Flatirons, Inc.

Surveying, Engineering & Geomatics

www.FlatironsInc.com

January 13, 2017

Town of Lyons
P.O. Box 49
Lyons, CO 80540

RE: Planet Bluegrass Farm Annexation – Description of Soil Types and Limitations

On behalf the owner of Planet Bluegrass, Lyons, Colorado the attached exhibits describe the soil types and their limitations on the proposed 26.2 acre annexation 19680 North St. Vrain Drive (the old Williams property) as required for the annexation application and review.

Attached to this letter is a Soil Survey map of the proposed annexation site, along with descriptions of the soil types shown, including soil properties and qualities. The Soil Survey and descriptions were prepared by the US Department of Agriculture (USDA) National Resources Conservation Service (NRCS) as part of the National Cooperative Soil Survey, and obtained on January 10, 2017 from the NRCS Soil Survey web site.

Please contact me by phone or e-mail if there are any questions or concerns regarding this annexation application Description of Soil Types and Limitations.

Sincerely,

Curtis D. Parker, P.E.
Flatirons Inc.

COLORADO REGISTERED
CURTIS D. PARKER
30598
1/13/17
PROFESSIONAL ENGINEER

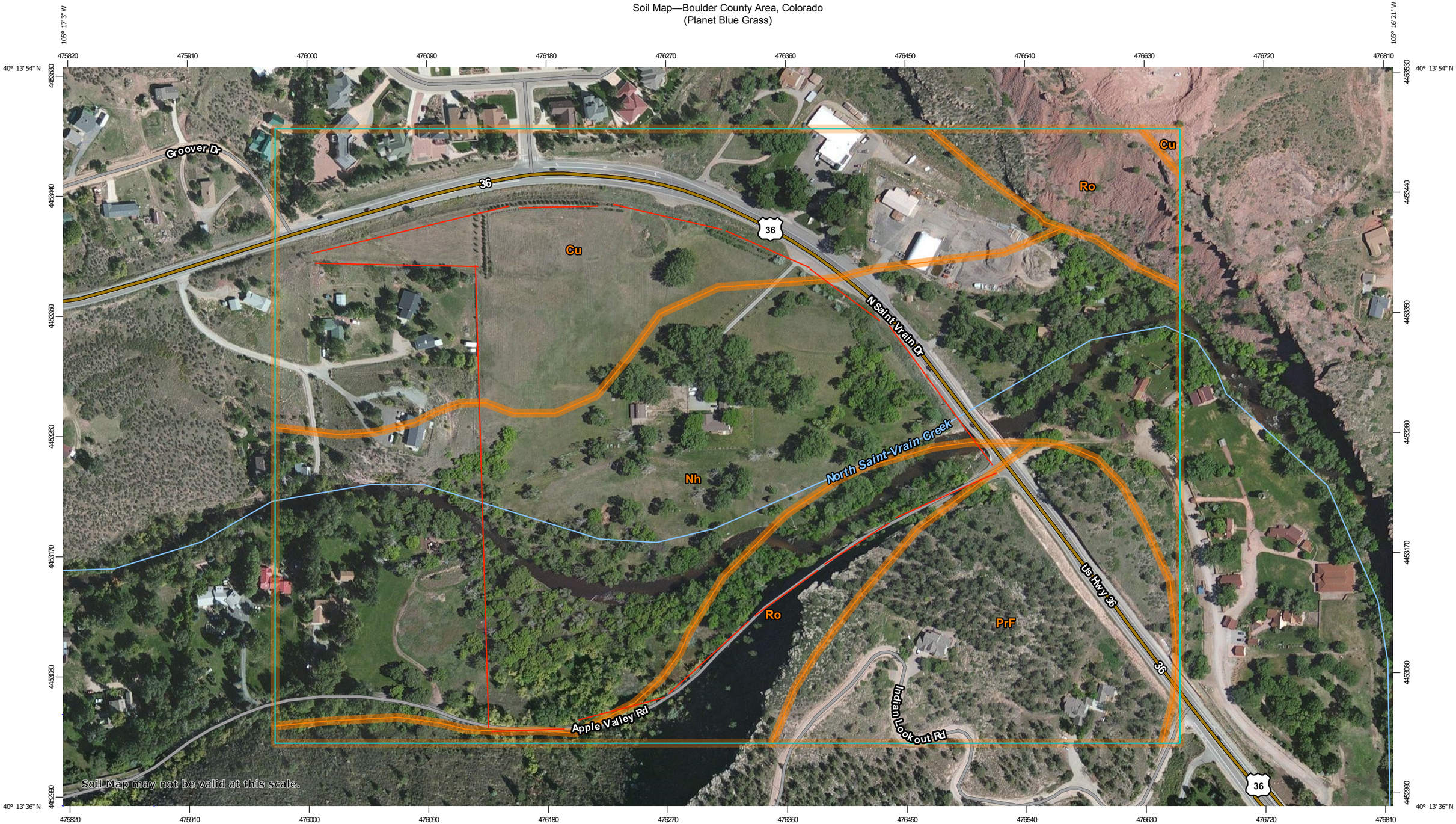
Attachments

3825 Iris Avenue, Ste 395
Boulder, CO 80301
Phone: (303) 443-7001
Fax: (303) 443-9830

655 Fourth Avenue
Longmont, CO 80501
Phone: (303) 776-1733
Fax: (303) 776-4355

3660 Downing Street, Unit E
Denver, CO 80205
Phone: (303) 936-6997
Fax: (303)443-9830

Soil Map—Boulder County Area, Colorado
(Planet Blue Grass)



Map Scale: 1:2,700 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N 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 1:20,000.

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: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

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

Date(s) aerial images were photographed: Apr 28, 2011—Nov 18, 2011

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

Boulder County Area, Colorado (CO643)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Cu	Colluvial land	22.1	28.5%
Nh	Niwot soils	33.9	43.6%
PrF	Pinata-Rock outcrop complex, 5 to 55 percent slopes	11.7	15.1%
Ro	Rock outcrop	10.0	12.8%
Totals for Area of Interest		**77.7**	**100.0%**

Boulder County Area, Colorado

Cu—Colluvial land

Map Unit Setting

National map unit symbol: jprk
Elevation: 7,500 to 9,000 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Colluvial land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colluvial Land

Setting

Landform: Valleys
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium

Typical profile

H1 - 0 to 3 inches: gravelly sandy loam
H2 - 3 to 60 inches: gravelly sand, very gravelly sand, gravelly loamy sand
H2 - 3 to 60 inches:
H2 - 3 to 60 inches:

Properties and qualities

Slope: 9 to 25 percent
Depth to restrictive feature: 2 to 60 inches to lithic bedrock
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Very low (about 0.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

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

Kim
Percent of map unit: 7 percent
Hydric soil rating: No

Otero
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

Boulder County Area, Colorado

Nh—Niwot soils

Map Unit Setting

National map unit symbol: jps8
Elevation: 4,900 to 5,500 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 140 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Niwot

Setting

Landform: Flood plains, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over sandy and gravelly alluvium

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B
Ecological site: Wet Meadow (R067XB038CO)
Hydric soil rating: No

Minor Components

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

Nunn
Percent of map unit: 4 percent
Hydric soil rating: No

Aquolls
Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

Boulder County Area, Colorado

Ro—Rock outcrop

Map Unit Composition

Rock outcrop: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Landform: Cliffs, mountain slopes
Landform position (three-dimensional): Free face, mountaintop
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mixed

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 95 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Available water storage in profile: Very low (about 0.0 inches)

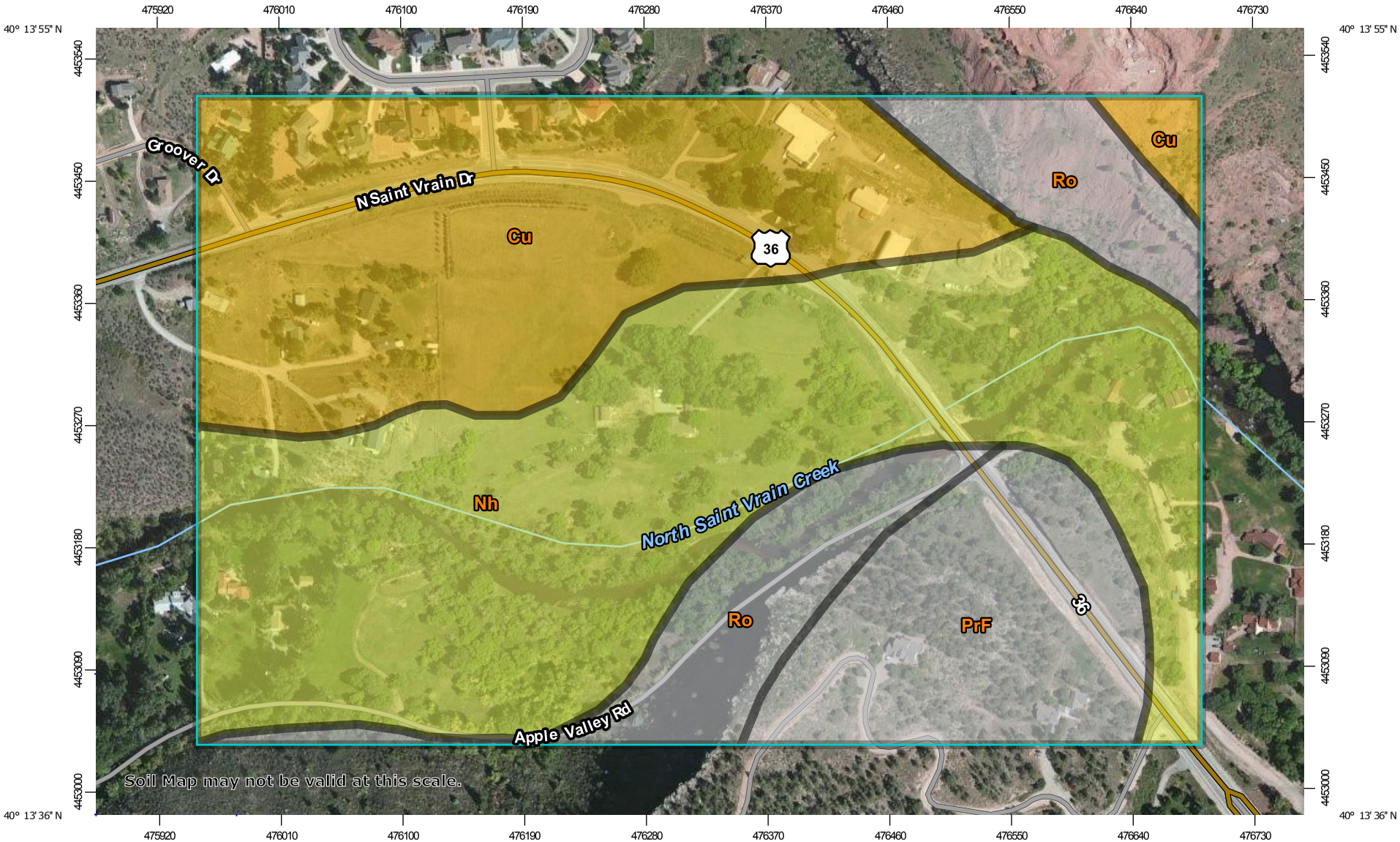
Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: No

Data Source Information

Soil Survey Area: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

K Factor, Whole Soil—Boulder County Area, Colorado
(Planet Blue Grass)



Map Scale: 1:4,080 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

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 1:20,000.

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: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

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

Date(s) aerial images were photographed: Apr 28, 2011—Nov 18, 2011

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.

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Boulder County Area, Colorado (CO643)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Cu	Colluvial land	.15	27.3	31.0%
Nh	Niwot soils	.20	38.3	43.4%
PrF	Pinata-Rock outcrop complex, 5 to 55 percent slopes		11.4	12.9%
Ro	Rock outcrop		11.2	12.7%
Totals for Area of Interest			**88.1**	**100.0%**

Description

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 saturated hydraulic conductivity (Ksat). 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 Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

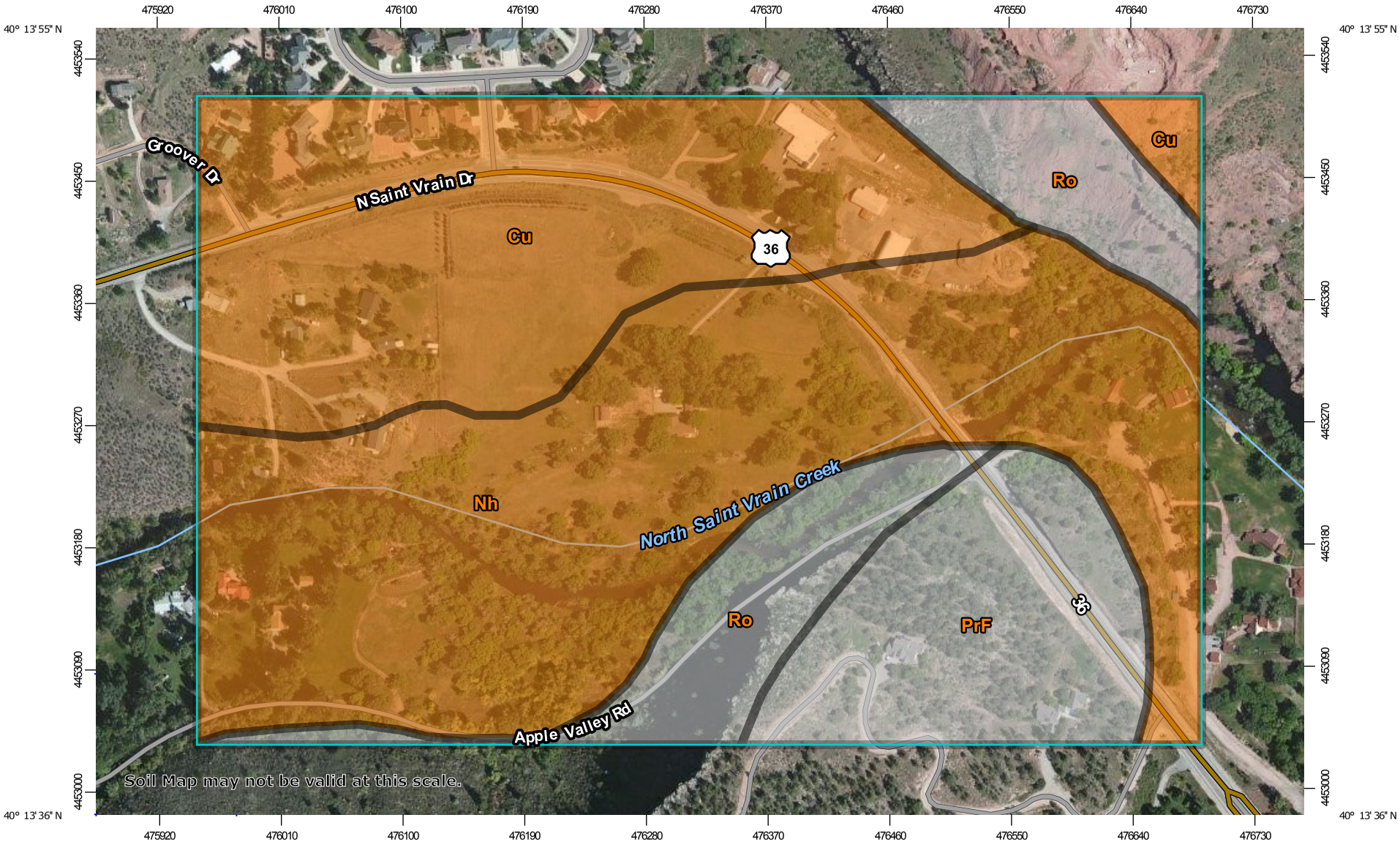
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

T Factor—Boulder County Area, Colorado
(Planet Blue Grass)



Map Scale: 1:4,080 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

1

2

3

4

5

Not rated or not available

Soil Rating Lines

1

2

3

4

5

Not rated or not available

Soil Rating Points

1

2

3

4

5

Not rated or not available

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 1:20,000.

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: Boulder County Area, Colorado
Survey Area Data: Version 13, Sep 23, 2016

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

Date(s) aerial images were photographed: Apr 28, 2011—Nov 18, 2011

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.

T Factor

T Factor— Summary by Map Unit — Boulder County Area, Colorado (CO643)				
Map unit symbol	**Map unit name**	**Rating (tons per acre per year)**	**Acres in AOI**	**Percent of AOI**
Cu	Colluvial land	2	27.3	31.0%
Nh	Niwot soils	2	38.3	43.4%
PrF	Pinata-Rock outcrop complex, 5 to 55 percent slopes		11.4	12.9%
Ro	Rock outcrop		11.2	12.7%
Totals for Area of Interest			**88.1**	**100.0%**

Description

The T factor 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.

Rating Options

Units of Measure: tons per acre per year

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No