WHITE PINE ENGINEERING
- CIVIL STRUCTURAL -

March 16, 2025

Efrain Garcia
beyondwelding13@gmail.com
(801)360-4439

RE: Septic Test Pits and Percolation Test
Legacy Design Garcia Warehouses Fairfield
428 West 645 South
Fairfield, Utah

Efrain,

The purpose of this letter is to document the test pits that were excavated and observed on March 14, 2025 and the percolation test that was performed on March 15, 2025. The proposed development consists of 6 commercial warehouse buildings on an approximately 4.29-acre site in Fairfield, Utah. The intention is to have a separate septic tank and drain field for each building. The attached site plan shows the 6-test pit approximate locations which corresponds with the anticipated absorption area for each building.

Each test pit was excavated to a depth of 8’. We observed the individual soil strata in each test pit, collected soil samples to determine USDA soil classifications for each layer, and looked for evidence of groundwater or other unsuitable soil characteristics for a septic system. Groundwater was not observed in any of the test pits. Groundwater is a function of time and may fluctuate depending on seasons and weather conditions. Determining seasonal high groundwater was not included in the scope of this exploration, however we did not observe any evidence (such as soil mottling) that indicates the groundwater would fluctuate to a level that would impact the septic systems. The soil strata for each test pit is described below:

TP-1:
0” – 12”: Topsoil
12” – 60”: Silt Loam with Granular Soil Structure
60” – 96”: Gravelly Silt Loam with Granular Soil Structure

TP-2:
0” – 12”: Topsoil
12” – 96”: Silt Loam with Granular Soil Structure

TP-3:
0” – 12”: Topsoil
12” – 96”: Silty Clay Loam with Granular Soil Structure

TP-4:
0” – 16”: Topsoil
16” – 96”: Silty Clay Loam with Granular Soil Structure

TP-5:
0” – 12”: Topsoil
12” – 96”: Silty Clay Loam with Granular Soil Structure

TP-6:
0” – 12”: Topsoil
12” – 60”: Silty Clay Loam with Granular Soil Structure
60” – 96”: Gravelly Silty Clay Loam with Granular Soil Structure

As required by Utah State Code R317-4-13, Table 6, soils with a silty clay loam texture are required to have a soil percolation test performed in order to be suitable for an absorption system. A soil percolation test was performed in at an approximate depth of 2’-6” adjacent to TP-6. The soil percolation test was performed in accordance with the requirements of R317-4 Appendix D. This included saturating the percolation test hole with water on March 14th and then allowing the hole to sit for approximately 19 hours prior to beginning the test on March 15th. A 6” diameter perforated PVC pipe was placed inside the whole on about 2” of clean pea gravel. The space between the outside of the pipe and the edge of the hole was then filled with clean pea gravel. Water was placed in the perforated pipe to a depth of 6” above the bottom and then measured every 30 minutes. After each measurement, the water level was restored to a depth of 6” above the bottom of the hole. The measurements for each time interval are shown below. The measurements are measured from the top of the 21” long perforated pipe.

Time Interval (Min.)	Beginning Water Measurement (in.)	End Water Measurement (in.)	Drop in Water Level (in.)	Percolation Rate (Mpi)
0 – 30	15	18-1/4”	3-1/4”	9.23
30 – 60	15	17-11/16”	2-11/16”	11.16
60 – 90	15	17-7/16”	2-7/16”	12.31
90 – 120	15	17-3/8”	2-3/8”	12.63

As allowed in R317-4 Appendix D, the test was completed after the fourth measurement was taken since it was within 1/16” of the 3rd measurement. The slowest percolation rate recorded of 12.63 Mpi should be used in the design. As shown in R317-4-13 Table 5, this percolation rate results in a hydraulic loading rate of 0.7 gal/ft^2/day. Although only one percolation test was performed, the soil found in TP-6 in the soil strata tested was consistent with that found in test pits 3-5. The soil found in test pits 1-2 were similar in texture, but appeared to have less clays tan test pits 3-6, thus the silt loam rather than the silty clay loam texture designation, so it would be conservative to use the same hydraulic loading rate for the more clayey soil. Therefore, I recommend that the hydraulic loading rate of 0.7 gal/ft^2/day be used for the design of all 6 septic systems on the property.

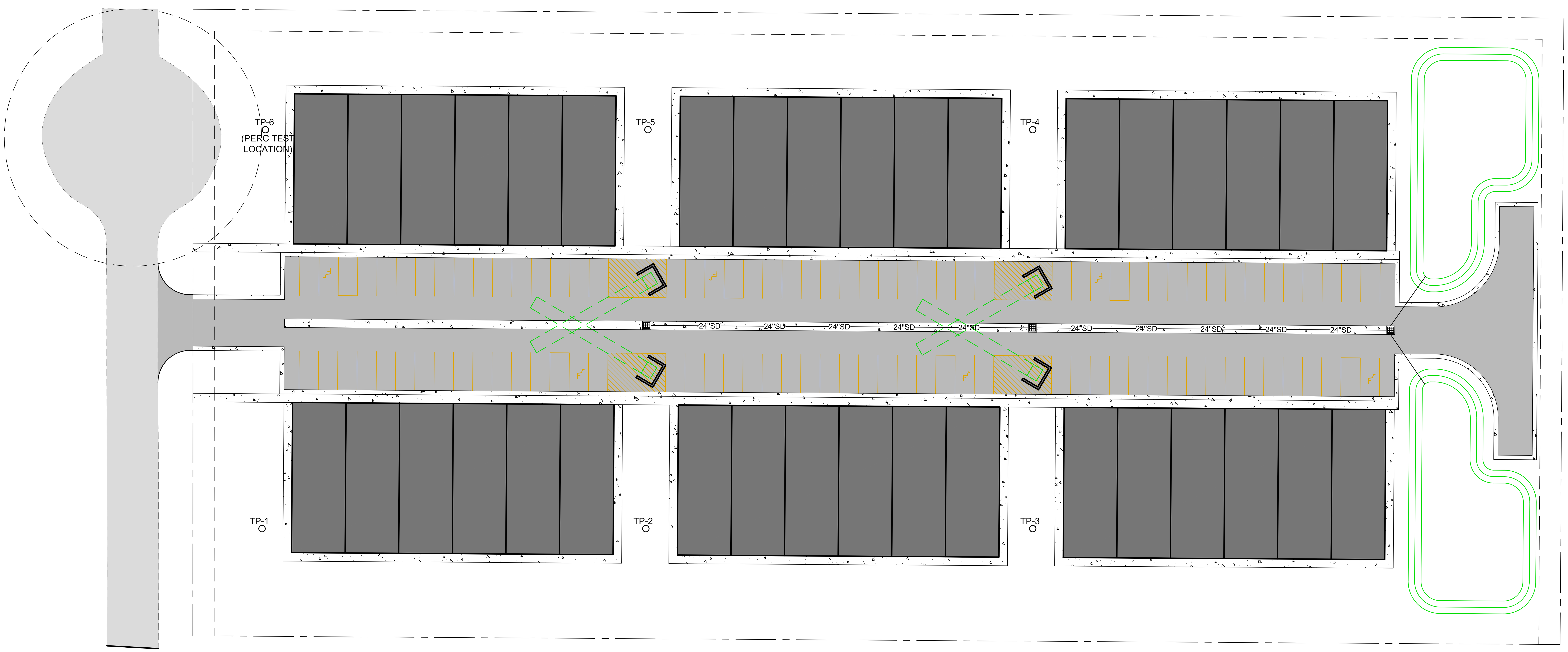
Conclusion

It is my professional opinion that onsite wastewater systems consisting of a septic tank and an absorption system are feasible based on the 6 test pits and 1 percolation test performed on the property. This opinion is based on the soil textures found and the lack of limiting layers such as groundwater, bedrock, or impermeable soils. Each absorption system on this property should be designed using a hydraulic loading rate of 0.7 gal/ft^2/day and by following the design requirements and guidelines outlined in R317-4.

Please let me know if you have any questions regarding this letter. I can be reached via phone or email.

Sincerely,

Thomas Hill, P.E.
tom@whitepineeng.com
(801)814-0227



WHITE PINE ENGINEERING
- CIVIL STRUCTURAL -

www.whitepineeng.com

435-515-0126
jackson@whitepineeng.com
tom@whitepineeng.com

P.O. BOX 669
HYDE PARK, UTAH
84318

LEGACY DESIGN FAIRFIELD WAREHOUSES

300 WEST 645 SOUTH
FAIRFIELD, UTAH

N

REVIEW SET ONLY

NOT FOR CONSTRUCTION

0' 15' 30'

SCALE: 12"X18": 1" = 30'
24"X36": 1" = 15'

DESIGNED BY: T. HILL
CHECKED BY: J. SAGERS

SHEET TITLE:

SITE PLANS
SEPTIC DESIGN

C-101

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

Fairfield-Nephi Area, Utah

March 16, 2025

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

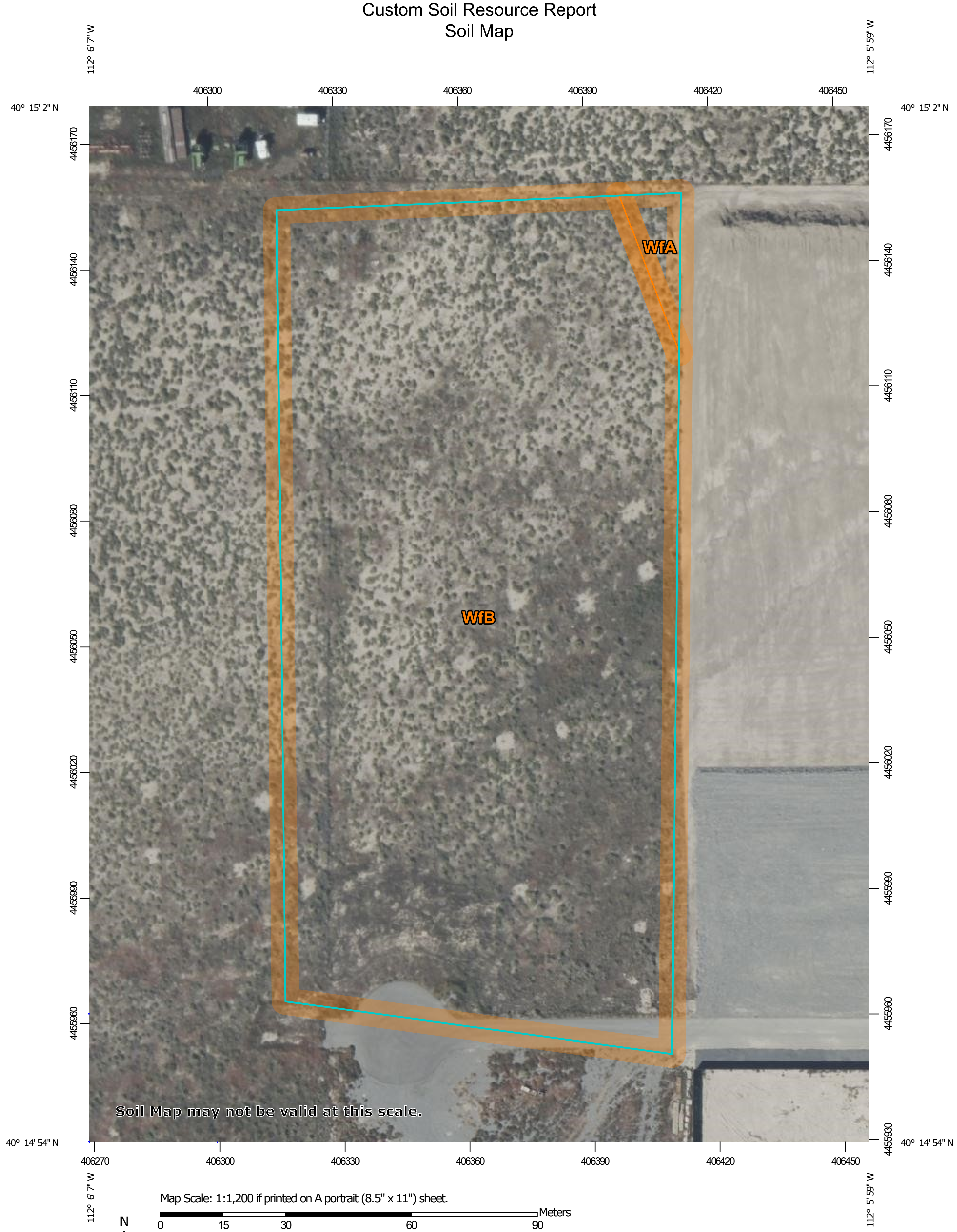
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

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

Soil Map

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

Soil Map



Map Scale: 1:1,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Fairfield-Nephi Area, Utah
Survey Area Data: Version 18, Aug 26, 2024

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

Date(s) aerial images were photographed: Sep 17, 2023—Sep 25, 2023

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
WfA	Woodrow silt loam, 0 to 1 percent slopes	0.1	1.5%
WfB	Woodrow silt loam, 1 to 2 percent slopes	4.6	98.5%
Totals for Area of Interest		**4.6**	**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.

Fairfield-Nephi Area, Utah

WfA—Woodrow silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j674
Elevation: 4,550 to 5,500 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Woodrow

Setting

Landform: Flood plains, lake terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Alluvium derived from sedimentary rock and/or lacustrine deposits derived from sedimentary rock

Typical profile

A1 - 0 to 5 inches: silt loam
C1 - 5 to 15 inches: silty clay loam
C2 - 15 to 20 inches: silty clay loam
C3 - 20 to 30 inches: silty clay loam
C4 - 30 to 40 inches: silty clay loam
C5 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
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: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R028AY202UT - Semidesert Alkali Loam (Black Greasewood)

Hydric soil rating: No

Minor Components

Woodrow

Percent of map unit: 10 percent

Genola

Percent of map unit: 5 percent

Mellor

Percent of map unit: 3 percent

Duggins

Percent of map unit: 2 percent

WfB—Woodrow silt loam, 1 to 2 percent slopes

Map Unit Setting

National map unit symbol: j675
Elevation: 4,550 to 5,500 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Woodrow and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodrow

Setting

Landform: Flood plains, lake terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Alluvium derived from sedimentary rock and/or lacustrine deposits derived from sedimentary rock

Typical profile

A1 - 0 to 5 inches: silt loam
C1 - 5 to 15 inches: silty clay loam
C2 - 15 to 20 inches: silty clay loam
C3 - 20 to 30 inches: silty clay loam
C4 - 30 to 45 inches: silty clay loam
C5 - 45 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 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): 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: 30 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R028AY202UT - Semidesert Alkali Loam (Black Greasewood)
Hydric soil rating: No

Minor Components

Genola

Percent of map unit: 5 percent

Woodrow

Percent of map unit: 5 percent

Woodrow

Percent of map unit: 5 percent

Mellor

Percent of map unit: 2 percent

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