high* draft Nitrate Priority Area as mapped on Ecology's website *Protecting Washington's Groundwater - The Nitrate Project*, accessible at the following link: <https://arcg.is/qLKqz>, under the Priority Areas tab.

The Facility's production area (Figure 3) consists of 27 acres of animal pens consisting of open-lot pens and free-stall barns, five acres of commodity storage, nine acres of solid manure and compost storage, two waste storage ponds totaling 6.2 acres, a 2.4-acre manure solids separation plant, two milking parlors, and office and shop buildings. The Facility (Figure 3) includes 543 acres of agricultural fields used for forage crop production, three stormwater catch basins, an additional six acres of solid manure and compost storage, and various private and public roads. All preceding presented acreage values are based on approximate measurements. Approximately 3,500 dairy cows are typically present at the Facility on a regular basis, including 2,900 milking cows, 450 dry cows, and 150 heifers.

1.3 General Geologic and Hydrogeologic Conditions

The Facility is located within the Benton Basin of the lower Yakima Valley. Geology consists of Holocene Pleistocene, and Pliocene-epoch fine- and coarse-grained sediments overlying a sequence of three Miocene-epoch flood basalt flows known as the Columbia River Basalt Group (CRBG). The CRBG flows (from youngest to oldest) consist of (1) the Saddle Mountains Basalt (the "SMB"), (2) the Wanapum Basalt, and (3) the Grande Rhonde Basalt. The CRBG flows are separated by two distinct sedimentary interbeds, both members of the Ellensburg Formation: (1) the Mabton Member (or "Mabton interbed"), separating the SMB and the Wanapum Basalt and (2) the Vantage Member (or "Vantage interbed"), separating the Wanapum Basalt and the Grande Rhonde Basalt. The structural setting of Benton Basin of the lower Yakima Valley is created by bounding ridges such as the Rattlesnake Mountains, Toppenish Ridge, and Horse Heaven Hills. The uppermost basalts of the SMB are typically exposed in these upland ridges. This SMB averages more than 500 feet thick. The underlying Wanapum Basalt averages 600 feet thick. The Mabton interbed is present at an average thickness of 70 feet.

The Saddle Mountain Basalt is the youngest and least extensive of the basalt units (Jones and Vaccaro, 2008). The unit is located within the southeast and south-central part of the Yakima River Basin; the unit is typically hydraulically confined and most of the unit lies beneath the sedimentary basin fill deposits. The SMB is composed of at least 13 named flows and 5 interbed members. The SMB flow texture and composition differ greatly throughout its extent. The sedimentary interbeds contained within the SMB are common, up to 50 feet thick, and range in composition from clay to sand and gravel. The SMB also may contain some of the younger basalts present in the area.

The Wanapum Basalt is located within the northeast, central, south, and southeastern part of the Yakima River Basin (Jones and Vaccaro, 2008). The Wanapum Basalt is hydraulically confined; most of the Wanapum Basalt lies beneath the basin-fill deposits, the SMB, or the Mabton interbed. The Wanapum Basalt contains predominantly the basalt and interbed members associated with the Wanapum Basalt. The Wanapum Basalt is composed of at least six named flows and two interbed members. The Wanapum Basalt flows are generally medium-grained to moderately plagioclase-phyric, olivine bearing, and relatively high in iron and titanium oxides. The clay to sand-and-gravel sedimentary interbeds in the Wanapum Basalt are less common than those in the SMB and generally are only a few feet thick. But the



Wanapum unit also may contain some of the younger basalt, particularly in areas along the margins of the unit extent and where the younger basalt abuts or overlies the Wanapum Basalt.

The Mabton interbed separates the SMB and the underlying Wanapum Basalt (Jones and Vaccaro, 2008). The Mabton sedimentary interbed is located within the southeast and south-central part of the Yakima River Basin. The unit is hydraulically confined, with most of the unit present beneath the Saddle Mountains Basalt. The Mabton interbed generally consists of clay, shale, claystone, clay with basalt, clay with sand, sand, sand-and-gravel, and sandstone. deposited by the ancestral Columbia River, Yakima River, and tributaries. The thickness of these sedimentary units averages less than 200 feet in the lower Benton Basin but up greater than 500 feet in the Toppenish Basin.

The Valley is filled with a variety of sediments that thin out along the flanks of the basalt ridges. These sediments include: (1) Late Pleistocene to Holocene alluvial fan deposits shed from the rising ridges and large areas of loess; (2) thick deposits of alternating fine sand and silt deposited by the Late Pleistocene Missoula Floods; (3) Early Pleistocene loess; and (4) Mabton interbed sediments of the Ellensburg Formation. The Mabton interbed is coarser than overlying material, consisting of medium to coarse sand interbedded with thinner layers of silt and gravel. The overlying Pleistocene alluvial fan and loess material occurs as 15 to 30 feet of geographically heterogeneous clay- to gravel-sized material. The upper 10 to 30 feet are the Late Pleistocene Flood Silts typically consisting of a basal deposit of silty sand capped by clayey silt to very fine sand.

There are two main aquifer types within the Valley (1) a surficial unconfined to semi-confined alluvial aquifer and (2) an extensive basalt aquifer of great thickness underlying the sedimentary deposits. The basalt aquifer is believed to be semi-isolated from the surficial aquifer and stream systems. Groundwater flow within the surficial aquifer generally follows topography, with natural recharge occurring within the headlands and on the sides of the valley and discharge occurring to the Yakima River. Flow within the uppermost portions of the underlying basaltic aquifer also generally follows this pattern.

The surficial unconfined to semi-confined alluvial aquifer Lower Yakima Valley consists of sediments shed by the ridges at the margins of the study area and those deposited in the valley bottom. These sediments have an internal structure that strongly controls groundwater movement. As the water moves through these sediments, it tends to follow preferential flow paths composed of coarser sediments. Groundwater at shallower depths in the uppermost sediments tends to flow toward the Yakima River. Locally, the flow direction may be modified by geologic structures and by irrigation practices, drains, ditches, canals, and other hydrologic features. The water table is found at shallower depths as the Valley is approached from the basalt ridges. Near the Yakima River, it may be less than 10 feet to water, especially during the irrigation season. Vaccaro *et al* (2009) map water table flow direction in Facility area generally from northeast to southwest, toward the Yakima River.

Groundwater within the CRBG is found in fractures and interbeds formed of clinkers, permeable lava, paleolacustrine deposits, or paleosols and may occur at significant depths in the upland ridges, such as Horse Heaven Hills. Because the basalts extend to great depths, the deeper basaltic layers may convey waters across local flow divides to more regionally significant discharge locations such as the Columbia River. This pattern produces a major flow direction from northwest to southeast as water moves down the valley parallel to the course of the Yakima River.



1.4 General Soil Types

Soil types for the Facility is described using the Natural Resources Conservation Service (NRCS) *Web Soil Survey*), accessed at: <https://websoilsurvey.sc.egov.usda.gov/>. The information provided by the custom soils resource report describes the Facility as underlain by four primary soil types:

- Burke silt loam
- Scoon silt loam
- Sinloc silt loam
- Warden silt loam

The Burke silt loam develops on hillslopes and hills with the parent material consisting of loess. The depth to a root-restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. There is no zone of water saturation within a depth of 72 inches.

The Scoon silt loam develops on alluvial fans, terraces with the parent material consisting of loess. The depth to a root-restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. There is no zone of water saturation within a depth of 72 inches.

The Sinloc silt loam develops on terraces with the parent material consisting of lacustrine deposits with a mantle of loess. The depth to a root-restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. A seasonal zone of water saturation is present at 27 inches from May through October.

The Warden silt loam develops on terraces with the parent material consisting of loess over lacustrine deposits. The depth to a root-restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. There is no zone of water saturation within a depth of 72 inches.

2 GROUNDWATER MONITORING NETWORK

A groundwater quality monitoring network will be installed at the Facility. **As required by Permit Special Condition S5.D.1**, all production areas and land application fields will be monitored. If the CAFO facility is not co-located, separate groundwater monitoring networks for each area will be established. Land application fields with similar management practices and site conditions including but not limited to soil type and hydrogeology, will be grouped together, so long as representative samples can be obtained. The groundwater monitoring network will have adequate groundwater monitoring wells downgradient of the CAFO facility to ensure a high probability of detecting groundwater impacts when present. At least one groundwater monitoring well will be installed upgradient of the CAFO facility monitored by the network. Groundwater monitoring will be conducted in the uppermost saturated zone.



2.1 Preliminary Hydrogeological Investigation

A preliminary hydrogeological investigation will be conducted at the Facility to evaluate groundwater conditions with respect to location, depth, and flow direction of uppermost saturated zone. This investigation will be accomplished using both available information and intrusive means, including the installation of piezometers to evaluate groundwater depth and flow direction both spatially and temporally. Piezometers will be installed and constructed in accordance with WAC 173-160 *Minimum Standards for Construction and Maintenance of Wells*. A Washington State Licensed Geologist or Professional Engineer will characterize the subsurface lithology in general accordance with ASTM Standard D2487 – *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* and ASTM Standard D2488 – *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)* during installation.

2.2 Development of Groundwater Monitoring Installation Work Plan

Based on the information obtained by the preliminary hydrogeological investigation, a groundwater evaluation program in accordance with WAC 173-200-080 *Water Quality Standards for Groundwaters of the State of Washington, Evaluation* will be developed for the Facility. The groundwater evaluation program may include:

- Groundwater monitoring for a specific activity;
- Groundwater monitoring at selected sites for a group of activities;
- Monitoring of the vadose zone;
- Evaluation and monitoring of effluent quality;
- Evaluation of management practices.

The Groundwater Monitoring Installation Work Plan will present the means and methods to evaluate potential impacts of the Facility on groundwater quality as related to potential nitrate loading (Permit Special Condition S4.L) and/or waste storage structures (Permit Special Condition S7.C).

2.3 Installation of Groundwater Monitoring Network

The groundwater quality monitoring network required by Permit Special Condition S5.D will be installed as described in the Groundwater Monitoring Installation Work Plan. A minimum of three (3) groundwater monitoring wells will be installed at the Facility as part of the groundwater monitoring network.

2.3.1 Installation of Groundwater Monitoring Wells

Groundwater monitoring wells will be installed and constructed in accordance with WAC 173-160 *Minimum Standards for Construction and Maintenance of Wells*. The types of monitoring wells, methods of installation, and specific materials to be used for well construction will be presented in the Groundwater Monitoring Installation Work Plan. A Washington State Licensed Geologist or Professional Engineer will characterize the subsurface lithology in general accordance with ASTM Standard D2487 – *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* and ASTM Standard D2488 – *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)* during monitoring well installation.



Well tag numbers, well coordinates in latitude and longitude surveyed to the World Geodetic System 1984 (WGS84) datum, and well top-of-casing elevations surveyed to the North American Vertical Datum 1988 (NAVD88) for each groundwater monitoring well will be reported to Ecology. Surveying will be conducted by a Washington State Professional Land Surveyor.

3 GROUNDWATER MONITORING PROGRAM

All groundwater monitoring activities will be performed under the direction of a Washington State Licensed Geologist or Professional Engineer.

3.1 Groundwater Monitoring Frequency

Groundwater monitoring will be conducted quarterly at the Facility in March, June, September, and December. Ecology will be notified at least 30 days prior to monitoring activities as required Permit Special Condition S5.D.1.c.

3.2 Groundwater Well Sampling Methods

This section presents general sampling methodology for collecting field water quality parameters and laboratory analytical samples from groundwater monitoring wells. Groundwater monitoring well sampling will be conducted in general accordance with ASTM Standard D4448 – *Standard Guide for Sampling Ground-Water Monitoring Wells* (as current) except as otherwise noted. Information regarding the sampling event (i.e., depth to water measurements, well purge readings, sample collection information) will be collected in general accordance with ASTM Standard D6089 – *Standard Guide for Documenting a Groundwater Sampling Event*, as current.

3.2.1 Depth to Water Measurements

Before groundwater sampling occurs, the depth to water in groundwater monitoring wells will be measured from the surveyed reference point of each well with an electric depth-to-water indicator to the nearest 0.01-foot. Depth to water measurements will be collected within a specific condensed timeframe to provide synoptic groundwater elevation data and reduce atmospheric pressure effects on the water levels. Depth to water measurements will be converted to groundwater elevations by subtracting the measurements from the surveyed reference point elevation for each well.

3.2.2 Well Purging Methodology

Groundwater well purging will be accomplished using “low-flow” techniques performed in general accordance with ASTM Standard D6771 – *Standard Practice for Low-Flow Purging and Sampling Used for Groundwater Monitoring*, as current.

Water quality parameters will be measured and recorded at three-to-five-minute intervals using a multiparameter water quality meter (the “WQ Meter”) equipped with a flow-through cell during purging activities. The WQ Meter (e.g., HORIBA U-50™ Series or YSI ProDSS™) is composed of a sensor unit that is in contact with the pumped groundwater via the flow-through cell and a hand-held monitor that allows the user to view and log sensor readings. The WQ Meter can make simultaneous measurements for multiple water quality parameters (i.e., dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and turbidity). The WQ Meter will be calibrated daily or as recommended by the manufacturer using the calibration procedures specified in the WQ Meter’s Operating Manual.



Low-flow purging will be considered complete when the following criteria are achieved:

- The depth to water in the well has stabilized (ceased decreasing).
- The pumping rate has stabilized to not greater than 1 L per minute.
- Water quality parameters stabilize for three consecutive readings within the following ranges:
 - pH within ± 0.1 Standard Units (SU);
 - Specific conductance ("conductivity") within ± 3 percent millisiemens per centimeter (mS/cm);
 - Dissolved Oxygen (DO) within ± 10 percent milligrams per liter (mg/L) for values greater than 0.5 mg/L, or three consecutive readings of less than 0.5 mg/L;
 - Oxidation-Reduction Potential (ORP) within ± 10 millivolts (mV);
 - Turbidity within ± 10 percent Nephelometric Turbidity Units (NTU) for values greater than 10 NTU, or three consecutive readings of less than 10 NTU.

3.2.3 Sample Collection

Once purge water quality parameters have stabilized, indicating that groundwater is being withdrawn directly from the aquifer, groundwater samples will be extracted and collected using the low-flow pumping system in general accordance with ASTM Standard D6771.

Samples will be collected in pre-cleaned, laboratory-provided sample containers. Sample container types, number of containers, holding times, and preservation for required analytes are specified in **Table 1**. Collected samples are preserved as required by the selected analytical method or in general accordance with ASTM Standard D6517 – *Standard Guide for Field Preservation of Ground Water Samples*, as current.

Supplies and consumables will be inspected upon receipt. All sample bottles used for collecting laboratory analysis samples will be new, certified clean, and provided by the laboratory. Samplers will make note of the information on the certificate of analysis that accompanies sample containers to ensure that they meet the specifications and guidance for contaminant-free sample containers.

3.2.4 Field Quality Assurance Samples

Field Quality Assurance (QA) samples for the groundwater monitoring event will be collected in general accordance with ASTM Standard D7069 – *Standard Guide for Field Quality Assurance in a Groundwater Sampling Event*, as current. Field QA samples collected for a groundwater monitoring event will include: (1) field duplicates, (2) field blanks, and (3) equipment blanks.

- **Field Duplicate (FD)** QA samples will be collected immediately after the target samples using the same collection procedures. Field duplicate samples will be collected at a frequency of one per every ten samples, or at a minimum of one per sampling day. The date and time the field duplicate is sampled will be recorded on the field forms and chain of custody correctly. No "blind" samples (e.g., marking all field duplicates as being collected as 12:00) will be submitted to the laboratory.



- **Field Blank (FB)** QA samples will be prepared by the sampling team at the beginning of each sampling day by filling a sample bottle with laboratory supplied deionized water. The field blank will remain in the sample container throughout the day. Field blanks will be prepared for each sample container and sent to the laboratory for analysis.
- **Equipment Blank (EB)** QA samples will be collected at a frequency of one per sampling day to evaluate possible cross contamination. Water used to decontaminate sampling equipment at the first location of the day will be collected and analyzed by the laboratory for all target analytes to ensure that target analytes are not present above the laboratory reporting limit(s).

3.2.5 Sample Identification

All samples collected for laboratory analysis, including normal samples, field duplicates, and field blanks, will be assigned a unique blind code sample identification number. Each sample collected in the field will be labeled for future identification with a consecutive unique sample identification (ID) consisting of **AAA-Date-Location Code**.

- **AAA** is a unique two or three letter code identifying the Facility.
- **Date** is recorded in the format of year, month, day as YYMMDD.
- **Location Code** is a unique two-to-four-character number and/or letter code identifying the groundwater monitoring location at the Facility or the type of Field QA sample (i.e., FD, FB, or EB) collected.

For example:

- Sample ID **ABC-240301-01** identifies the sample collected at ABC facility on March 1, 2024 from the groundwater monitoring location designated as "01".
- Sample ID **ABC-240302-10FD** identifies the **field duplicate** sample collected at ABC facility on March 2, 2024 from the groundwater monitoring location designated as "10".
- Sample ID **ABC-240303-EB1** identifies the first **equipment blank** sample collected at ABC facility on March 3, 2024.

Designations for groundwater monitoring locations will be assigned prior to the commencement of groundwater monitoring activities and will remain constant for the duration of monitoring activities.

All sample labels will be filled out using waterproof ink. Each sample label will contain the following information at a minimum:

- Sampler's initials;
- Sampler's company affiliation;
- Facility designation;
- Sample location identification number, and;
- Date and time of sample collection.



3.2.6 Sample Handling and Custody

Collected groundwater monitoring samples and field QA samples will be handled and delivered to the analytical laboratory in general accordance with ASTM Standard D6911 – *Standard Guide Packaging and Shipping Environmental Samples for Laboratory Analysis*, as current. Sample ID, sampling time and date, sampling personnel, and analyses will be recorded on the chain-of-custody records. The purpose of the chain-of-custody is to ensure the possession of samples is traceable from the time the samples are collected until they are analyzed. The chain-of-custody will be completed as required by the selected analytical laboratory or in general accordance with ASTM Standard D4840 – *Standard Guide for Sample Chain-of-Custody Procedures*, as current. A sample is in custody when the following occurs:

- It is in the possession of the sampler, transporter, or laboratory.
- It is in view of the sampler, transporter, or laboratory after being in their possession.
- It was in the possession of the sampler, transporter, or laboratory and was then secured by them.
- It is in a designated secure area that has restricted access.

Prior to submitting the analytical samples to the laboratory, IES will review the field notes and chain-of-custody for accuracy and completeness. The notes will be reviewed for appropriate documentation of the field work pertinent activities, including verifying complete residential information. The chain-of-custody will be reviewed for appropriate sample nomenclature and selected analysis.

3.2.7 Equipment Decontamination

All field equipment will be decontaminated in general accordance with ASTM Standard D5088 – *Standard Practice for Decontamination of Field Equipment Used at Waste Sites* (as current) prior to initiation of sample collection and between sample locations.

4 ANALYTICAL PARAMETERS

4.1 Sample Analysis

Collected groundwater monitoring samples will be submitted to LabTest NW LLC (“LabTest”) analytical laboratory of Yakima, Washington (<https://labtestwa.com/>) for analysis. LabTest is accredited by Ecology (Accreditation #C1008-23) under the provisions of WAC 173-50, *Accreditation of Environmental Laboratories*, for analysis of the following constituents by the presented methods:

- Nitrate (as Nitrogen) by Standard Method (SM) 4500 NO₃-F;
- Nitrite (as Nitrogen) by SM 4500 N₃-F;
- Total Kjeldahl Nitrogen (TKN) by SM 4500 NH₃-G, and;
- *Escherichia coli* (E. coli) by Standard Method 9223 B.

The Laboratory Reporting Limit (LRL) and Reporting Units for the analytes are presented in **Table 2**. Total nitrogen is calculated and reported as the sum of nitrate-nitrogen, nitrite-nitrogen, and TKN.



4.2 Laboratory Quality Control

4.2.1 Laboratory Quality Control Procedures

Laboratory QC procedures include the following:

- Instrument calibration and standards as defined in the specified Standard Method;
- Laboratory blank measurements at a minimum five percent or one per batch frequency;
- Accuracy and precision measurements at a minimum of one in 20 or one per sample set;
- Data reduction and reporting according to the specified Standard Methods, and;
- Laboratory documentation according to the specified Standard Methods and laboratory Standard Operating Procedure (SOP) requirements.

4.2.2 Instrument/Equipment Testing, Inspection, and Maintenance

Instrument maintenance logbooks will be continually maintained in the laboratory and include a schedule of maintenance and a complete history of past maintenance for equipment used to analyze groundwater monitoring samples.

4.2.3 Instrument/Equipment Calibration and Frequency

The analytical laboratory will follow all calibration procedures and frequencies specified for the analytical methods listed above.

5 DATA VALIDATION AND USABILITY

5.1 Measurement Performance Criteria

Measurement performance criteria are often expressed in terms of data quality indicators. The principal data quality indicator criteria are Precision, Accuracy, Representativeness, Comparability, and Completeness (PARCC).

- **Precision** is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions and is calculated as either the range or standard deviation.
- **Accuracy** is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias) components of both sampling and analytical operations.
- **Representativeness** is a qualitative term that expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process conditions, or an environmental condition.
- **Comparability** is a qualitative term that expresses the measure of confidence that one data set can be compared to another and can be combined for the decision to be made.



- **Completeness** is a measure of the amount of valid data needed to be obtained from a measurement system.

The precision, accuracy, and completeness criteria for given analytes are presented in **Table 2**.

5.2 Data Review, Verification, and Validation

Data verification will be conducted by the laboratory prior to submitting the Certified Analytical Report (CAR) for the sampling event. Data review, validation, and verification performed by the laboratory will comply with method requirements and laboratory SOPs for the Standard Methods specified in this Plan.

5.3 Verification and Validation

The analytical data generated shall be reduced, verified, and reported by the laboratory according to the Standard Methods listed above. Data verification will be performed by the laboratory for all analyses prior to releasing the data to IES. The laboratory will archive analytical data in their own laboratory data management system. IES personnel will validate laboratory data upon receipt.

5.4 Reconciliation with User Requirements

Analytical data results obtained during the groundwater monitoring will be reconciled with precision, accuracy, and completeness criteria presented in **Table 2**.

6 REPORTING

Routine groundwater monitoring results (the "Report") will be submitted to Ecology in conjunction with the annual report required by Permit Special Condition S7.D. The Report will be submitted using Ecology's **WQWebPortal** as described in Permit Special Condition S7.D *Annual Report* and will include the certification statement and signature required by Permit General Condition G14. The Report will include, but are not limited to, the following components:

- The field parameters and validated data with qualifiers, if applied.
- The complete analytical data package for constituents monitored for each quarterly groundwater monitoring event.
- Figure(s) that depict, at a minimum, water level elevations and gradient, and analytical data.
- Tables summarizing recorded water levels and groundwater elevation.
- Tables summarizing analytical results for the quarterly sampling events.



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TABLES



TABLE 1 ANALYTES, METHODS, HOLDING TIMES, AND PRESERVATION

Groundwater Monitoring Work Plan
CAFO General Permit WAG015020
Skyridge Farms Barn 2
Sunnyside, Washington

Analyte	Analytical Method	Container Type	No. of Containers	Hold Time	Preservation Method
Nitrate (as Nitrogen)	SM 4500 NO3-F	250 mL PE	1	48 Hours	≤6 °C
Nitrite (as Nitrogen)	SM 4500 N3-F	250 mL PE	1	48 Hours	≤6 °C
Total Kjeldahl Nitrogen	SM 4500 NH3-G	250 mL PE	1	1 Week	≤6 °C
Total Nitrogen	Calculated	NA	NA	NA	NA
<i>E. Coli</i>	SM 9223 B	120 mL Sterile PS	1	24 Hours	≤6 °C

Notes

mL - milliliters
E.Coli - Escherichia coli
°C - degrees Celsius

PE - Polyethylene
PS - Polystyrene
NA - Not Applicable



TABLE 2 ANALYTES, REPORTING LIMITS, AND QUALITY ASSURANCE CRITERIA

Groundwater Monitoring Work Plan
CAFO General Permit WAG015020
Skyridge Farms Barn 2
Sunnyside, Washington

Analyte	Analytical Method	Laboratory Reporting Limit	Reporting Units	Precision	Accuracy	Completeness
Nitrate (as Nitrogen)	SM 4500 NO3-F	0.2	mg/L	±20%	80 to 120%	90%
Nitrite (as Nitrogen)	SM 4500 N3-F	0.1	mg/L	±20%	80 to 120%	90%
Total Kjeldahl Nitrogen	SM 4500 NH3-G	1	mg/L	±20%	80 to 120%	90%
Total Nitrogen	Calculated	1	mg/L	NA	80 to 120%	90%
<i>E. Coli</i>	SM 9223 B	1 CFU	MPN/100 mL	NA	NA	90%

Notes

mg/L - milligrams per liter
mL - milliliters

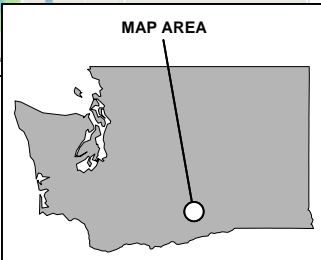
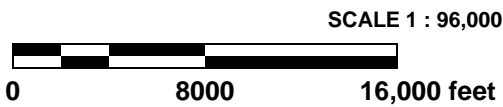
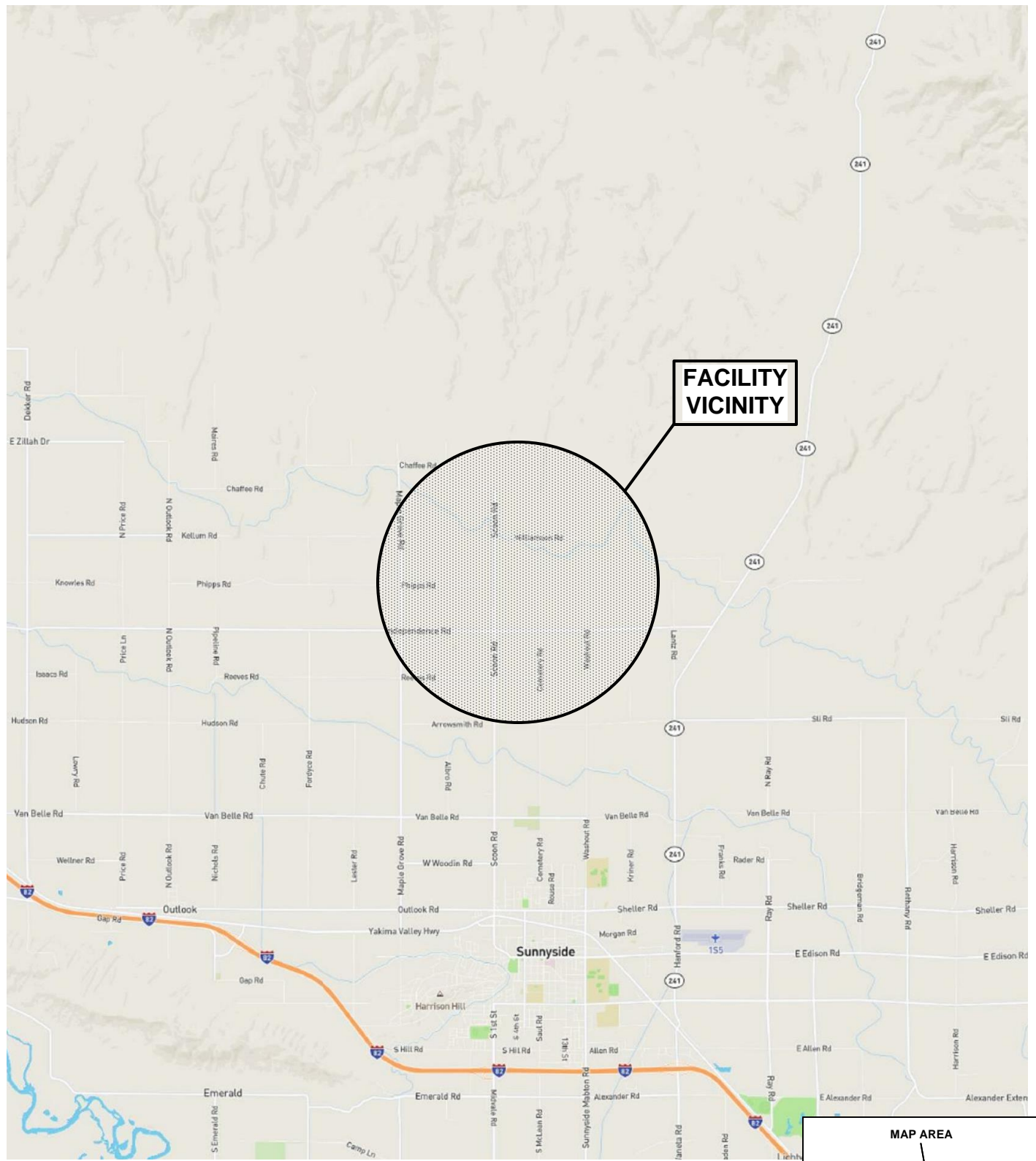
CFU - Colony Forming Unit
MPN - Most Probable Number
E. Coli - Escherichia coli
NA - Not Applicable



FIGURES

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Source: Trimble Terrain Navigator Pro; 2019, v. 12.2.1.193; Terrain Street Map; 46.387999°N, 120.027059°W, WGS84



SRF-2301.001

September 2023

LOCATION MAP

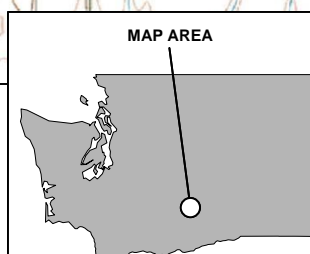
GROUNDWATER MONITORING WORK PLAN
CAFO GENERAL PERMIT WAG015020
SKYRIDGE FARMS DAIRY
SUNNYSIDE, WASHINGTON

FIGURE

1

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Projects\SRF\2301\001\Figure 2.vsd



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VICINITY MAP
GROUNDWATER MONITORING WORK PLAN
CAFO GENERAL PERMIT WAG015020
SKYRIDGE FARMS DAIRY
SUNNYSIDE, WASHINGTON

2

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\\projects\SRF\2301\001\Figure 3.vsd



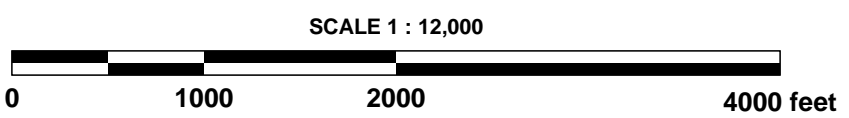
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WASTE STORAGE POND

STORMWATER CATCH BASIN

One inch equals 1,000 feet if produced on ANSI B (11 x 17 inches) size paper



September 2023		 INLAND EARTH SCIENCES <small>Earth & Environmental Consultants Washington Idaho Montana 509 563 5242 www.inlandearth.com</small>
SRF-2301.001		
FACILITY PLAN GROUNDWATER MONITORING WORK PLAN CAFO GENERAL PERMIT WAG015020 SKYRIDGE FARMS DAIRY SUNNYSIDE, WASHINGTON		FIGURE 3



APPENDIX A

NRCS CUSTOM SOILS REPORT



United States
Department of
Agriculture

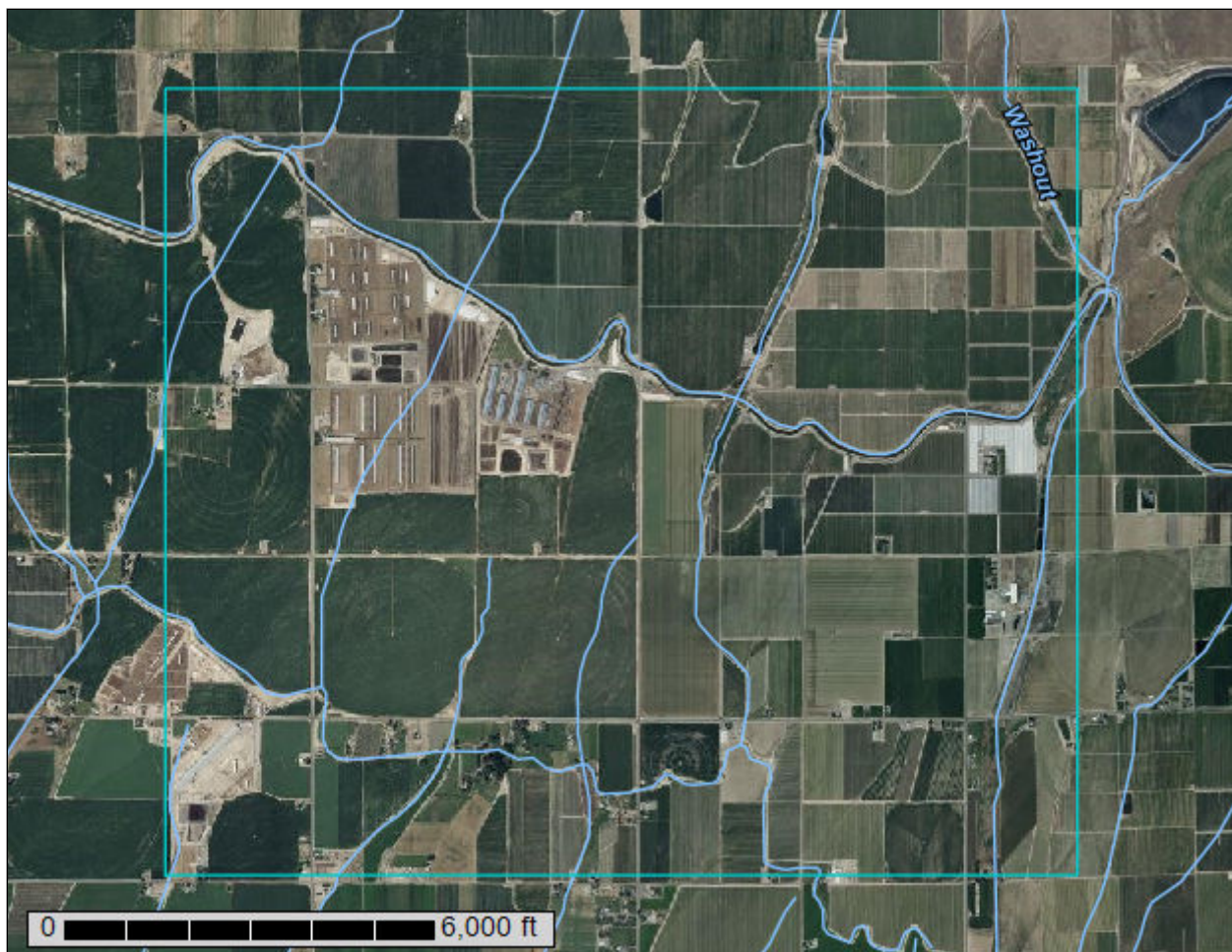
NRCS

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 **Yakima County Area, Washington**

Skyridge Farms Dairy



September 17, 2023

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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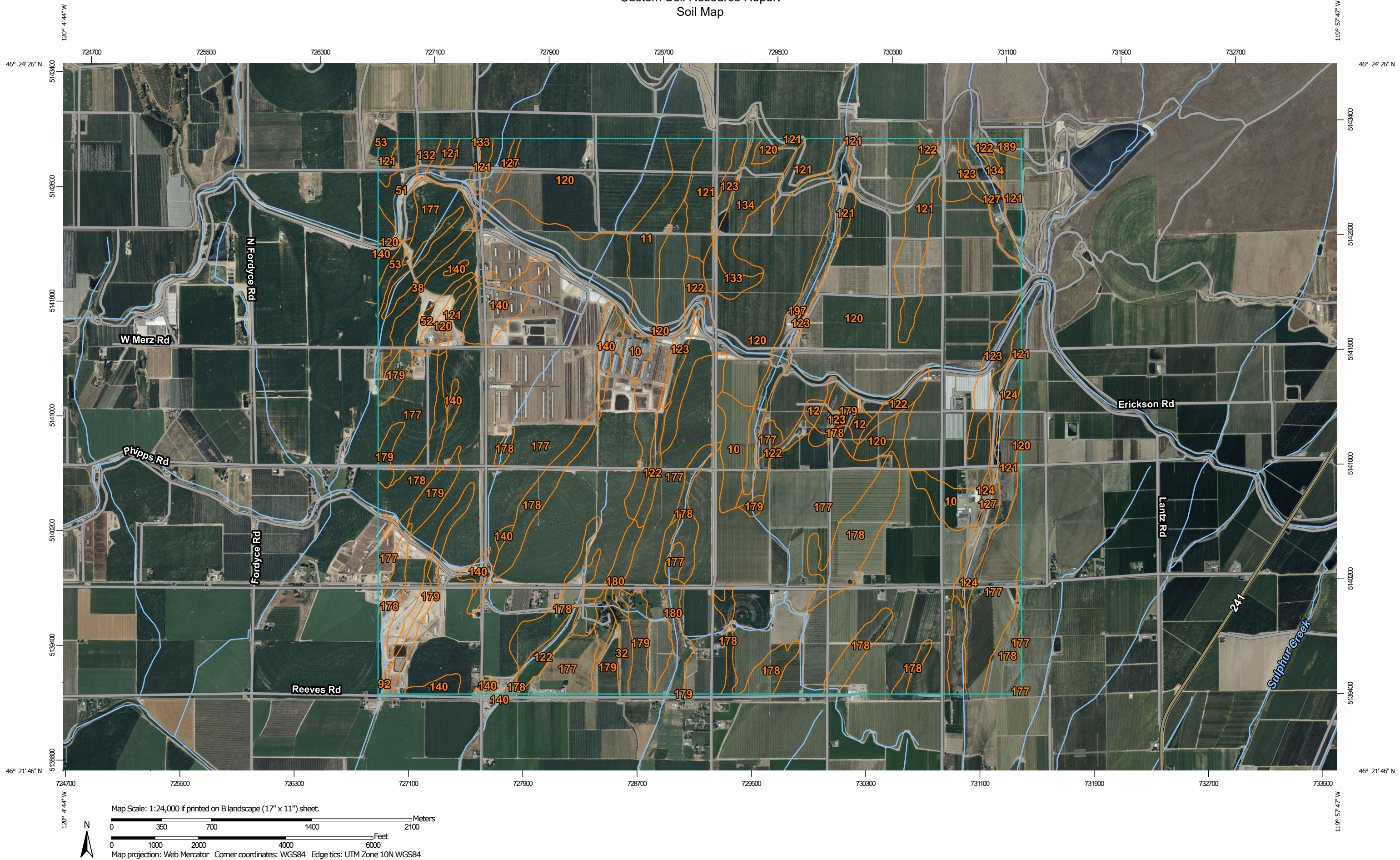
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Soil Map

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.

Custom Soil Resource Report
Soil Map



Custom Soil Resource Report

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.

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: Yakima County Area, Washington

Survey Area Data: Version 22, Sep 8, 2022

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

Date(s) aerial images were photographed: Jun 26, 2022—Aug 5, 2022

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Burke silt loam, 2 to 5 percent slopes	73.6	1.7%
11	Burke silt loam, 5 to 8 percent slopes	67.7	1.6%
12	Burke silt loam, 8 to 15 percent slopes	9.4	0.2%
32	Esquatzel silt loam, 0 to 2 percent slopes	14.8	0.3%
38	Finley silt loam, 2 to 5 percent slopes	32.6	0.8%
51	Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes	32.7	0.8%
52	Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes	15.0	0.3%
53	Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes	8.4	0.2%
92	Outlook silt loam	1.7	0.0%
120	Scoon silt loam, 2 to 5 percent slopes	1,048.0	24.2%
121	Scoon silt loam, 5 to 8 percent slopes	212.2	4.9%
122	Scoon silt loam, 8 to 15 percent slopes	79.9	1.8%
123	Scoon silt loam, 15 to 30 percent slopes	132.2	3.1%
124	Scooteney silt loam, 0 to 2 percent slopes	49.3	1.1%
127	Scooteney cobbly silt loam, 0 to 5 percent slopes	53.2	1.2%
132	Shano silt loam, 2 to 5 percent slopes	7.6	0.2%
133	Shano silt loam, 5 to 8 percent slopes	17.3	0.4%
134	Shano silt loam, 8 to 15 percent slopes	54.8	1.3%
140	Sinloc silt loam, 2 to 5 percent slopes	78.7	1.8%
141	Sinloc silt loam, 5 to 8 percent slopes	1.5	0.0%
177	Warden silt loam, 2 to 5 percent slopes	1,807.5	41.8%
178	Warden silt loam, 5 to 8 percent slopes	345.9	8.0%

Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
179	Warden silt loam, 8 to 15 percent slopes	112.9	2.6%
180	Warden silt loam, 15 to 30 percent slopes	57.9	1.3%
189	Willis silt loam, 8 to 15 percent slopes	6.4	0.1%
197	Water	1.3	0.0%
Totals for Area of Interest		4,323.0	100.0%

Map Unit Descriptions

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.

Yakima County Area, Washington

10—Burke silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29nz

Elevation: 650 to 1,600 feet

Mean annual precipitation: 6 to 9 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 135 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Burke and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burke

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam

H2 - 7 to 25 inches: silt loam

H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

11—Burke silt loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29pb

Custom Soil Resource Report

Elevation: 650 to 1,600 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Burke and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burke

Setting

Landform: Hillslopes
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 25 inches: silt loam
H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

12—Burke silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29pp
Elevation: 650 to 1,600 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Burke and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burke

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam

H2 - 7 to 25 inches: silt loam

H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

32—Esquatzel silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 29ss

Elevation: 300 to 2,900 feet

Mean annual precipitation: 6 to 12 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 130 to 200 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Esquatzel and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Esquatzel

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 17 inches: silt loam
H2 - 17 to 60 inches: silt loam
H3 - 60 to 64 inches: stratified fine sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R007XY930WA - Loamy Bottom
Hydric soil rating: No

38—Finley silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29sz
Elevation: 300 to 1,800 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 180 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Finley and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Finley

Setting

Landform: Alluvial fans, terraces
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 30 inches: very gravelly loam
H3 - 30 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R007XY143WA - Sandy Loam
Hydric soil rating: No

51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29tg
Elevation: 400 to 6,200 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Harwood and similar soils: 35 percent
Burke and similar soils: 25 percent
Wiehl and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harwood

Setting

Landform: Terraces
Parent material: Loess and old alluvium

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 26 inches: loam
H3 - 26 to 30 inches: gravelly loam

Custom Soil Resource Report

H4 - 30 to 34 inches: cemented material

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R008XY130WA - Loamy sagebrush

Hydric soil rating: No

Description of Burke

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam

H2 - 7 to 25 inches: silt loam

H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

Description of Wiehl

Setting

Landform: Terraces

Parent material: Eolian deposits over residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 21 inches: silt loam
H3 - 21 to 27 inches: gravelly silt loam
H4 - 27 to 37 inches: weathered bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29th
Elevation: 400 to 6,200 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Harwood and similar soils: 35 percent
Burke and similar soils: 25 percent
Wiehl and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harwood

Setting

Landform: Terraces
Parent material: Loess and old alluvium

Custom Soil Resource Report

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 26 inches: loam
H3 - 26 to 30 inches: gravelly loam
H4 - 30 to 34 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R008XY130WA - Loamy sagebrush
Hydric soil rating: No

Description of Burke

Setting

Landform: Hillslopes
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 25 inches: silt loam
H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

Description of Wiehl

Setting

Landform: Terraces

Parent material: Eolian deposits over residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 3 inches: silt loam

H2 - 3 to 21 inches: silt loam

H3 - 21 to 27 inches: gravelly silt loam

H4 - 27 to 37 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

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

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 29tj

Elevation: 400 to 6,200 feet

Mean annual precipitation: 6 to 12 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 135 to 200 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Harwood and similar soils: 35 percent

Burke and similar soils: 25 percent

Wiehl and similar soils: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harwood

Setting

Landform: Terraces

Parent material: Loess and old alluvium

Typical profile

H1 - 0 to 8 inches: loam

H2 - 8 to 26 inches: loam

H3 - 26 to 30 inches: gravelly loam

H4 - 30 to 34 inches: cemented material

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: R008XY130WA - Loamy sagebrush

Hydric soil rating: No

Description of Burke

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam

H2 - 7 to 25 inches: silt loam

H3 - 25 to 29 inches: cemented material

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Custom Soil Resource Report

Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

Description of Wiehl

Setting

Landform: Terraces
Parent material: Eolian deposits over residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 21 inches: silt loam
H3 - 21 to 27 inches: gravelly silt loam
H4 - 27 to 37 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

92—Outlook silt loam

Map Unit Setting

National map unit symbol: 29vx
Elevation: 300 to 2,000 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Outlook, drained, and similar soils: 90 percent

Custom Soil Resource Report

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Outlook, Drained

Setting

Landform: Flood plains

Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: fine sandy loam

H2 - 8 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly 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 12 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 25 percent

Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum: 5.0

Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Ecological site: R007XY978WA - Sodic Flat

Hydric soil rating: Yes

Minor Components

Sinloc

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Outlook, undrained

Percent of map unit: 5 percent

Landform: Alluvial cones

Hydric soil rating: Yes

120—Scoons silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29pq

Elevation: 1,000 to 4,900 feet

Mean annual precipitation: 6 to 12 inches

Custom Soil Resource Report

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 100 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Scoon and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scoon

Setting

Landform: Terraces, alluvial fans

Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 16 inches: gravelly very fine sandy loam

H3 - 16 to 60 inches: cemented material

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: 10 to 20 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R007XY120WA - Stony

Hydric soil rating: No

121—Scoon silt loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29pr

Elevation: 1,000 to 4,900 feet

Mean annual precipitation: 6 to 12 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 100 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Scoon and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scoon

Setting

Landform: Terraces, alluvial fans

Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 16 inches: gravelly very fine sandy loam

H3 - 16 to 60 inches: cemented material

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: 10 to 20 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R007XY120WA - Stony

Hydric soil rating: No

122—Scoon silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29ps

Elevation: 1,000 to 4,900 feet

Mean annual precipitation: 6 to 12 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 100 to 210 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Scoon and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scoon

Setting

Landform: Terraces, alluvial fans

Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam

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H2 - 6 to 16 inches: gravelly very fine sandy loam

H3 - 16 to 60 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 10 to 20 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R007XY120WA - Stony

Hydric soil rating: No

123—Scoon silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 29pt

Elevation: 1,000 to 4,900 feet

Mean annual precipitation: 6 to 12 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 100 to 210 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Scoon and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scoon

Setting

Landform: Terraces, alluvial fans

Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 16 inches: gravelly very fine sandy loam

H3 - 16 to 60 inches: cemented material

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: 10 to 20 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R007XY120WA - Stony
Hydric soil rating: No

124—Scooteney silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 29pv
Elevation: 400 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Scooteney and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scooteney

Setting

Landform: Terraces
Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 22 inches: silt loam
H3 - 22 to 33 inches: gravelly fine sandy loam
H4 - 33 to 60 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

127—Scooteney cobbly silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29py
Elevation: 400 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Scooteney, cobbly, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scooteney, Cobbly

Setting

Landform: Terraces
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: cobbly silt loam
H2 - 6 to 22 inches: silt loam
H3 - 22 to 33 inches: gravelly fine sandy loam
H4 - 33 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: R007XY120WA - Stony
Hydric soil rating: No

132—Shano silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29q4

Elevation: 500 to 2,300 feet

Mean annual precipitation: 6 to 10 inches

Mean annual air temperature: 46 to 54 degrees F

Frost-free period: 125 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Shano and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shano

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 4 inches: silt loam

H2 - 4 to 30 inches: silt loam

H3 - 30 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

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

Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

133—Shano silt loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29q5

Elevation: 500 to 2,300 feet

Mean annual precipitation: 6 to 10 inches

Mean annual air temperature: 46 to 54 degrees F

Frost-free period: 125 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Shano and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shano

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 4 inches: silt loam

H2 - 4 to 30 inches: silt loam

H3 - 30 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: More than 80 inches

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

Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

134—Shano silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29q6

Elevation: 500 to 2,300 feet

Mean annual precipitation: 6 to 10 inches

Mean annual air temperature: 46 to 54 degrees F

Frost-free period: 125 to 200 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Shano and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shano

Setting

Landform: Hillslopes

Parent material: Loess

Typical profile

H1 - 0 to 4 inches: silt loam

H2 - 4 to 30 inches: silt loam

H3 - 30 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

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

Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

140—Sinloc silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29qf

Elevation: 500 to 1,200 feet

Mean annual precipitation: 6 to 9 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 136 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Sinloc, drained, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sinloc, Drained

Setting

Landform: Terraces

Parent material: Lacustrine deposits with a mantle of loess

Typical profile

H1 - 0 to 3 inches: silt loam

H2 - 3 to 15 inches: silt loam

H3 - 15 to 45 inches: silt loam

H4 - 45 to 60 inches: loamy fine sand

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly 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 12 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 20 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum: 10.0

Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C

Ecological site: R007XY970WA - Alkali Terrace

Hydric soil rating: Yes

Minor Components

Sinloc, undrained

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Outlook

Percent of map unit: 5 percent
Landform: Alluvial cones
Hydric soil rating: Yes

141—Sinloc silt loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29qg
Elevation: 500 to 1,200 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 136 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Sinloc, drained, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sinloc, Drained

Setting

Landform: Terraces
Parent material: Lacustrine deposits with a mantle of loess

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 15 inches: silt loam
H3 - 15 to 45 inches: silt loam
H4 - 45 to 60 inches: loamy fine sand

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly 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 12 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 5 percent

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Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum: 10.0

Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: C

Ecological site: R007XY970WA - Alkali Terrace

Hydric soil rating: Yes

Minor Components

Sinloc, undrained

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

177—Warden silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 29rq

Elevation: 600 to 1,300 feet

Mean annual precipitation: 6 to 9 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 135 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Warden and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Warden

Setting

Landform: Terraces

Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 5 inches: silt loam

H2 - 5 to 19 inches: silt loam

H3 - 19 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

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

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Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

178—Warden silt loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 29rr
Elevation: 600 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Warden and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Warden

Setting

Landform: Terraces
Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 19 inches: silt loam
H3 - 19 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e

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Hydrologic Soil Group: B
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

179—Warden silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29rs
Elevation: 600 to 1,300 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 200 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Warden and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Warden

Setting

Landform: Terraces
Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 19 inches: silt loam
H3 - 19 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
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
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R007XY130WA - Loamy
Hydric soil rating: No

180—Warden silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 29rv

Elevation: 600 to 1,300 feet

Mean annual precipitation: 6 to 9 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 135 to 200 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Warden and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Warden

Setting

Landform: Terraces

Parent material: Loess over lacustrine deposits

Typical profile

H1 - 0 to 5 inches: silt loam

H2 - 5 to 19 inches: silt loam

H3 - 19 to 60 inches: stratified very fine sandy loam to silt loam

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: More than 80 inches

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

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: R007XY130WA - Loamy

Hydric soil rating: No

189—Willis silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 29s4

Elevation: 1,000 to 3,000 feet

Mean annual precipitation: 9 to 12 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 125 to 180 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Willis and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Willis

Setting

Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 22 inches: silt loam

H3 - 22 to 34 inches: silt loam

H4 - 34 to 38 inches: cemented material

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to duripan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R008XY130WA - Loamy sagebrush

Hydric soil rating: No

197—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Text Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the selected area. The component descriptions in this report, 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 associated 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 (components) for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The "Map Unit Component Nontechnical Descriptions" report gives a brief, general description of the soil components that occur in a map unit. Descriptions of nonsoil (miscellaneous areas) and minor map unit components may or may not be included. This description is written by the local soil scientists responsible for the respective

soil survey area data. A more detailed description can be generated by the "Map Unit Description" report.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Component Text Descriptions

Yakima County Area, Washington

Map Unit: 10—Burke silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Burke: 100 percent

The Burke component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 11—Burke silt loam, 5 to 8 percent slopes

Description Category: GENSOIL

Burke: 100 percent

The Burke component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 12—Burke silt loam, 8 to 15 percent slopes

Description Category: GENSOIL

Burke: 100 percent

The Burke component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 32—Esquatzel silt loam, 0 to 2 percent slopes

Description Category: GENSOIL

Esquatzel: 100 percent

The Esquatzel component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY930WA Loamy Bottom ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 2c. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 38—Finley silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Finley: 100 percent

The Finley component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This

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component is in the R007XY143WA Sandy Loam ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 3s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes

Description Category: GENSOIL

Harwood: 35 percent

The Harwood component makes up 35 percent of the map unit. Slopes are 5 to 8 percent. This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R008XY130WA Loamy sagebrush ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Burke: 25 percent

The Burke component makes up 25 percent of the map unit. Slopes are 5 to 8 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Wiehl: 20 percent

The Wiehl component makes up 20 percent of the map unit. Slopes are 5 to 8 percent. This component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon

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is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes

Description Category: GENSOIL

Harwood: 35 percent

The Harwood component makes up 35 percent of the map unit. Slopes are 8 to 15 percent. This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R008XY130WA Loamy sagebrush ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Burke: 25 percent

The Burke component makes up 25 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Wiehl: 20 percent

The Wiehl component makes up 20 percent of the map unit. Slopes are 8 to 15 percent. This component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon

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is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes

Description Category: GENSOIL

Harwood: 35 percent

The Harwood component makes up 35 percent of the map unit. Slopes are 15 to 30 percent. This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R008XY130WA Loamy sagebrush ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 6e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Burke: 25 percent

The Burke component makes up 25 percent of the map unit. Slopes are 15 to 30 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Description Category: GENSOIL

Wiehl: 20 percent

The Wiehl component makes up 20 percent of the map unit. Slopes are 15 to 30 percent. This component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon

is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 92—Outlook silt loam

Description Category: GENSOIL

Outlook, drained: 90 percent

The Outlook, drained component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY978WA Sodic Flat ecological site. Nonirrigated land capability classification is 4s. Irrigated land capability classification is 3w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 20 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 3 within 30 inches of the soil surface.

Description Category: GENSOIL

Sinloc: 5 percent

Generated brief soil descriptions are created for major soil components. The Sinloc soil is a minor component.

Description Category: GENSOIL

Outlook, undrained: 5 percent

Generated brief soil descriptions are created for major soil components. The Outlook, undrained soil is a minor component.

Map Unit: 120—Scoon silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Scoon: 100 percent

The Scoon component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on alluvial fans, terraces. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell

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potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY120WA Stony ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 6s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Map Unit: 121—Scoon silt loam, 5 to 8 percent slopes

Description Category: GENSOIL

Scoon: 100 percent

The Scoon component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on alluvial fans, terraces. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY120WA Stony ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 6s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Map Unit: 122—Scoon silt loam, 8 to 15 percent slopes

Description Category: GENSOIL

Scoon: 100 percent

The Scoon component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on alluvial fans, terraces. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY120WA Stony ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 6s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Map Unit: 123—Scoon silt loam, 15 to 30 percent slopes

Description Category: GENSOIL

Scoon: 100 percent

The Scoon component makes up 100 percent of the map unit. Slopes are 15 to 30 percent. This component is on alluvial fans, terraces. The parent material consists

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of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY120WA Stony ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 6s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Map Unit: 124—Scooteney silt loam, 0 to 2 percent slopes

Description Category: GENSOIL

Scooteney: 100 percent

The Scooteney component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on terraces. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 2s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 127—Scooteney cobbly silt loam, 0 to 5 percent slopes

Description Category: GENSOIL

Scooteney, cobbly: 100 percent

The Scooteney, cobbly component makes up 100 percent of the map unit. Slopes are 0 to 5 percent. This component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY120WA Stony ecological site. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 132—Shano silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Shano: 100 percent

The Shano component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 133—Shano silt loam, 5 to 8 percent slopes

Description Category: GENSOIL

Shano: 100 percent

The Shano component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 134—Shano silt loam, 8 to 15 percent slopes

Description Category: GENSOIL

Shano: 100 percent

The Shano component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent

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within 40 inches, typically, does not exceed 15 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 140—Sinloc silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Sinloc, drained: 90 percent

The Sinloc, drained component makes up 90 percent of the map unit. Slopes are 2 to 5 percent. This component is on terraces. The parent material consists of lacustrine deposits with a mantle of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during May, June, July, August, September, October. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY970WA Alkali Terrace ecological site. Nonirrigated land capability classification is 6s. Irrigated land capability classification is 3w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 8 within 30 inches of the soil surface.

Description Category: GENSOIL

Sinloc, undrained: 5 percent

Generated brief soil descriptions are created for major soil components. The Sinloc, undrained soil is a minor component.

Description Category: GENSOIL

Outlook: 5 percent

Generated brief soil descriptions are created for major soil components. The Outlook soil is a minor component.

Map Unit: 141—Sinloc silt loam, 5 to 8 percent slopes

Description Category: GENSOIL

Sinloc, drained: 95 percent

The Sinloc, drained component makes up 95 percent of the map unit. Slopes are 5 to 8 percent. This component is on terraces. The parent material consists of lacustrine deposits with a mantle of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27

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inches during May, June, July, August, September, October. Organic matter content in the surface horizon is about 1 percent. This component is in the R007XY970WA Alkali Terrace ecological site. Nonirrigated land capability classification is 6w. Irrigated land capability classification is 3e. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 8 within 30 inches of the soil surface.

Description Category: GENSOIL

Sinloc, undrained: 5 percent

Generated brief soil descriptions are created for major soil components. The Sinloc, undrained soil is a minor component.

Map Unit: 177—Warden silt loam, 2 to 5 percent slopes

Description Category: GENSOIL

Warden: 100 percent

The Warden component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on terraces. The parent material consists of loess over lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 178—Warden silt loam, 5 to 8 percent slopes

Description Category: GENSOIL

Warden: 100 percent

The Warden component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on terraces. The parent material consists of loess over lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium

carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 179—Warden silt loam, 8 to 15 percent slopes

Description Category: GENSOIL

Warden: 100 percent

The Warden component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on terraces. The parent material consists of loess over lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 180—Warden silt loam, 15 to 30 percent slopes

Description Category: GENSOIL

Warden: 100 percent

The Warden component makes up 100 percent of the map unit. Slopes are 15 to 30 percent. This component is on terraces. The parent material consists of loess over lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R007XY130WA Loamy ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 189—Willis silt loam, 8 to 15 percent slopes

Description Category: GENSOIL

Willis: 100 percent

The Willis component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available

water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R008XY130WA Loamy sagebrush ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 197—Water

Description Category: GENSOIL

Water: 100 percent

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Soil Chemical Properties

This folder contains a collection of tabular reports that present soil chemical properties. The reports (tables) include all selected map units and components for each map unit. Soil chemical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

Chemical Soil Properties

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
10—Burke silt loam, 2 to 5 percent slopes								
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
11—Burke silt loam, 5 to 8 percent slopes								
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
12—Burke silt loam, 8 to 15 percent slopes								
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
32—Esquatzel silt loam, 0 to 2 percent slopes								
Esquatzel	0-17	5.0-10	—	6.6-7.8	0	0	0	0
	17-60	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
	60-64	5.0-10	—	7.4-8.4	1-5	0	0.0-2.0	0
38—Finley silt loam, 2 to 5 percent slopes								
Finley	0-12	5.0-10	—	6.6-8.4	0	0	0	0
	12-30	5.0-10	—	7.4-8.4	5-20	0	0.0-2.0	0
	30-60	5.0-10	—	7.4-8.4	10-20	0	0.0-2.0	0

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes								
Harwood	0-8	8.0-12	—	6.6-7.8	0	0	0	0
	8-26	9.0-15	—	7.4-8.4	0	0	0	0
	26-30	9.0-12	—	7.9-8.4	0	0	0.0-2.0	0
	30-34	—	—	—	—	—	—	—
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
Wiehl	0-3	8.0-15	—	6.6-7.8	0	0	0	0
	3-21	5.0-15	—	6.6-7.8	0	0	0	0
	21-27	5.0-15	—	7.4-8.4	1-5	0	0.0-2.0	0
	27-37	—	—	—	—	—	—	—

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes								
Harwood	0-8	8.0-12	—	6.6-7.8	0	0	0	0
	8-26	9.0-15	—	7.4-8.4	0	0	0	0
	26-30	9.0-12	—	7.9-8.4	0	0	0.0-2.0	0
	30-34	—	—	—	—	—	—	—
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
Wiehl	0-3	8.0-15	—	6.6-7.8	0	0	0	0
	3-21	5.0-15	—	6.6-7.8	0	0	0	0
	21-27	5.0-15	—	7.4-8.4	1-5	0	0.0-2.0	0
	27-37	—	—	—	—	—	—	—

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes								
Harwood	0-8	8.0-12	—	6.6-7.8	0	0	0	0
	8-26	9.0-15	—	7.4-8.4	0	0	0	0
	26-30	9.0-12	—	7.9-8.4	0	0	0.0-2.0	0
	30-34	—	—	—	—	—	—	—
Burke	0-7	5.0-12	—	7.4-8.4	0	0	0	0
	7-25	4.0-12	—	7.4-9.0	2-15	0	0.0-2.0	0
	25-29	—	—	—	—	—	—	—
Wiehl	0-3	8.0-15	—	6.6-7.8	0	0	0	0
	3-21	5.0-15	—	6.6-7.8	0	0	0	0
	21-27	5.0-15	—	7.4-8.4	1-5	0	0.0-2.0	0
	27-37	—	—	—	—	—	—	—
92—Outlook silt loam								
Outlook, drained	0-8	5.0-10	—	8.5-9.0	15-25	0	4.0-8.0	1-5
	8-60	5.0-10	—	7.9-9.0	5-10	0	2.0-4.0	0
120—Scoon silt loam, 2 to 5 percent slopes								
Scoon	0-6	10-20	—	7.4-8.4	0	0	0	0
	6-16	10-20	—	7.4-8.4	1-5	0	0	0
	16-60	—	—	—	—	—	—	—

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
121—Scoon silt loam, 5 to 8 percent slopes								
Scoon	0-6	10-20	—	7.4-8.4	0	0	0	0
	6-16	10-20	—	7.4-8.4	1-5	0	0	0
	16-60	—	—	—	—	—	—	—
122—Scoon silt loam, 8 to 15 percent slopes								
Scoon	0-6	10-20	—	7.4-8.4	0	0	0	0
	6-16	10-20	—	7.4-8.4	1-5	0	0	0
	16-60	—	—	—	—	—	—	—
123—Scoon silt loam, 15 to 30 percent slopes								
Scoon	0-6	10-20	—	7.4-8.4	0	0	0	0
	6-16	10-20	—	7.4-8.4	1-5	0	0	0
	16-60	—	—	—	—	—	—	—
124—Scooteney silt loam, 0 to 2 percent slopes								
Scooteney	0-6	4.0-9.0	—	6.6-7.3	0	0	0	0
	6-22	3.0-6.0	—	6.6-7.8	0	0	0	0
	22-33	3.0-6.0	—	7.9-8.4	5-10	0	0.0-2.0	0
	33-60	0.0-3.0	—	7.9-8.4	5-10	0	0.0-2.0	0

Custom Soil Resource Report

Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
127—Scooteney cobbly silt loam, 0 to 5 percent slopes								
Scooteney, cobbly	0-6	4.0-9.0	—	6.6-7.3	0	0	0	0
	6-22	3.0-6.0	—	6.6-7.8	0	0	0	0
	22-33	3.0-6.0	—	7.9-8.4	5-10	0	0.0-2.0	0
	33-60	0.0-3.0	—	7.9-8.4	5-10	0	0.0-2.0	0
132—Shano silt loam, 2 to 5 percent slopes								
Shano	0-4	5.0-10	—	6.6-8.4	0	0	0	0
	4-30	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	30-60	5.0-14	—	7.4-9.0	0-30	0	0.0-2.0	0
133—Shano silt loam, 5 to 8 percent slopes								
Shano	0-4	5.0-10	—	6.6-8.4	0	0	0	0
	4-30	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	30-60	5.0-14	—	7.4-9.0	0-30	0	0.0-2.0	0
134—Shano silt loam, 8 to 15 percent slopes								
Shano	0-4	5.0-10	—	6.6-8.4	0	0	0	0
	4-30	5.0-12	—	7.4-8.4	0	0	0.0-2.0	0
	30-60	5.0-14	—	7.4-9.0	0-30	0	0.0-2.0	0

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Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
140—Sinloc silt loam, 2 to 5 percent slopes								
Sinloc, drained	0-3	5.0-15	—	8.5-9.0	10-20	0-5	4.0-8.0	5-10
	3-15	5.0-15	—	8.5-9.0	10-20	0-5	4.0-8.0	5-10
	15-45	5.0-15	—	7.9-9.0	10-20	0-5	4.0-8.0	5-10
	45-60	5.0-15	—	7.9-9.0	10-20	0-5	4.0-8.0	5-10
141—Sinloc silt loam, 5 to 8 percent slopes								
Sinloc, drained	0-3	5.0-15	—	8.5-9.0	10-20	0-5	4.0-8.0	5-10
	3-15	5.0-15	—	8.5-9.0	10-20	0-5	4.0-8.0	5-10
	15-45	5.0-15	—	7.9-9.0	10-20	0-5	4.0-8.0	5-10
	45-60	5.0-15	—	7.9-9.0	10-20	0-5	4.0-8.0	5-10
177—Warden silt loam, 2 to 5 percent slopes								
Warden	0-5	5.0-15	—	6.6-8.4	0	0	0	0
	5-19	5.0-10	—	6.6-8.4	0	0	0	0
	19-60	5.0-10	—	6.6-8.4	0-5	0	0.0-2.0	0
178—Warden silt loam, 5 to 8 percent slopes								
Warden	0-5	5.0-15	—	6.6-8.4	0	0	0	0
	5-19	5.0-10	—	6.6-8.4	0	0	0	0
	19-60	5.0-10	—	6.6-8.4	0-5	0	0.0-2.0	0

Custom Soil Resource Report

Chemical Soil Properties—Yakima County Area, Washington								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
179—Warden silt loam, 8 to 15 percent slopes								
Warden	0-5	5.0-15	—	6.6-8.4	0	0	0	0
	5-19	5.0-10	—	6.6-8.4	0	0	0	0
	19-60	5.0-10	—	6.6-8.4	0-5	0	0.0-2.0	0
180—Warden silt loam, 15 to 30 percent slopes								
Warden	0-5	5.0-15	—	6.6-8.4	0	0	0	0
	5-19	5.0-10	—	6.6-8.4	0	0	0	0
	19-60	5.0-10	—	6.6-8.4	0-5	0	0.0-2.0	0
189—Willis silt loam, 8 to 15 percent slopes								
Willis	0-6	2.0-5.0	—	6.6-7.8	0	0	0	0
	6-22	3.0-5.0	—	7.4-8.4	0	0	0	0
	22-34	2.0-4.0	—	7.9-9.0	1-10	0	0.0-2.0	0
	34-38	—	—	—	—	—	—	—
197—Water								
Water	—	—	—	—	—	—	—	—

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell

potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

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American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

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Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
10—Burke silt loam, 2 to 5 percent slopes														
Burke	100	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—
11—Burke silt loam, 5 to 8 percent slopes														
Burke	100	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—
12—Burke silt loam, 8 to 15 percent slopes														
Burke	100	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—

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Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
32—Esquatzel silt loam, 0 to 2 percent slopes														
Esquatzel	100	B	0-17	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	75-83-90	—	NP
			17-60	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	65-80-95	20-25-30	NP-3 -5
			60-64	Stratified fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	60-75-90	20-25-30	NP-3 -5
38—Finley silt loam, 2 to 5 percent slopes														
Finley	100	A	0-12	Silt loam	ML, SM	A-4	0- 0- 0	0- 3- 5	90-95-100	85-90-95	70-80-90	35-48-60	15-20-25	NP-3 -5
			12-30	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam	GM, GP-GM	A-1, A-2	0- 3- 5	0- 3- 5	40-50-60	25-35-45	10-20-30	5-18-30	15-20-25	NP-3 -5
			30-60	Very cobbly loamy sand, extremely gravelly loamy sand, extremely gravelly sand	GM, GP, SM, SP, GP-GM	A-1	0- 5- 10	15-30-45	20-40-60	15-35-55	5-20-35	0- 8- 15	—	NP

Custom Soil Resource Report

Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes														
Harwood	35	C	0-8	Loam	ML	A-4	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	20-23-25	NP-3 -5
			8-26	Loam, silt loam	CL	A-6	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	25-30-35	10-13-15
			26-30	Gravelly loam, gravelly silt loam	GC	A-6	0- 0- 0	0- 3- 5	60-65-70	55-60-65	50-55-60	35-40-45	25-30-35	10-13-15
			30-34	Cemented material	—	—	—	—	—	—	—	—	—	—
Burke	25	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—
Wiehl	20	C	0-3	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-80-90	15-20-25	NP-3 -5
			3-21	Very fine sandy loam, silt loam, fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	100-100-100	100-100-100	80-85-95	40-55-65	15-20-25	NP-3 -5
			21-27	Gravelly silt loam, very fine sandy loam, fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	70-85-100	60-80-100	55-70-95	40-55-65	15-20-25	NP-3 -5
			27-37	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

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Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes														
Harwood	35	C	0-8	Loam	ML	A-4	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	20-23-25	NP-3 -5
			8-26	Loam, silt loam	CL	A-6	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	25-30-35	10-13-15
			26-30	Gravelly loam, gravelly silt loam	GC	A-6	0- 0- 0	0- 3- 5	60-65-70	55-60-65	50-55-60	35-40-45	25-30-35	10-13-15
			30-34	Cemented material	—	—	—	—	—	—	—	—	—	—
Burke	25	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—
Wiehl	20	C	0-3	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-80-90	15-20-25	NP-3 -5
			3-21	Fine sandy loam, silt loam, very fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	100-100-100	100-100-100	80-85-95	40-55-65	15-20-25	NP-3 -5
			21-27	Fine sandy loam, gravelly silt loam, very fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	70-85-100	60-80-100	55-70-95	40-55-65	15-20-25	NP-3 -5
			27-37	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

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Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes														
Harwood	35	C	0-8	Loam	ML	A-4	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	20-23-25	NP-3 -5
			8-26	Loam, silt loam	CL	A-6	0- 0- 0	0- 3- 5	95-98-100	95-98-100	80-88-95	60-68-75	25-30-35	10-13-15
			26-30	Gravelly loam, gravelly silt loam	GC	A-6	0- 0- 0	0- 3- 5	60-65-70	55-60-65	50-55-60	35-40-45	25-30-35	10-13-15
			30-34	Cemented material	—	—	—	—	—	—	—	—	—	—
Burke	25	C	0-7	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	75-85-95	20-25-30	NP-3 -5
			7-25	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	80-88-95	20-25-30	NP-3 -5
			25-29	Cemented material	—	—	—	—	—	—	—	—	—	—
Wiehl	20	C	0-3	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-80-90	15-20-25	NP-3 -5
			3-21	Fine sandy loam, silt loam, very fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	100-100-100	100-100-100	80-85-95	40-55-65	15-20-25	NP-3 -5
			21-27	Fine sandy loam, gravelly silt loam, very fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 5	70-85-100	60-80-100	55-70-95	40-55-65	15-20-25	NP-3 -5
			27-37	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
92—Outlook silt loam														
Outlook, drained	90	C	0-8	Fine sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	70-78-85	40-48-55	15-18-20	NP-3 -5
			8-60	Very fine sandy loam, silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	80-88-95	15-18-20	NP-3 -5

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Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
120—Scoon silt loam, 2 to 5 percent slopes														
Scoon	100	D	0-6	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	90-95-100	70-85-100	60-70-80	15-20-25	NP-3 -5
			6-16	Very fine sandy loam, gravelly silt loam, gravelly very fine sandy loam	GM, ML, SM	A-4	0- 0- 0	0- 5- 10	60-80-100	55-78-100	50-68-85	35-55-75	20-23-25	NP-3 -5
			16-60	Cemented material	—	—	—	—	—	—	—	—	—	—
121—Scoon silt loam, 5 to 8 percent slopes														
Scoon	100	D	0-6	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	90-95-100	70-85-100	60-70-80	15-20-25	NP-3 -5
			6-16	Very fine sandy loam, gravelly silt loam, gravelly very fine sandy loam	GM, ML, SM	A-4	0- 0- 0	0- 5- 10	60-80-100	55-78-100	50-68-85	35-55-75	20-23-25	NP-3 -5
			16-60	Cemented material	—	—	—	—	—	—	—	—	—	—
122—Scoon silt loam, 8 to 15 percent slopes														
Scoon	100	D	0-6	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	90-95-100	70-85-100	60-70-80	15-20-25	NP-3 -5
			6-16	Very fine sandy loam, gravelly silt loam, gravelly very fine sandy loam	GM, ML, SM	A-4	0- 0- 0	0- 5- 10	60-80-100	55-78-100	50-68-85	35-55-75	20-23-25	NP-3 -5
			16-60	Cemented material	—	—	—	—	—	—	—	—	—	—

Custom Soil Resource Report

Engineering Properties—Yakima County Area, Washington														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
123—Scoonsilt loam, 15 to 30 percent slopes														
Scoon	100	D	0-6	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	90-95-100	70-85-100	60-70-80	15-20-25	NP-3 -5
			6-16	Very fine sandy loam, gravelly silt loam, gravelly very fine sandy loam	GM, ML, SM	A-4	0- 0- 0	0- 5- 10	60-80-100	55-78-100	50-68-85	35-55-75	20-23-25	NP-3 -5
			16-60	Cemented material	—	—	—	—	—	—	—	—	—	—
124—Scooteneysilt loam, 0 to 2 percent slopes														
Scooteneysilt loam	100	B	0-6	Silt loam	ML, SM	A-4	0- 0- 0	0- 0- 0	90-95-100	75-85-95	70-80-90	40-53-65	20-25-30	NP-3 -5
			6-22	Loam, very fine sandy loam, silt loam	ML, SM	A-4	0- 0- 0	0- 0- 0	90-95-100	75-85-95	70-80-90	40-53-65	20-25-30	NP-3 -5
			22-33	Gravelly silt loam, gravelly fine sandy loam, cobbly loam	SM	A-2, A-4	0- 3- 5	0-10- 20	80-90-100	60-78-95	55-65-75	30-40-50	20-25-30	NP-3 -5
			33-60	Very gravelly fine sandy loam, very cobbly sandy loam	SM	A-1, A-2	0- 5- 10	20-33-45	70-80-90	40-48-55	40-45-50	15-25-35	15-20-25	NP-3 -5

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Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
127—Scooteney cobbly silt loam, 0 to 5 percent slopes														
Scooteney, cobbly	100	B	0-6	Cobbly silt loam	GM, ML, SM	A-4	0- 3- 5	15-23-30	70-80-90	65-75-85	60-70-80	40-55-70	20-25-30	NP-3 -5
			6-22	Loam, very fine sandy loam, silt loam	ML, SM	A-4	0- 0- 0	0- 3- 5	90-95-100	75-85-95	70-80-90	40-50-60	20-25-30	NP-3 -5
			22-33	Gravelly silt loam, gravelly fine sandy loam, cobbly loam	SM	A-2, A-4	0- 3- 5	5-10- 15	75-80-85	60-68-75	60-65-70	30-40-50	20-25-30	NP-3 -5
			33-60	Very gravelly sandy loam, very cobbly sandy loam, very gravelly loam	GM, SM	A-2, A-1	0- 5- 10	20-38-55	55-73-90	50-55-60	30-40-50	15-25-35	15-20-25	NP-3 -5
132—Shano silt loam, 2 to 5 percent slopes														
Shano	100	B	0-4	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3 -5
			4-30	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5
			30-60	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5
133—Shano silt loam, 5 to 8 percent slopes														
Shano	100	B	0-4	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3 -5
			4-30	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5
			30-60	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5

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Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
134—Shano silt loam, 8 to 15 percent slopes														
Shano	100	B	0-4	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	75-80-85	15-20-25	NP-3 -5
			4-30	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5
			30-60	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	80-85-90	15-20-25	NP-3 -5
140—Sinloc silt loam, 2 to 5 percent slopes														
Sinloc, drained	90	C	0-3	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	70-85-100	17-21-24	NP
			3-15	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	75-82-90	16-19-23	2-4 -6
			15-45	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	75-82-90	16-19-23	2-4 -6
			45-60	Loamy fine sand, loamy sand, sandy loam	SM	A-4, A-2	0- 0- 0	0- 0- 0	100-100-100	95-98-100	65-80-95	25-37-50	16-19-23	2-4 -6
141—Sinloc silt loam, 5 to 8 percent slopes														
Sinloc, drained	95	C	0-3	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	70-85-100	17-21-24	NP
			3-15	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	75-82-90	16-19-23	2-4 -6
			15-45	Silt loam, very fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	90-95-100	75-82-90	16-19-23	2-4 -6
			45-60	Loamy fine sand, loamy sand, sandy loam	SM	A-2, A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	65-80-95	25-37-50	16-19-23	2-4 -6

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					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
177—Warden silt loam, 2 to 5 percent slopes														
Warden	100	B	0-5	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	85-93-1 00	70-75- 80	25-28 -30	NP-3 -5
			5-19	Very fine sandy loam, silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5
178—Warden silt loam, 5 to 8 percent slopes														
Warden	100	B	0-5	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	85-93-1 00	70-75- 80	25-28 -30	NP-3 -5
			5-19	Very fine sandy loam, silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5
179—Warden silt loam, 8 to 15 percent slopes														
Warden	100	B	0-5	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	85-93-1 00	70-75- 80	25-28 -30	NP-3 -5
			5-19	Very fine sandy loam, silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-1 00	95-98-1 00	95-98-1 00	75-83- 90	25-28 -30	NP-3 -5

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					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
180—Warden silt loam, 15 to 30 percent slopes														
Warden	100	B	0-5	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	85-93-100	70-75-80	25-28-30	NP-3 -5
			5-19	Very fine sandy loam, silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3 -5
			19-60	Stratified very fine sandy loam to silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	95-98-100	75-83-90	25-28-30	NP-3 -5
189—Willis silt loam, 8 to 15 percent slopes														
Willis	100	C	0-6	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-75-80	15-18-20	NP-3 -5
			6-22	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	95-98-100	85-90-95	20-25-30	NP-3 -5
			22-34	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	95-98-100	80-85-90	20-25-30	NP-3 -5
			34-38	Cemented material	—	—	—	—	—	—	—	—	—	—

Particle Size and Coarse Fragments

This table shows estimates of particle size distribution and coarse fragment content of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (K_{sat}), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Total fragments is the content of fragments of rock and other materials larger than 2 millimeters in diameter on volumetric basis of the whole soil.

Fragments 2-74 mm refers to the content of coarse fragments in the 2 to 74 millimeter size fraction.

Fragments 75-249 mm refers to the content of coarse fragments in the 75 to 249 millimeter size fraction.

Fragments 250-599 mm refers to the content of coarse fragments in the 250 to 599 millimeter size fraction.

Fragments ≥600 mm refers to the content of coarse fragments in the greater than or equal to 600 millimeter size fraction.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

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Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
10—Burke silt loam, 2 to 5 percent slopes										
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
11—Burke silt loam, 5 to 8 percent slopes										
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
12—Burke silt loam, 8 to 15 percent slopes										
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
32—Esquatzel silt loam, 0 to 2 percent slopes										
Esquatzel	H1	0-17	-28-	-66-	2- 6- 8	—	—	—	—	—
	H2	17-60	-21-	-69-	5-10- 15	—	—	—	—	—
	H3	60-64	-21-	-69-	5-10- 15	—	—	—	—	—

Custom Soil Resource Report

Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
38—Finley silt loam, 2 to 5 percent slopes										
Finley	H1	0-12	-66-	-27-	4- 7- 10	9	7	2	—	—
	H2	12-30	-48-	-45-	4- 7- 10	41	37	2	—	2
	H3	30-60	-97-	- 2-	0- 2- 4	55	35	17	—	3
51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes										
Harwood	H1	0-8	-43-	-38-	16-19- 22	6	4	2	—	—
	H2	8-26	-41-	-37-	18-22- 25	6	4	2	—	—
	H3	26-30	-41-	-37-	18-22- 25	26	24	2	—	—
	H4	30-34	—	—	—	57	57	—	—	—
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
Wiehl	H1	0-3	-34-	-59-	5- 7- 8	—	—	—	—	—
	H2	3-21	-34-	-59-	5- 7- 8	—	—	—	—	—
	H3	21-27	-34-	-59-	5- 7- 8	20	20	—	—	—
	H4	27-37	—	—	—	—	—	—	—	—

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Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes										
Harwood	H1	0-8	-43-	-38-	16-19- 22	6	4	2	—	—
	H2	8-26	-41-	-37-	18-22- 25	6	4	2	—	—
	H3	26-30	-41-	-37-	18-22- 25	26	24	2	—	—
	H4	30-34	—	—	—	57	57	—	—	—
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
Wiehl	H1	0-3	-34-	-59-	5- 7- 8	—	—	—	—	—
	H2	3-21	-34-	-59-	5- 7- 8	—	—	—	—	—
	H3	21-27	-34-	-59-	5- 7- 8	20	20	—	—	—
	H4	27-37	—	—	—	—	—	—	—	—

Custom Soil Resource Report

Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes										
Harwood	H1	0-8	-43-	-38-	16-19- 22	6	4	2	—	—
	H2	8-26	-41-	-37-	18-22- 25	6	4	2	—	—
	H3	26-30	-41-	-37-	18-22- 25	26	24	2	—	—
	H4	30-34	—	—	—	57	57	—	—	—
Burke	H1	0-7	-21-	-69-	5-10- 15	2	2	—	—	—
	H2	7-25	-21-	-69-	5-10- 15	2	2	—	—	—
	H3	25-29	—	—	—	57	57	—	—	—
Wiehl	H1	0-3	-34-	-59-	5- 7- 8	—	—	—	—	—
	H2	3-21	-34-	-59-	5- 7- 8	—	—	—	—	—
	H3	21-27	-34-	-59-	5- 7- 8	20	20	—	—	—
	H4	27-37	—	—	—	—	—	—	—	—
92—Outlook silt loam										
Outlook, drained	H1	0-8	-65-	-27-	5- 8- 10	2	2	—	—	—
	H2	8-60	-22-	-71-	5- 8- 10	2	2	—	—	—
120—Scoon silt loam, 2 to 5 percent slopes										
Scoon	H1	0-6	-66-	-26-	5- 9- 12	5	5	—	—	—
	H2	6-16	-66-	-26-	5- 9- 12	28	25	3	—	—
	H3	16-60	—	—	—	57	57	—	—	—

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Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
121—Scoon silt loam, 5 to 8 percent slopes										
Scoon	H1	0-6	-66-	-26-	5- 9- 12	5	5	—	—	—
	H2	6-16	-66-	-26-	5- 9- 12	28	25	3	—	—
	H3	16-60	—	—	—	57	57	—	—	—
122—Scoon silt loam, 8 to 15 percent slopes										
Scoon	H1	0-6	-66-	-26-	5- 9- 12	5	5	—	—	—
	H2	6-16	-66-	-26-	5- 9- 12	28	25	3	—	—
	H3	16-60	—	—	—	57	57	—	—	—
123—Scoon silt loam, 15 to 30 percent slopes										
Scoon	H1	0-6	-66-	-26-	5- 9- 12	5	5	—	—	—
	H2	6-16	-66-	-26-	5- 9- 12	28	25	3	—	—
	H3	16-60	—	—	—	57	57	—	—	—
124—Scooteney silt loam, 0 to 2 percent slopes										
Scooteney	H1	0-6	-34-	-59-	5- 8- 10	12	10	2	—	—
	H2	6-22	-34-	-59-	5- 8- 10	12	10	2	—	—
	H3	22-33	-70-	-22-	5- 8- 10	26	18	6	—	2
	H4	33-60	-62-	-35-	0- 3- 5	41	20	18	—	3

Custom Soil Resource Report

Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
127—Scooteney cobbly silt loam, 0 to 5 percent slopes										
Scooteney, cobbly	H1	0-6	-34-	-59-	5- 8- 10	30	15	13	—	2
	H2	6-22	-34-	-59-	5- 8- 10	12	10	2	—	—
	H3	22-33	-65-	-27-	5- 8- 10	25	17	6	—	2
	H4	33-60	-66-	-26-	0- 8- 10	44	20	21	—	3
132—Shano silt loam, 2 to 5 percent slopes										
Shano	H1	0-4	-22-	-71-	5- 8- 10	—	—	—	—	—
	H2	4-30	-22-	-71-	5- 8- 10	—	—	—	—	—
	H3	30-60	-22-	-71-	5- 8- 10	—	—	—	—	—
133—Shano silt loam, 5 to 8 percent slopes										
Shano	H1	0-4	-22-	-71-	5- 8- 10	—	—	—	—	—
	H2	4-30	-22-	-71-	5- 8- 10	—	—	—	—	—
	H3	30-60	-22-	-71-	5- 8- 10	—	—	—	—	—
134—Shano silt loam, 8 to 15 percent slopes										
Shano	H1	0-4	-22-	-71-	5- 8- 10	—	—	—	—	—
	H2	4-30	-22-	-71-	5- 8- 10	—	—	—	—	—
	H3	30-60	-22-	-71-	5- 8- 10	—	—	—	—	—

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Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
140—Sinloc silt loam, 2 to 5 percent slopes										
Sinloc, drained	H1	0-3	-22-	-71-	5- 8- 10	2	2	—	—	—
	H2	3-15	-22-	-71-	5- 8- 10	—	—	—	—	—
	H3	15-45	-22-	-71-	5- 8- 10	—	—	—	—	—
	H4	45-60	-83-	- 9-	5- 8- 10	—	—	—	—	—
141—Sinloc silt loam, 5 to 8 percent slopes										
Sinloc, drained	H1	0-3	-22-	-71-	5- 8- 10	2	2	—	—	—
	H2	3-15	-22-	-71-	5- 8- 10	—	—	—	—	—
	H3	15-45	-22-	-71-	5- 8- 10	—	—	—	—	—
	H4	45-60	-83-	- 9-	5- 8- 10	—	—	—	—	—
177—Warden silt loam, 2 to 5 percent slopes										
Warden	H1	0-5	-21-	-68-	8-12- 15	4	4	—	—	—
	H2	5-19	-21-	-68-	8-12- 15	4	4	—	—	—
	H3	19-60	-21-	-68-	8-12- 15	4	4	—	—	—
178—Warden silt loam, 5 to 8 percent slopes										
Warden	H1	0-5	-21-	-68-	8-12- 15	4	4	—	—	—
	H2	5-19	-21-	-68-	8-12- 15	4	4	—	—	—
	H3	19-60	-21-	-68-	8-12- 15	4	4	—	—	—

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Particle Size and Coarse Fragments—Yakima County Area, Washington										
Map symbol and soil name	Horizon	Depth	Sand	Silt	Clay	Total fragments	Fragments 2-74 mm	Fragments 75-249 mm	Fragments 250-599 mm	Fragments >=600 mm
		<i>In</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>L-RV-H Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>	<i>RV Pct</i>
179—Warden silt loam, 8 to 15 percent slopes										
Warden	H1	0-5	-21-	-68-	8-12- 15	4	4	—	—	—
	H2	5-19	-21-	-68-	8-12- 15	4	4	—	—	—
	H3	19-60	-21-	-68-	8-12- 15	4	4	—	—	—
180—Warden silt loam, 15 to 30 percent slopes										
Warden	H1	0-5	-21-	-68-	8-12- 15	4	4	—	—	—
	H2	5-19	-21-	-68-	8-12- 15	4	4	—	—	—
	H3	19-60	-21-	-68-	8-12- 15	4	4	—	—	—
189—Willis silt loam, 8 to 15 percent slopes										
Willis	H1	0-6	-22-	-71-	5- 8- 10	—	—	—	—	—
	H2	6-22	-14-	-73-	10-13- 15	2	2	—	—	—
	H3	22-34	-14-	-73-	10-13- 15	4	4	—	—	—
	H4	34-38	—	—	—	57	57	—	—	—
197—Water										
Water	—	—	—	—	—	—	—	—	—	—

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and K_{sat} . Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

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Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service.
National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

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Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
10—Burke silt loam, 2 to 5 percent slopes														
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
11—Burke silt loam, 5 to 8 percent slopes														
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
12—Burke silt loam, 8 to 15 percent slopes														
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					

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Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
32—Esquatzel silt loam, 0 to 2 percent slopes														
Esquatzel	0-17	-28-	-66-	2- 6- 8	1.10-1.20-1.30	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	5	3	86
	17-60	-21-	-69-	5-10- 15	1.20-1.30-1.40	4.00-9.00-14.00	0.19-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	60-64	-21-	-69-	5-10- 15	1.25-1.40-1.55	4.00-9.00-14.00	0.18-0.21-0.23	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
38—Finley silt loam, 2 to 5 percent slopes														
Finley	0-12	-66-	-27-	4- 7- 10	1.15-1.25-1.35	14.00-28.00-42.00	0.13-0.14-0.15	0.0- 1.5- 2.9	0.7- 0.9- 1.0	.28	.28	3	5	56
	12-30	-48-	-45-	4- 7- 10	1.30-1.40-1.50	14.00-28.00-42.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.17	.49			
	30-60	-97-	- 2-	0- 2- 4	1.40-1.50-1.60	141.00-300.00-705.00	0.03-0.04-0.05	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.02	.05			

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Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
51—Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes														
Harwood	0-8	-43-	-38-	16-19- 22	1.15-1.25-1.35	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.37	.37	2	5	56
	8-26	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.32	.32			
	26-30	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.12-0.13-0.14	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.24	.43			
	30-34	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Wiehl	0-3	-34-	-59-	5- 7- 8	1.15-1.25-1.35	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	3	5	56
	3-21	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-27	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.43	.64			
	27-37	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
52—Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes														
Harwood	0-8	-43-	-38-	16-19- 22	1.15-1.25-1.35	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.37	.37	2	5	56
	8-26	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.32	.32			
	26-30	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.12-0.13-0.14	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.24	.43			
	30-34	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Wiehl	0-3	-34-	-59-	5- 7- 8	1.15-1.25-1.35	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	3	5	56
	3-21	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-27	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.43	.64			
	27-37	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
53—Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes														
Harwood	0-8	-43-	-38-	16-19- 22	1.15-1.25-1.35	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.37	.37	2	5	56
	8-26	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.16-0.17-0.18	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.32	.32			
	26-30	-41-	-37-	18-22- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.12-0.13-0.14	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.24	.43			
	30-34	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Burke	0-7	-21-	-69-	5-10- 15	1.10-1.23-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	2	5	56
	7-25	-21-	-69-	5-10- 15	1.30-1.45-1.60	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.64	.64			
	25-29	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
Wiehl	0-3	-34-	-59-	5- 7- 8	1.15-1.25-1.35	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	3	5	56
	3-21	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.15-0.17-0.19	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	21-27	-34-	-59-	5- 7- 8	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.43	.64			
	27-37	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
92—Outlook silt loam														
Outlook, drained	0-8	-65-	-27-	5- 8- 10	1.20-1.35-1.50	14.00-28.00-42.00	0.12-0.14-0.16	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.28	.28	5	3	86
	8-60	-22-	-71-	5- 8- 10	1.20-1.35-1.50	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.64	.64			
120—Scoon silt loam, 2 to 5 percent slopes														
Scoon	0-6	-66-	-26-	5- 9- 12	1.15-1.25-1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	3	86
	6-16	-66-	-26-	5- 9- 12	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	16-60	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
121—Scoon silt loam, 5 to 8 percent slopes														
Scoon	0-6	-66-	-26-	5- 9- 12	1.15-1.25-1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	3	86
	6-16	-66-	-26-	5- 9- 12	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	16-60	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
122—Scoon silt loam, 8 to 15 percent slopes														
Scoon	0-6	-66-	-26-	5- 9- 12	1.15-1.25-1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	3	86
	6-16	-66-	-26-	5- 9- 12	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	16-60	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
123—Scoon silt loam, 15 to 30 percent slopes														
Scoon	0-6	-66-	-26-	5- 9- 12	1.15-1.25-1.35	4.00-9.00-14.00	0.14-0.16-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	1	3	86
	6-16	-66-	-26-	5- 9- 12	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.32	.64			
	16-60	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
124— Scooteney silt loam, 0 to 2 percent slopes														
Scooteney	0-6	-34-	-59-	5- 8- 10	1.15-1.25-1.35	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.49	.49	4	5	56
	6-22	-34-	-59-	5- 8- 10	1.20-1.33-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	22-33	-70-	-22-	5- 8- 10	1.30-1.38-1.45	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.17	.32			
	33-60	-62-	-35-	0- 3- 5	1.30-1.43-1.55	14.00-28.00-42.00	0.05-0.07-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.17	.43			
127— Scooteney cobbly silt loam, 0 to 5 percent slopes														
Scooteney, cobbly	0-6	-34-	-59-	5- 8- 10	1.15-1.25-1.35	4.00-9.00-14.00	0.18-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.24	.49	5	6	48
	6-22	-34-	-59-	5- 8- 10	1.20-1.33-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	22-33	-65-	-27-	5- 8- 10	1.30-1.38-1.45	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.20	.37			
	33-60	-66-	-26-	0- 8- 10	1.30-1.43-1.55	14.00-28.00-42.00	0.05-0.07-0.09	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.10	.32			

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
132—Shano silt loam, 2 to 5 percent slopes														
Shano	0-4	-22-	-71-	5- 8- 10	1.15-1.23-1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	5	5	56
	4-30	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	30-60	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
133—Shano silt loam, 5 to 8 percent slopes														
Shano	0-4	-22-	-71-	5- 8- 10	1.15-1.23-1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	5	5	56
	4-30	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	30-60	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
134—Shano silt loam, 8 to 15 percent slopes														
Shano	0-4	-22-	-71-	5- 8- 10	1.15-1.23-1.30	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	5	5	56
	4-30	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	30-60	-22-	-71-	5- 8- 10	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
140—Sinloc silt loam, 2 to 5 percent slopes														
Sinloc, drained	0-3	-22-	-71-	5- 8- 10	1.40-1.50-1.60	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	5	4L	86
	3-15	-22-	-71-	5- 8- 10	1.20-1.30-1.50	4.00-9.00-14.00	0.17-0.19-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	15-45	-22-	-71-	5- 8- 10	1.20-1.30-1.50	4.00-9.00-14.00	0.17-0.19-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	45-60	-83-	- 9-	5- 8- 10	1.40-1.50-1.60	14.00-25.00-42.00	0.08-0.09-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.28	.28			
141—Sinloc silt loam, 5 to 8 percent slopes														
Sinloc, drained	0-3	-22-	-71-	5- 8- 10	1.40-1.50-1.60	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55	5	4L	86
	3-15	-22-	-71-	5- 8- 10	1.20-1.30-1.50	4.00-9.00-14.00	0.17-0.19-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	15-45	-22-	-71-	5- 8- 10	1.20-1.30-1.50	4.00-9.00-14.00	0.17-0.19-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	45-60	-83-	- 9-	5- 8- 10	1.40-1.50-1.60	14.00-25.00-42.00	0.08-0.09-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.28	.28			

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
177—Warden silt loam, 2 to 5 percent slopes														
Warden	0-5	-21-	-68-	8-12- 15	1.15-1.23-1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	5-19	-21-	-68-	8-12- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43-1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
178—Warden silt loam, 5 to 8 percent slopes														
Warden	0-5	-21-	-68-	8-12- 15	1.15-1.23-1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	5-19	-21-	-68-	8-12- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43-1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
179—Warden silt loam, 8 to 15 percent slopes														
Warden	0-5	-21-	-68-	8-12- 15	1.15-1.23-1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	5-19	-21-	-68-	8-12- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43-1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			

Custom Soil Resource Report

Physical Soil Properties—Yakima County Area, Washington														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
180—Warden silt loam, 15 to 30 percent slopes														
Warden	0-5	-21-	-68-	8-12- 15	1.15-1.23-1.30	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.43	.43	5	5	56
	5-19	-21-	-68-	8-12- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
	19-60	-21-	-68-	8-12- 15	1.35-1.43-1.50	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.55	.55			
189—Willis silt loam, 8 to 15 percent slopes														
Willis	0-6	-22-	-71-	5- 8- 10	1.15-1.25-1.35	4.00-9.00-14.00	0.19-0.20-0.21	0.0- 1.5- 2.9	1.0- 1.5- 2.0	.55	.55	2	5	56
	6-22	-14-	-73-	10-13- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.20-0.21	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.55	.55			
	22-34	-14-	-73-	10-13- 15	1.30-1.38-1.45	4.00-9.00-14.00	0.18-0.19-0.20	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.64	.64			
	34-38	—	—	—	—	0.01-0.20-0.42	0.00-0.00-0.00	—	—					
197—Water														
Water	—	—	—	—	—	—	—	—	—					

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