



# NRCS Soils and Geology Evaluation

Denova Project

Washington County, Colorado

**February 2022, Revised November 2022**

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## PRESENTED TO

**Denova Sequestration, LLC a wholly-owned  
subsidiary of Carbon America**  
5525 W 56th Ave. Suite 200  
Arvada, CO 80002

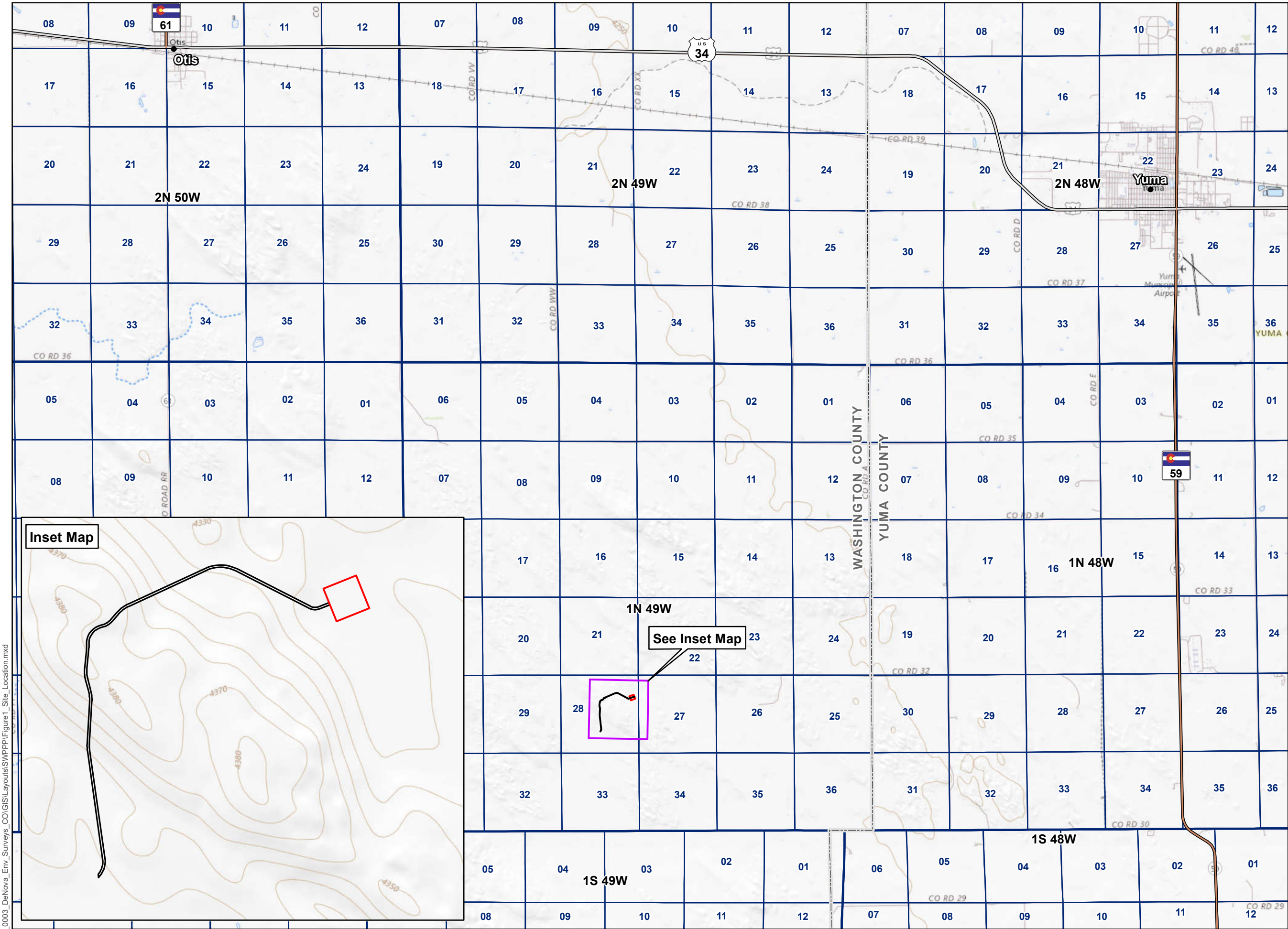


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## PRESENTED BY

**Tetra Tech, Inc.**  
1560 Broadway, Suite 1400  
Denver, CO 80202








## FIGURES



Carbon America  
Denova Project

Figure 1  
Site Location

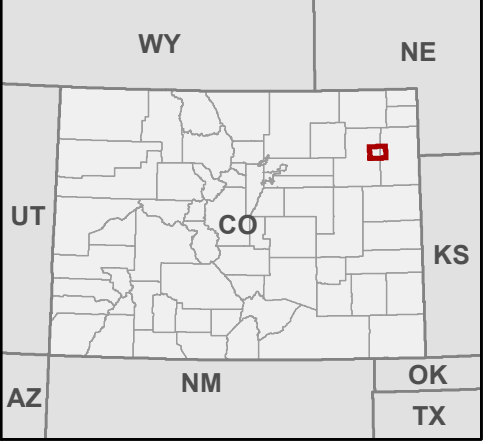
SW4NW4 SEC 27; NE4, SE4NW4, NE4SW4,  
NW4SE4 SEC 28; T1N R49W of the 6th PM,  
Washington County, CO

- Project Features**
-  Pad Site
  -  Access Road 15-foot Corridor
- Transportation**
-  US Highway
  -  State Highway
- Boundaries**
-  County Boundary
  -  PLSS Township
  -  PLSS Section



NOT FOR CONSTRUCTION

Reference Map



Inset Map

See Inset Map



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


**Carbon America  
Denova Project**

**Figure 2  
Site Plan**

SW4NW4 SEC 27; NE4, SE4NW4, NE4SW4,  
NW4SE4 SEC 28; T1N R49W of the 6th PM,  
Washington County, CO

**Project Features**

-  Pad Site
-  Access Road 15-foot Corridor

**Transportation**

-  Existing Two-Track Path



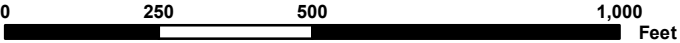
**NOT FOR CONSTRUCTION**

**Reference Map**



**1:3,750**

**NAD 1983 StatePlane Colorado North FIPS 0501 Feet**



Source: ESRI, USDA NAIP, BTS, US CENSUS



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**Carbon America  
Denova Project**




**Figure 3  
Natural Resources Conservation  
Service (NRCS) Soils**

SW4NW4 SEC 27; NE4, SE4NW4, NE4SW4,  
NW4SE4 SEC 28; T1N R49W of the 6th PM,  
Washington County, CO

**Project Features**

-  Pad Site
-  Access Road 15-foot Corridor

**Soil Types**

-  Valent sand, rolling
-  Valent sand, 3-9% slopes
-  Haxtun loamy sand, 0-3% slopes

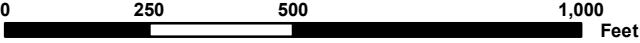


**NOT FOR CONSTRUCTION**

**Reference Map**



**1:4,000 NAD 1983 StatePlane Colorado North FIPS 0501 Feet**



Source: ESRI, USDA NAIP, NRCS

## Attachment A: NRCS Web Soil Survey

Washington County, Colorado

27—Haxtun loamy sand, 0 to 3 percent slopes

**Map Unit Setting**  
*National map unit symbol:* 2s7wd  
*Elevation:* 3,480 to 4,720 feet  
*Mean annual precipitation:* 15 to 23 inches  
*Mean annual air temperature:* 46 to 52 degrees F  
*Frost-free period:* 130 to 160 days  
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**  
*Haxtun and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Haxtun**

**Setting**  
*Landform:* Interdunes  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Eolian deposits

**Typical profile**  
*Ap - 0 to 9 inches:* loamy sand  
*Bt1 - 9 to 23 inches:* sandy clay loam  
*2Bt2 - 23 to 39 inches:* clay loam  
*2C - 39 to 79 inches:* loam

**Properties and qualities**  
*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 14 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Moderate (about 8.2 inches)

**Interpretive groups**  
*Land capability classification (irrigated):* 3e  
*Land capability classification (nonirrigated):* 3c  
*Hydrologic Soil Group:* C

*Ecological site:* R067BY024CO - Sandy Plains  
*Hydric soil rating:* No

**Minor Components**

**Ascalon**

*Percent of map unit:* 6 percent  
*Landform:* Interdunes  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Ecological site:* R067BY024CO - Sandy Plains  
*Hydric soil rating:* No

**Vona**

*Percent of map unit:* 4 percent  
*Landform:* Dunes  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Ecological site:* R067BY024CO - Sandy Plains  
*Hydric soil rating:* No

**Data Source Information**

Soil Survey Area: Washington County, Colorado  
Survey Area Data: Version 24, Sep 1, 2022



Washington County, Colorado

71—Valent sand, rolling

Map Unit Setting

National map unit symbol: 2tczg  
Elevation: 2,500 to 4,650 feet  
Mean annual precipitation: 14 to 20 inches  
Mean annual air temperature: 48 to 54 degrees F  
Frost-free period: 135 to 160 days  
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Valent, Rolling

Setting

Landform: Dunes, hills  
Landform position (two-dimensional): Summit, shoulder, backslope  
Landform position (three-dimensional): Head slope, nose slope, side slope, crest  
Down-slope shape: Convex, linear  
Across-slope shape: Convex, linear  
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 4 inches: sand  
C - 4 to 80 inches: sand

Properties and qualities

Slope: 9 to 24 percent  
Depth to restrictive feature: More than 80 inches  
Drainage class: Excessively drained  
Runoff class: Low  
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)  
Depth to water table: More than 80 inches  
Frequency of flooding: None  
Frequency of ponding: None  
Calcium carbonate, maximum content: 1 percent  
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)  
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e  
Land capability classification (nonirrigated): 6e  
Hydrologic Soil Group: A

Ecological site: R067BY015CO - Deep Sand, R072XY109KS -  
Rolling Sands  
Hydric soil rating: No

Minor Components

**Dailey**

Percent of map unit: 10 percent  
Landform: Interdunes  
Landform position (two-dimensional): Footslope, toeslope  
Landform position (three-dimensional): Base slope  
Down-slope shape: Linear  
Across-slope shape: Concave  
Ecological site: R067BY015CO - Deep Sand, R072XY111KS -  
Sandy Plains  
Hydric soil rating: No

**Ipaga**

Percent of map unit: 3 percent  
Landform: Dune slacks  
Landform position (two-dimensional): Footslope, toeslope  
Landform position (three-dimensional): Base slope  
Down-slope shape: Concave  
Across-slope shape: Concave  
Ecological site: R067BY029CO - Sandy Meadow, R072XY107KS -  
Sandy Lowland  
Hydric soil rating: No

**Valent, eroded**

Percent of map unit: 2 percent  
Landform: Blowouts  
Landform position (two-dimensional): Summit, shoulder, backslope  
Landform position (three-dimensional): Head slope, nose slope,  
side slope, crest  
Down-slope shape: Concave  
Across-slope shape: Concave  
Ecological site: R067BY015CO - Deep Sand, R072XY109KS -  
Rolling Sands  
Hydric soil rating: No

Data Source Information

Soil Survey Area: Washington County, Colorado  
Survey Area Data: Version 24, Sep 1, 2022

Washington County, Colorado

70—Valent sand, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2tczf  
Elevation: 3,050 to 5,150 feet  
Mean annual precipitation: 12 to 18 inches  
Mean annual air temperature: 48 to 55 degrees F  
Frost-free period: 130 to 180 days  
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Valent

Setting

Landform: Hills, dunes  
Landform position (two-dimensional): Shoulder, backslope, footslope, summit  
Landform position (three-dimensional): Head slope, nose slope, side slope, crest  
Down-slope shape: Convex, linear  
Across-slope shape: Convex, linear  
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 5 inches: sand  
AC - 5 to 12 inches: sand  
C1 - 12 to 30 inches: sand  
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 3 to 9 percent  
Depth to restrictive feature: More than 80 inches  
Drainage class: Excessively drained  
Runoff class: Very low  
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)  
Depth to water table: More than 80 inches  
Frequency of flooding: None  
Frequency of ponding: None  
Calcium carbonate, maximum content: 1 percent  
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)  
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e



Land capability classification (nonirrigated): 6e  
Hydrologic Soil Group: A  
Ecological site: R067BY015CO - Deep Sand, R072XY109KS -  
Rolling Sands  
Hydric soil rating: No

Minor Components

**Dailey**  
Percent of map unit: 10 percent  
Landform: Interdunes  
Landform position (two-dimensional): Footslope, toeslope  
Landform position (three-dimensional): Base slope  
Down-slope shape: Linear  
Across-slope shape: Concave  
Ecological site: R067BY015CO - Deep Sand, R072XA021KS -  
Sands (North) (PE 16-20)  
Hydric soil rating: No

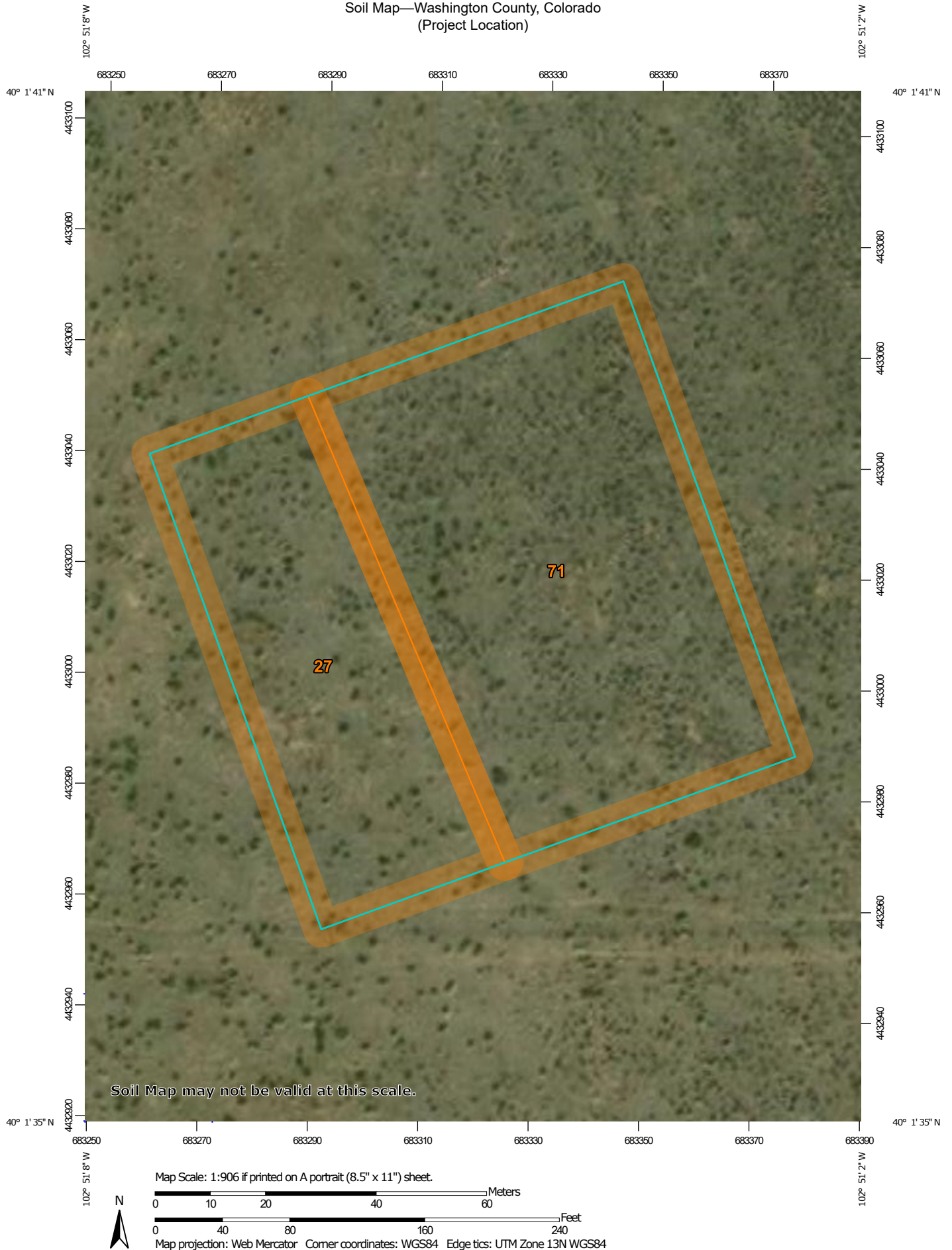
**Vona**  
Percent of map unit: 5 percent  
Landform: Hills  
Landform position (two-dimensional): Shoulder, backslope,  
footslope  
Landform position (three-dimensional): Head slope, nose slope,  
side slope, base slope  
Down-slope shape: Linear  
Across-slope shape: Linear  
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS -  
Sandy (North) Draft (April 2010) (PE 16-20)  
Hydric soil rating: No

**Haxtun**  
Percent of map unit: 5 percent  
Landform: Interdunes  
Landform position (two-dimensional): Footslope, toeslope  
Landform position (three-dimensional): Base slope  
Down-slope shape: Linear  
Across-slope shape: Concave  
Ecological site: R067BY024CO - Sandy Plains, R072XY111KS -  
Sandy Plains  
Hydric soil rating: No

Data Source Information

Soil Survey Area: Washington County, Colorado  
Survey Area Data: Version 24, Sep 1, 2022


# Soil Map—Washington County, Colorado (Project Location)



Soil Map—Washington County, Colorado  
(Project Location)


## 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: Washington County, Colorado

Survey Area Data: Version 23, Aug 31, 2021

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

Date(s) aerial images were photographed: Oct 21, 2011—Oct 10, 2017

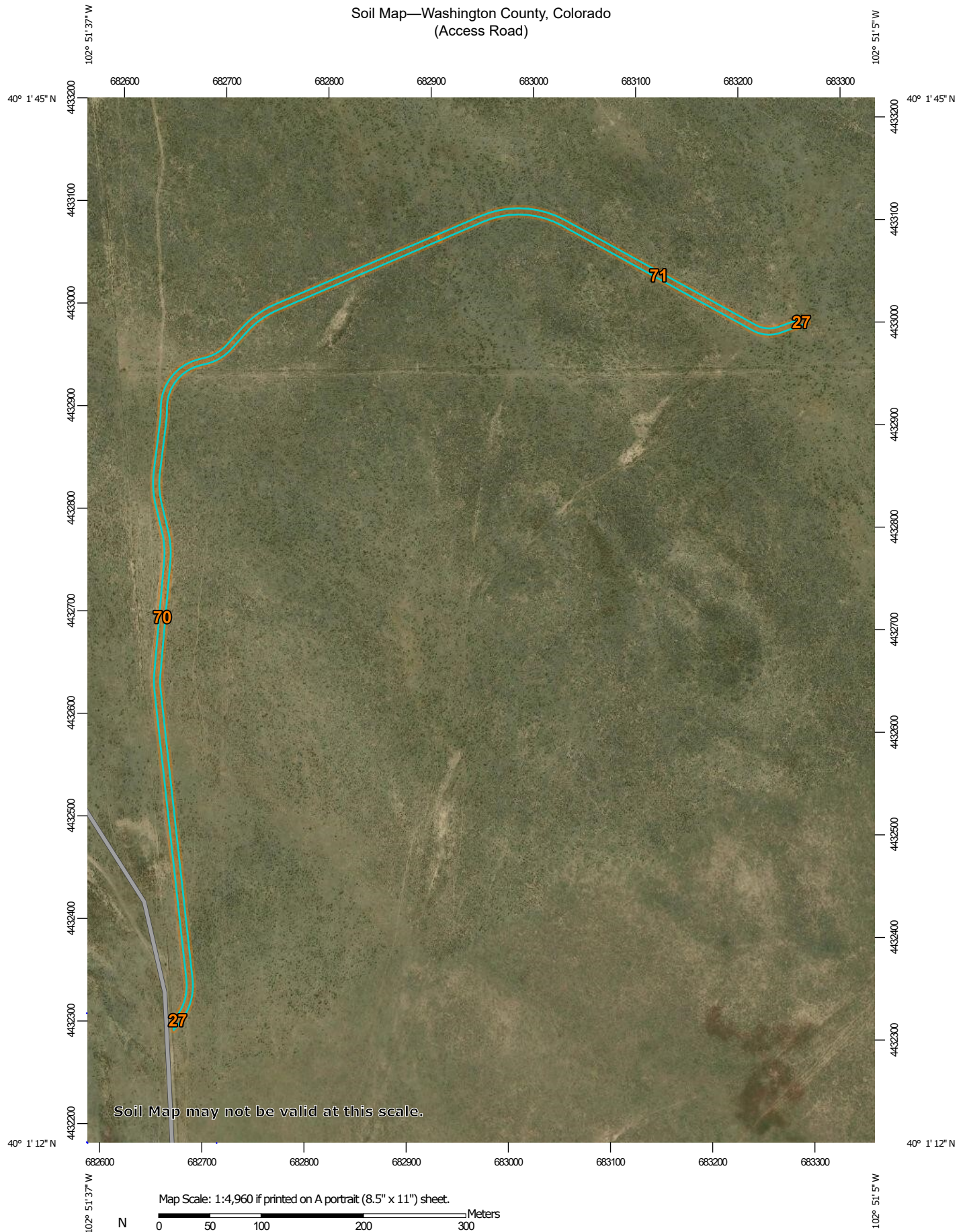
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
27	Haxtun loamy sand, 0 to 3 percent slopes	0.7	36.1%
71	Valent sand, rolling	1.3	63.9%
<b>Totals for Area of Interest</b>		<b>2.1</b>	<b>100.0%</b>


# Soil Map—Washington County, Colorado (Access Road)




Soil Map—Washington County, Colorado  
(Access Road)

## 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: Washington County, Colorado

Survey Area Data: Version 23, Aug 31, 2021

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

Date(s) aerial images were photographed: Oct 21, 2011—Oct 10, 2017

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
27	Haxtun loamy sand, 0 to 3 percent slopes	0.0	1.9%
70	Valent sand, 3 to 9 percent slopes	1.4	69.3%
71	Valent sand, rolling	0.6	28.8%
<b>Totals for Area of Interest</b>		<b>2.0</b>	<b>100.0%</b>