

SITE-SPECIFIC QUALITY ASSURANCE & QUALITY CONTROL AUDIT



Permit Closure Type – Final

PERMIT CLOSURE REPORT – RANGELAND

Location ID 331414

Location Name DOW-65N63W/28SWSE

Report Date

31 May 2023

Soil Sage has conducted a thorough data audit as part of our Quality Assurance and Quality Control (QA/QC) protocols.

Initial Job Assignment

Client	CIVITAS Resources
Work Assignment	CPW Centennial Valley State Wildlife Area Reclamation Reports
Date	April 26, 2023

Quality Assurance & Quality Control Audit

Auditor	Soil Sage
Audit Date	04/27/2023

Audit Methodology

The following source materials were consulted during the QA and QC audit process:

- ✓ Site Permit Closures provided by CIVITAS Resources
- ✓ Colorado Oil & Gas Information System – COGIS Database
- ✓ On-site Evaluation and Proprietary Soil Sage Drone Imagery data collection
- ✓ Review of legacy imagery for site location and facility parameters

All pertinent data, imagery, and materials are included at the end of this report.

Site Description

Name	DOW-65N63W/28SWSE		
Location ID	331414		
Operator / #	BONANZA CREEK ENERGY OPERATING COMPANY LLC / 8960		
Field	WATTENBERG / 90750		
County, State	WELD, CO		
Lat/Long	40.364790 / -104.439190		
	Planned Location	X	As Drilled
Facility Status	AC	Location	SWSE 28 5N63W
Facility Status Date	06/12/2019	Access Road	Oil & Gas Access
Facility Entities	X	Tank Battery	Pits
	X	Wells	Off-Location Flowlines (Form 44)
		Domestic Taps	X On-Location Flowlines (Form 42)
Equipment Remaining on Site	X	None	Debris or Non-Oil & Gas
	List of Equipment:		
Environment Incidents & Remediation	X	None	Spill or Release (Form 19)
	Remediation (Form 27/27A)		
Inspection Corrective Actions (CA)s	<p>Corrective Actions (CA)s were detected during the QA & QC Audit.</p> <p>CA Overall Status: 1 of 1 CAs have not been completed.</p> <p>Originating Field Inspection Report (FIR) Doc #697504625</p> <ul style="list-style-type: none"> See "Field Inspection Form" section of this report below for details. <p>Complete COGCC Inspection Search Results: Link</p>		
Sundry Notice (Form 4)	Form 4s exist for Related Facilities – See individual scout card data for report details.		
On Location Flowlines (Form 42)	Form 42s exist for Related Facilities – See individual scout card data for report details.		
Off-Location Flowlines (Form 44)	No Form 44s were detected during this QA & QC Audit.		
Field Inspection Form (Form INSP)	<p>Form INSP Doc # & Date: 697504625 & 04/20/2023</p> <ul style="list-style-type: none"> Status Summary: Follow Up Inspection Required, Corrective Action Response Required Inspected Facilities: Well DOW 34-28 and Tank Battery DOW - 65N63W28SWSE Inspection Status: Both RI Inspection Date & Inspector: 04/20/2023 by Chris Binschus 		

	<ul style="list-style-type: none"> ○ Comments: On 4/20/2023, Reclamation Specialist Chris Binschus performed an inspection in response to a complaint regarding failed reclamation throughout the Centennial Valley SWA. Complaint: #403379491. Nature of complaint: CPW had concerns about failed reclamation that was previously performed by Bonanza Creek approximately three years ago. ○ Corrective Action: The well/tank battery location and access road consisted mostly of weeds or bare soil that is not reflective of reference areas. Due to the lack of desirable vegetation establishment, COGCC is requiring soil sampling. Note- Operator may need to install temporary fencing to facilitate on-going grazing operations. Comply with Rule 1004 to conduct additional reclamation. The corrective action date is the date the location was observed out of compliance. CA Date: 04/20/2023 ○ Attachments: Photo Inspection Document #697504626. ○ Overall Final Reclamation: Fail <p>Form INSP Doc # & Date: 696101580 & 11/19/2019</p> <ul style="list-style-type: none"> ○ Status Summary: None Checked ○ Inspected Facilities: Well DOW 34-28 and Tank Battery DOW - 65N63W 28SWSE ○ Inspection Status: Well: PA; Tank Battery: IO (Inactive Operation) ○ Inspection Date & Inspector: 11/18/2019 by Bret Evins ○ Comments: This is a PLUGGED & ABANDONED WELL & BATTERY inspection. While there, I observed: Well(s): 1: Plugged & Abandoned PA. Battery: Abandoned Dismantled. Most equipment removed. Reclamation progressing. During this inspection, NO possible compliance issues were observed. ○ Attachments: Photo Inspection Document #696101580.
COGIS Tank Facilities Information (Scout Card)	<p>Tank Battery Name: DOW-65N63W/28SWSE</p> <p>FACILITY ID: 447075</p> <ul style="list-style-type: none"> ○ Status & Date: AC & 07/29/2016 ○ Lat/Long: 40.365048 / -104.439882
COGIS Well Information (Scout Card)	<p>Well Name: DOW #34-28</p> <p>API#: 05-123-20657</p> <p>FACILITY ID: 261887</p> <ul style="list-style-type: none"> ○ Status & Date: PA & 06/12/2019

	<ul style="list-style-type: none"> ○ Lat/Long As Drilled: 40.364790 / -104.439190 ○ Form 42 Doc # & Date: 402258886 & 12/10/2019 Purpose: Flowlines Abandoned – per RULE 1105. Date Completed: 12/05/2019 ○ Form 6 Subsequent Doc # & Date: 402082983 & 08/29/2019 ○ Form 4 Doc # & Date: 402066720 & 08/29/2019 Purpose: Notice of Continued Temporarily Abandoned Status. Date well temporarily abandoned: 02/24/2018. Has production been removed from site? No. Date of last MIT 03/06/2018. ○ Form 42 Doc # & Date: 402068902 & 06/10/2019 Purpose: Start of Plugging Operations – 48-hour notice required.
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COGCC Abbreviations: [Location & Facility Status Codes](#), [Inspection Types & Statuses](#) and [COGCC Help](#).

Audit Key Findings – Designation Land Use Observations

PREVIOUS LAND USE	CURRENT LAND USE
Reference Imagery for Infrastructure: Landsat/Copernicus 2013	Remotely Sensed Imagery: 05/02/2023
Designation: Oil and Gas Facility	Designation: Rangeland

The following imagery sources were reviewed during this audit:

EarthExplorer, DRCOG 2002 - 2014, NAIP Imagery 2011, 2013, 2015, 2017, 2019, 2021, ESRI Maxar and Remotely Sensed Imagery Sep 2022

Closure Information

Landowner Colorado Parks and Wildlife (CPW) filed a complaint on 04/20/2023 stating concerns about failed reclamation activities at the Centennial Valley State Wildlife Area performed by operator Bonanza Creek Energy Operating Company LLC approximately three years ago. In response, COGCC Reclamation Specialist Chris Binschus performed a Reclamation Inspection of the area that failed and identified a Corrective Action (CA) requiring the operator to perform soil sampling.

The inspection for this location includes both the well DOW 34-28 and tank battery DOW-65N63W 28SWSE. The inspection noted that the well/tank battery location and its access road were stated to have high percentages of weeds or bare soil. This was not representative of the reference areas, therefore the COGCC requires soil sampling to take place. The inspection also noted that the operator may need to install temporary fencing to facilitate on-going grazing operations.

Site Photos

Site Investigation and Photos Date

05/02/2023

Cardinal directional and ground perspective photos of the site



North



East



South



West

ATTACHMENTS

Maps and Figures

Location Maps

CPW Overview Roads and Reclamation Extents

Area Maps

Previous Infrastructure Overview

Current Site Overview

Elevation & Contours

Slope

Hydrology

NDVI Composite

NDVI

Reports

Reclamation Report

Soil Analytics

Overview Table

Lab Reports

Reference Soil and Vegetation

Observations

Background Information

Natural Resources Conservation Service (NRCS) Map Unit Description

Reference Soil and Ecological Description

Supplemental Data

The following information was provided by Civitas.

Topsoil Analytical Report

Seed Mix

SITE-SPECIFIC RECLAMATION PLAN



Permit Closure Type – Final

Failed Reclamation Inspection

Site Description

Name	DOW-65N63W/28SWSE
Location ID	331414
Operator / #	BONANZA CREEK ENERGY OPERATING COMPANY LLC / 8960
Field	WATTENBERG / 90750
County, State	WELD, CO
Associated Facilities	Tank Battery, On-Location Flowline

Report Date

31 May 2023

Revision 5 October 2023

Site Evaluation

Investigator: Soil Sage

Investigation Date: 2-4 May 2023

Reference Soil Information: This site is comprised within one soil type, Map Unit 3 - Aquolls and Aquents, gravelly substratum, 0 to 3 percent slopes, variable texture surface and at depth. These soils are recent alluvium. Landform is stream terraces. Poorly drained with a moderate available water holding capacity. Depth ranges from 0 – 10 inches, the pH is 7.9 and the organic matter is 2.0%.

Soil chemical properties within the rooting zone to 50 inches is described in the Soil Properties – USDA Soil Properties section of this report.

Current Land Use in Reference Area: Range land

Observations

The Southern section is intermixed leased grazing land and “native” ecosystem along the South Platte River. The reclaimed areas have residual gravel and excessive applications of manure, which have impacted the recovery of the sites.

Weed pressure has occurred along the roads and patchy areas at each site.

Debris remains along the roads and sites in the form of silt fencing, waddles and oil and gas operational equipment. Reference the observation document for specifics.

Stream crossings have not been recontoured, disruption of the stream flow and vehicle crossing has occurred.

Site Soils

During the field investigation, Soil Sage collected soil samples every six inches from 0 – 24 inches within the site and reference locations within the map unit. These soils were analyzed to establish current soil physicochemical properties for reclamation planning. See spreadsheet attachment Table 1 for site specific soil characterizations and associated reference soils. Reference USDA Soils and Ecological Site Description for historical properties.

Recommendations

Data of Sampling – 2-4 May 2023

Vegetation

Spring vegetation characteristics were present, newly emerging grasses and weeds are the primary vegetation during the site visit.

Ecological Site observations serve as the baseline vegetation cover.

Table represents the present cover observations.

Sample Number	Bare Ground	Grass	Forbs	Shrubs	Litter	Weeds	Field Notes
8	75	15	0	0	10	0	

Weeds

Weed Summary Reference

Common Name	Weed List Type	Percent Cover (%)
N/A		

Weed Inventory Criteria

- Each site is accessed for noxious weeds and common weeds
- Data are aggregated using point locations coupled with percent cover assessments and area measurements as needed
- Governance - Colorado Department of Agriculture - Colorado Noxious Weeds List, effective October 2020
- List A - Designated for eradication, List B - Designated to stop the continued spread, List C - Facilitate more integrated effective weed management, Watch List - Determined to pose a potential threat to ag and natural productivity.
- Common - designates weeds that do not fall within the Colorado Department of Agriculture lists
- Other - designates other identified weeds at the site

Site Characteristics

Hydrology

Hydrology – Stream Orders 1 – 5 are present - dominant streams are orders are 1, 2 and 3. Order 3 are present in locations that have the potential for soil erosion represented by gullying and riling that follow the elevation gradient from high to low within the current reclaim extent. These could be major runoff areas for gullying and soil erosion with heavy precipitation events.

Ponding - potential ponding can occur where water follows the elevation gradients in low lying area.

Reference Hydrology and Elevation and Contour Maps

Soil/Erosion

Exposed soils have low susceptibility to water erosion and are in the low susceptible group for wind erosion due to ecosystem dynamics and vegetative cover.

Summary Acreage Table

Description	Acres
Historic Disturbance Extent	1.30
Current Reclaim Extent	0.86
Road Associated with Facility	0.24*
Reference Extent	0.05

*Road extends to Location 415154.

Reference areas are shared and are available in the South Reference Document and Site Overview Reference Map.

Summary Reclamation Acreage Table

Description	Acres
Reclaim Extent	0.86
Road Reclaim Extent without additional area	0.24

Reference Reclaim Map

Summary Cubic Yards of Soils

Description	Cubic Yards
Reclaim Extent remove 12 inches	1387
Reclaim Extent replace 12 inches	1387
Reclaim Road remove 12 inches	387
Reclaim Road replace 12 inches	387
Additional Road removal	726*
Additional Road replacement	726*

This additional road area captures the difference between the original road and the previous road reclaim extent.

Reference Reclaim and Road Maps

Site Recommendation and Re-Evaluation

North Side

Road: 12 inches remove and replace

Pad: 12 inches remove and replace

NOTE: Gravel and water table were found at 24 inches. Do not deep rip below 24.

Replacement Soil

Texture: Sandy Loam

Organic Matter: 1%

pH: 7.0 - 8.3

Nitrate N: less than 50 ppm

Sodium: less than 150 ppm

Chloride Cl: less than 100 ppm

Sulfate S: less than 100 ppm

Soil tests must be submitted to Luke Kelly (lkelly@civiresources.com) AND Sam Streeter (sam@soilsage.com) for approval prior to use on the project. Certified Weed Free Straw must be used, and evidence must be supplied to Luke Kelly and Sam Streeter. Soil Sage will be performing inspections during reclamation activities and after work is complete to ensure success. On-site access must be coordinated with Colorado Parks and Wildlife (CPW) before work commences. Schedule of reclamation activities (approximate) must be submitted before reclamation starts and any changes to the schedule must be communicated via email to Luke Kelly and Sam Streeter.

Seed Mix

Vegetation Seed Mix

Additional reclamation procedures are recommended at this time.

Seed mixed provided by surface owner

Reference Seed Mix

Soil Amendments

New soil specifications are outlined above with NPK and OM recommendations.

Soil Analytics

Soil analytics provided to Civitas by Lone Tree Services

Soils imported by Lone Tree Services

Reference – Topsoil Report for 22-272-0302

Site Monitoring

Continue monitoring for vegetative recovery and weed control.

Pre-Reclamation Activities and Notes:

- There are active and abandoned midstream assets in both the northern and southern parts of the reclamation area.
- Remove silt fencing, waddles and remaining oil and gas operational equipment.

Reclaim Area Protocol

Time Frame	Activity	Specifications	Site Totals
Prior to Reclamation Activities	Pre-Reclamation	Remove trash, silt fencing, waddles, and oil and gas operational equipment	Refer to the observation document for the area
Recontour Ditches	Pre-Reclamation	Recontour ditch crossings on the south side. 3 ditch crossings need to be converted to crossing points where vehicles can cross when dry and water can flow when wet. In the current condition vehicles cannot cross.	Refer to the observation document for the area
Spring 2023 Seedbed prep	Remove and Replace Soil	Texture: Sandy Loam Organic Matter: 1% pH: 7.0 - 8.3 Nitrate N: less than 50 ppm Sodium: less than 150 ppm Chloride Cl: less than 100 ppm Sulfate S: less than 100 ppm	0.86 Acres
	Rip	Cross rip to 18 inches, do not rip below 18 inches. Evidence of seasonably high-water table found as shallow as 18 inches. Do not interact with this layer	
	Disc	Disc the site to a depth of 6.0-inches using a disk and harrow, field cultivator, vibrashank, or another alternative suitable to site conditions	
Seeding	Seeding	If reclamation occurs > 30-days prior to preferred seeding dates, drill seed into the soil surface no deeper than ¼ -inch using the provided seed mix	
	Seed	Provided by Surface Owner	Reference Seed Mix
	Straw	Spread certified weed free straw	
	Crimp	Crimp Straw to a depth of 3 inches without cutting the mulch fiber	
Monitoring	Continuous	Site should be monitored post reclamation to ensure success	
Weed Management		Due to the seed bank of cheatgrass, thistle and kochia monthly monitoring is recommended with appropriate herbicide control	



Site Photos – Soil 9 – S9

Lat/Long: 40.364772 / -104.439181

Nearest Facility #: 331414

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location




Site Photos – Soil 10 – S10

Lat/Long: 40.36503 / -104.439904

Nearest Facility #: 331414

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location
	
Soil Picture 3	

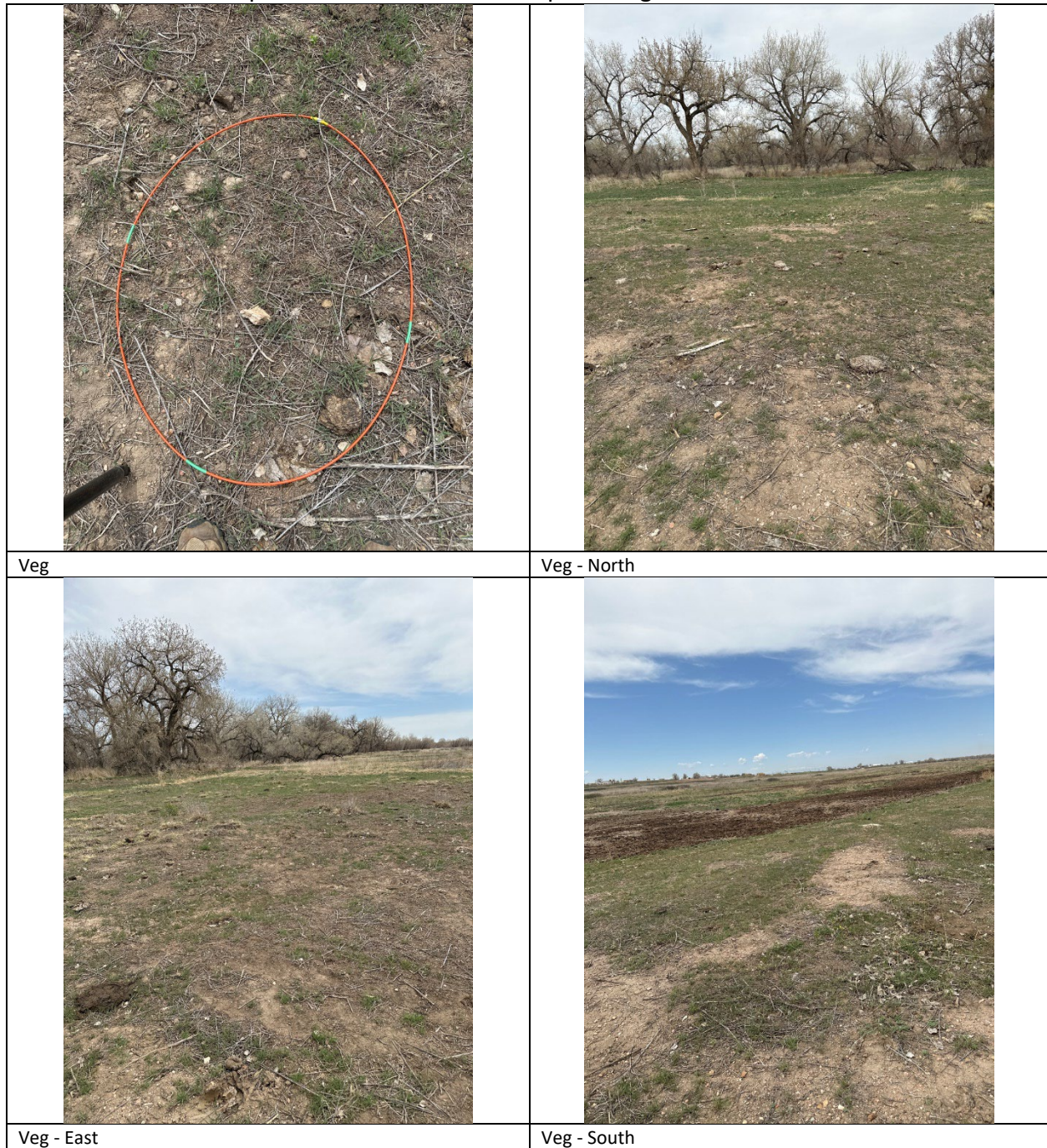
Site Photos – Vegetation 8 – V8

Lat/Long: 40.36475 / -104.439145

Nearest Facility #: 331414

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.





	
Veg – West	Grass

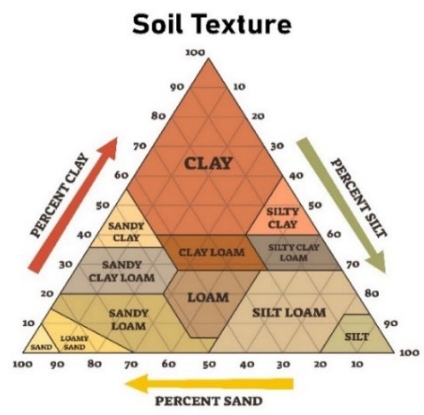
TABLE 1: Soil Report

Client	Civitas		Date	17-May-23
Operator	Bonanza Creek		Ward	20230512
Location ID - Name	CPW	South Side		
Type	Well, Tank Battery, Roads, Reference			



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Soil Profile				Physical Properties			Texture Hydro	Location Ref
Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Partical Size				
				Sand %	Silt %	Clay %		
Soil - 9.1	0	6	6	64	19	17	Sandy Loam	331414-Well
Soil - 9.2	6	12	6	78	13	9	Sandy Loam	
Soil - 9.3	12	18	6	63	20	17	Sandy Loam	
Soil - 9.4	18	24	6	67	18	15	Sandy Loam	
Soil - 10.1	0	6	6	71	12	17	Sandy Loam	331414-TB
Soil - 10.2	6	12	6	67	18	15	Sandy Loam	
Soil - 10.3	12	18	6	63	20	17	Sandy Loam	
Soil - 10.4	18	24	6	65	18	17	Sandy Loam	
Site Average				67	17	16		



Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Sand %	Silt %	Clay %	Texture Hydro	Location Ref
Soil - 2 REF	0	10	10	63	16	21	Sandy Clay Loam	MU3
Soil - 4 REF	0	8	8	45	28	27	Loam	MU3
Soil - 6.1 REF	0	6	6	35	24	41	Clay	MU3
Soil - 6.2 REF	6	12	6	47	24	29	Sandy Clay Loam	MU3
Soil - 6.3 REF	12	18	6	60	21	19	Sandy Loam	MU3
Soil - 6.4 REF	18	24	6	86	9	5	Loamy Sand	MU3
Soil - 11.1 REF	0	6	6	53	28	19	Sandy Loam	MU3
Soil - 11.2 REF	6	12	6	51	26	23	Sandy Clay Loam	MU3
Soil - 11.3 REF	12	18	6	50	26	24	Sandy Clay Loam	MU3
Soil - 11.4 REF	18	24	6	80	9	11	Sandy Loam	MU3
Soil - 16.1 REF	0	6	6	66	14	20	Sandy Loam	MU3
Soil - 16.2 REF	6	12	6	76	13	11	Sandy Loam	MU3
Soil - 16.3 REF	12	18	6	79	10	11	Sandy Loam	MU3
Soil - 16.4 REF	18	24	6	76	8	16	Sandy Loam	MU3
Site Ref Average				62	18	20		

Soil Profile				Chemical Properties				Organic	
Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	pH	ECe	CEC	Excess Lime	Matter	SAR
				Sat Paste	mmhos/cm	meq/100g	CaCO3 Rating	(LOI) %	Sat Paste
Soil - 9.1	0	6	6	7.9	0.38	23.2	LOW	1.5	0.8
Soil - 9.2	6	12	6	8.5	0.35	18.4	HIGH	0.7	2.3
Soil - 9.3	12	18	6	8.3	0.49	22	HIGH	1.4	3.7
Soil - 9.4	18	24	6	8.5	1.25	23.6	HIGH	1.2	3.3
Soil - 10.1	0	6	6	7.9	7.1	25.8	LOW	3.5	8.1

Soil - 10.2	6	12	6	7.9	8	26.6	LOW	1.4	8.7
Soil - 10.3	12	18	6	7.8	7.53	25.6	HIGH	1	10.8
Soil - 10.4	18	24	6	8.1	4.64	25.7	HIGH	0.9	17.6
Site Average				8.1	3.7	23.9		1.5	6.9

	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	pH	ECe	CEC	Excess Lime	Organic	SAR
				Sat Paste	mmhos/cm	meq/100g	CaCO3 Rating	Matter (LOI) %	Sat Paste
Soil - 2 REF	0	10	10	8.2	3.4	20.9	NONE	2.2	14.2
Soil - 4 REF	0	8	8	7.2	7.74	21.5	NONE	5.9	10.7
Soil - 6.1 REF	0	6	6	8	1.74	28.2	LOW	4.7	4.6
Soil - 6.2 REF	6	12	6	8.4	2.23	31.2	HIGH	2.7	12.6
Soil - 6.3 REF	12	18	6	8.4	5.47	30	HIGH	1.1	15.7
Soil - 6.4 REF	18	24	6	8.1	1.25	10.4	LOW	0.6	4
Soil - 11.1 REF	0	6	6	5.8	2.93	9.7	NONE	3.6	16
Soil - 11.2 REF	6	12	6	8	11.26	34	HIGH	1.9	32.9
Soil - 11.3 REF	12	18	6	8.6	14.86	37.9	HIGH	1.2	50.1
Soil - 11.4 REF	18	24	6	8.5	9.64	25.6	HIGH	0.5	29
Soil - 16.1 REF	0	6	6	6.6	0.75	10.6	NONE	2.6	0.3
Soil - 16.2 REF	6	12	6	7.1	0.42	7	NONE	1	0.5
Soil - 16.3 REF	12	18	6	7.7	0.37	9	NONE	0.9	0.5
Soil - 16.4 REF	18	24	6	7.9	0.74	21.6	LOW	1	1.2
Site Ref Average				7.8	4.49	21.3		2.1	13.7

Location	Soil Profile			Extraction Method			Nitrate - N		Nitrate-N	Phosphorus	Potassium
				KCL	M3	NH4OAc					
	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Phosphorus							
				Nitrate-N	P	Potassium					
				ppm	ppm	ppm	Lbs/A		ppm	ppm	ppm
Soil - 9.1	0	6	6	1.2	58	375	2	0-12	1.15	37	224
Soil - 9.2	6	12	6	1.1	16	73	2	12-24	3.05	29	141.5
Soil - 9.3	12	18	6	2.5	33	142	5				
Soil - 9.4	18	24	6	3.6	25	141	7				
Soil - 10.1	0	6	6	81.7	730	2652	147	0-12	93.35	425	2390
Soil - 10.2	6	12	6	105	120	2128	189	12-24	63.55	57.5	420.5
Soil - 10.3	12	18	6	83.9	69	577	151				
Soil - 10.4	18	24	6	43.2	46	264	78				
Site Average				40	137	794	73				

	Bottom Depth		Soil Thickness	Phosphorus		Potassium			Phosphorus		Potassium
	Top Depth (in)	(in)	(in)	Nitrate-N	P	K	Nitrate - N	Nitrate-N	P	K	
				ppm	ppm	ppm	Lbs/A	ppm	ppm	ppm	
Soil - 2 REF	0	10	10	1.3	66	703	4				
Soil - 4 REF	0	8	8	3.1	95	694	7				
Soil - 6.1 REF	0	6	6	43.4	59	399	78	0-12	30	40	294.5
Soil - 6.2 REF	6	12	6	16.6	21	190	30	12-24	2.3	9	49
Soil - 6.3 REF	12	18	6	1.8	5	58	3				

Soil - 6.4 REF	18	24	6	2.8	13	40	5						
Soil - 11.1 REF	0	6	6	48.9	92	378	88		0-12	31.45	57.5	349	
Soil - 11.2 REF	6	12	6	14	23	320	25		12-24	2.7	7.5	162.5	
Soil - 11.3 REF	12	18	6	4.2	9	221	8						
Soil - 11.4 REF	18	24	6	1.2	6	104	2						
Soil - 16.1 REF	0	6	6	21.5	83	244	39		0-12	14.85	59	193.5	
Soil - 16.2 REF	6	12	6	8.2	35	143	15		12-24	7.15	20	110	
Soil - 16.3 REF	12	18	6	5.9	30	151	11						
Soil - 16.4 REF	18	24	6	8.4	10	69	15						
Site Ref Average				13	39	265	24						

Plant Available													
Location	Soil Profile			NH4OAc	NH4OAc	NH4OAc	Hot Water	Ca-NO3	M3	AB-DTPA	Iron	Manganese	Zinc
	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Calcium	Magnesium	Sodium	Boron B	Chloride Cl	Sulfate	Copper			
				Ca	Mg	Na							
				ppm	ppm	ppm							
Soil - 9.1	0	6	6	3736	397	51	1.13	3.2	36	4.52	7.7	2.9	4.41
Soil - 9.2	6	12	6	2966	356	103	0.93	0.8	24.1	1.64	6.8	2.6	1.15
Soil - 9.3	12	18	6	3383	461	195	1.39	5.9	34.8	3.85	12.8	3.3	2.96
Soil - 9.4	18	24	6	3877	370	184	1.11	50.4	64	3.34	13.4	2.1	2.79
Soil - 10.1	0	6	6	2540	501	501	2.4	202.1	229.2	1.64	19.1	9.1	8.57
Soil - 10.2	6	12	6	3100	363	613	1.7	451.1	339.2	1.2	13.2	9.4	2.22
Soil - 10.3	12	18	6	3484	445	691	1.56	509.1	208.3	0.83	4.8	3	1.37
Soil - 10.4	18	24	6	3560	397	897	1.77	299.1	115.4	1.18	7.4	2.4	1.28
Site Average				3331	411	404	1	190.2	131.4	2.28	10.7	4.4	3.09

Reference	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Calcium	Magnesium	Sodium	Boron B	Chloride Cl	Sulfate	Copper	Iron	Manganese	Zinc
				Ca	Mg	Na			S	Cu			
				ppm	ppm	ppm			ppm	ppm			
Soil - 2 REF	0	10	10	1756	726	979	6.08	145.6	150.6	0.99	7.7	5	0.81
Soil - 4 REF	0	8	8	1958	648	1046	4.09	527.1	500.2	0.9	10.6	4.8	2.29
Soil - 6.1 REF	0	6	6	3062	1091	642	6.14	52.9	62.3	7.33	8.6	4	3.59
Soil - 6.2 REF	6	12	6	3751	990	845	7.03	73.2	110.7	2.36	8.9	3.9	1.29
Soil - 6.3 REF	12	18	6	3671	848	1017	4.19	163.6	445.9	0.94	9.6	3.4	0.33
Soil - 6.4 REF	18	24	6	1530	245	133	0.96	36.9	85.8	0.53	7.2	2	0.57
Soil - 11.1 REF	0	6	6	855	216	611	1.41	97.6	55.8	0.92	68.1	14.9	2.29
Soil - 11.2 REF	6	12	6	3887	438	2328	3.47	181.1	999.9	0.52	9.2	3.4	0.5
Soil - 11.3 REF	12	18	6	3796	581	3107	3.58	230.1	1357	0.58	5.2	2	0.17
Soil - 11.4 REF	18	24	6	2803	472	1695	1.62	110.6	642.2	0.31	5.7	1.4	0.14
Soil - 16.1 REF	0	6	6	1519	280	18	0.85	26.5	14.3	4.46	32.8	4.2	6.61
Soil - 16.2 REF	6	12	6	1008	177	19	0.57	3.7	6.5	3.88	10.6	4.6	2.16
Soil - 16.3 REF	12	18	6	1426	162	23	0.55	2.1	10.1	1.72	6.7	2.9	0.89
Soil - 16.4 REF	18	24	6	3748	284	72	0.68	21.9	33.3	0.69	5.5	2.6	0.45
Site Ref Average				2484	511	895	2.94	119.5	319.6	1.87	14.0	4.2	1.58

Terms Defined

pH	A measure of the acidity or basicity (alkalinity) of a soil. pH is defined as the negative logarithm (base 10) of the activity of hydronium ion in a solution
ECe	The Electrical Conductivity of a saturated soil Extract that measures salinity
Alkalinity	Alkalinity indicates a solution's power to react with acid and buffer its pH - the power to keep its pH from changing. The higher the Alkanility, the higher the buffering capacity against pH change.
CEC - Cation Exchange Capacity	The measure of how many cations can be retained on soil particle surfaces.
CEC Ranges	
Range 11-50	High Clay, more lime to correct a given pH, greater capacity to hold nutrients, physical effects of high clay content, high water-holding capacity
Range 1-10	High Sand, Nitrogen and potassium leaching, less lime to correct a given pH, physical effects of high sand content, low water-holding capacity

Optimal pH range for plant growth

6.0 -7.0

Typical Soil Concentrations sufficient for plant growth

Element	Symbol	mg/kg	percent	Relative number
		ppm		of atoms
Nitrogen	N	15,000	1.5	1,000,000
Potassium	K	10,000	1	250,000
Calcium	Ca	5,000	0.5	125,000
Magnesium	Mg	2,000	0.2	80,000
Phosphorus	P	2,000	0.2	60,000
Sulfur	S	1,000	0.1	30,000
Chlorine	Cl	100	--	3,000
Iron	Fe	100	--	2,000
Boron	B	20	--	2,000
Manganese	Mn	50	--	1,000
Zinc	Zn	20	--	300
Copper	Cu	6	--	100
Molybdenum	Mo	0.1	--	1
Nickel	Ni	0.1	--	1

Notes

Root Formation

Chlorophyll Formation

Proteins & NPK Uptake

Chlorophyll catalyst

Absorption Calcium

Photosynthesis & Respiration - correlated with %OM

Fixation of Organic Nitrogen

Source: E.Epstein, 1965

Reference Key

Low

Medium

High

Optimal

Neutral

No Reference

Analytical Error



CIV - CPW South Side **Map Extent - Overview Reclaim & Road** **Reclaim Extent**

Imagery: RS Orthomosaic & DSM
 Imagery Date: 2 May 2023
 Map Date: 31 May 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

Legend

- Well
- Tank Battery
- Reclaim Extent
- Road Reclaim

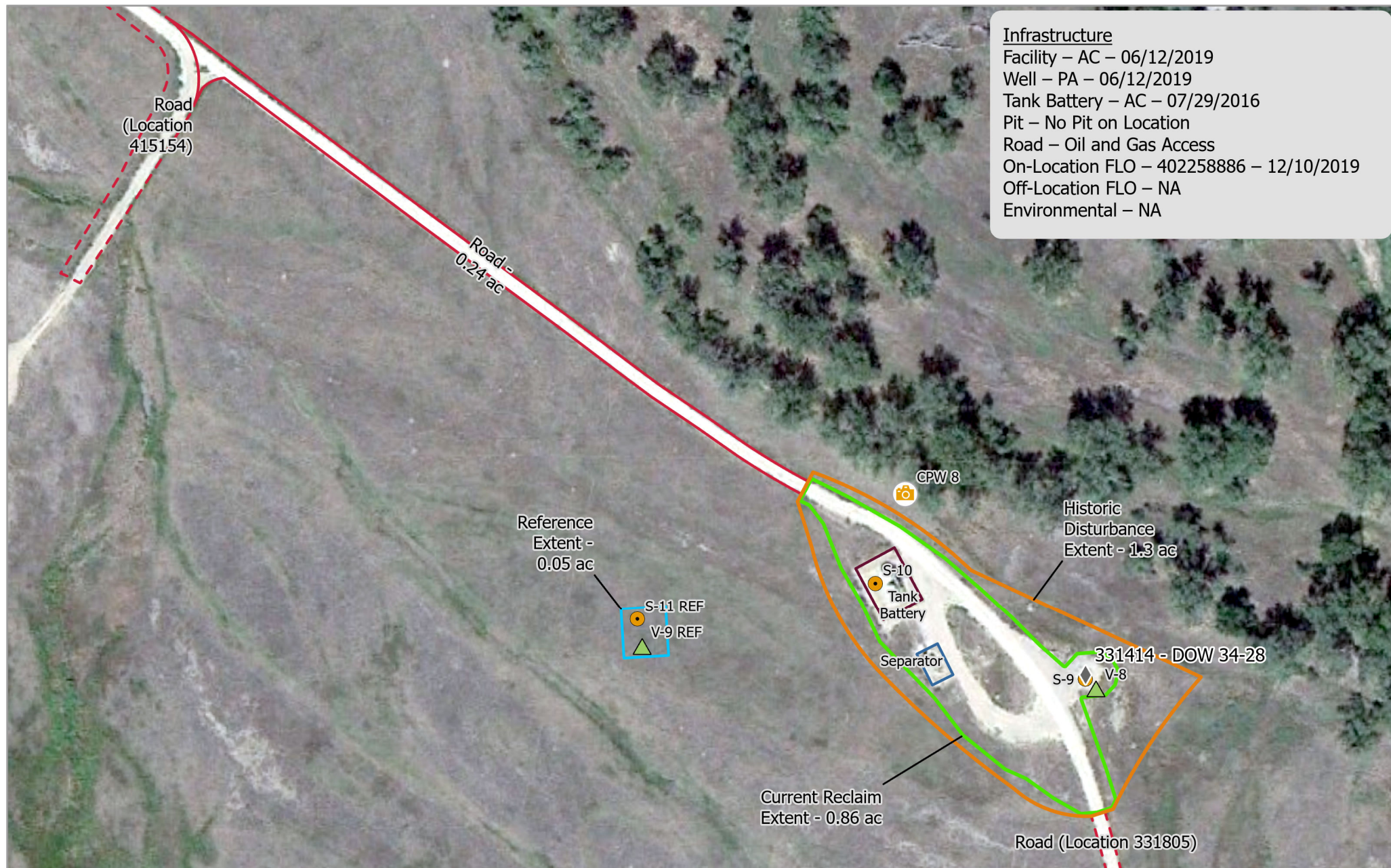
0 275 550 Meters

Reclaim Extent: 5.0 Surface Acres
 Road: 6 Surface Acres including buffer

Scale: 1:9,000



Service Credits - Maxar



CIV - 331414 - DOW 34-28
Map Extent - Landsat/Copernicus 2013

Imagery: Landsat/Copernicus
 Imagery Date: 6 Sep 2013
 Map Date: 14 Sep 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

Legend

- ◆ Well
- Soils
- ▲ Veg
- 📷 Observation Points
- ▭ Historic Disturbance Extent
- ▭ Current Reclaim Extent
- ▭ Road
- ▭ Tank Battery
- ▭ Separator
- ▭ Reference Extent

0 40 80 Meters

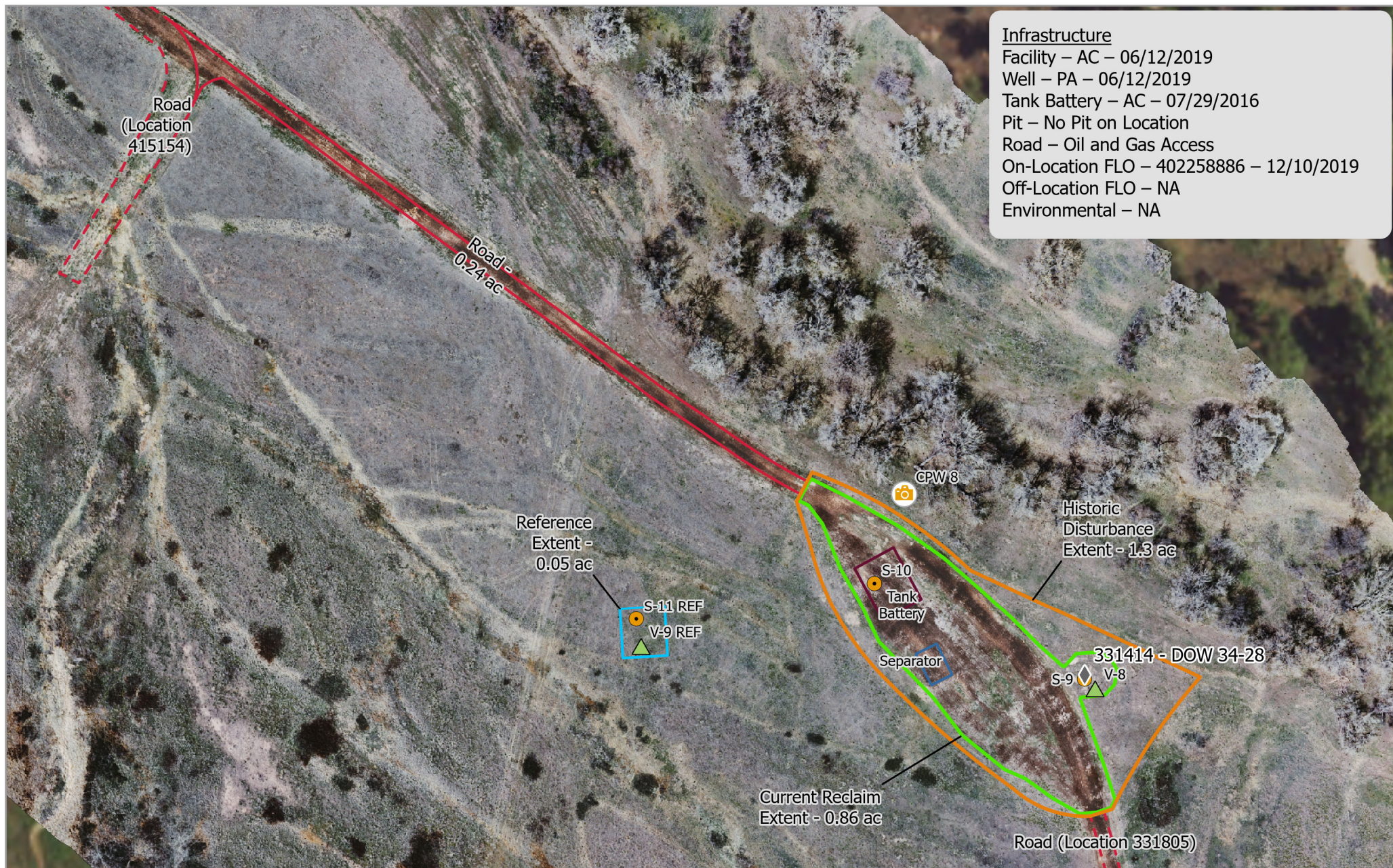
Scale: 1:1,500

Pad Location:
 40.364790
 -104.439190



Service Credits -





CIV - 331414 - DOW 34-28 Map Extent - Overview

Imagery: RS Orthomosaic & DSM
 Imagery Date: 2 May 2023
 Map Date: 14 Sep 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

Legend

- ◆ Well
- Soils
- ▲ Veg
- 📷 Observation Points
- ▭ Historic Disturbance Extent
- ▭ Current Reclaim Extent
- ▭ Reference Extent
- ▭ Road
- ▭ Separator
- ▭ Tank Battery

0 40 80 Meters

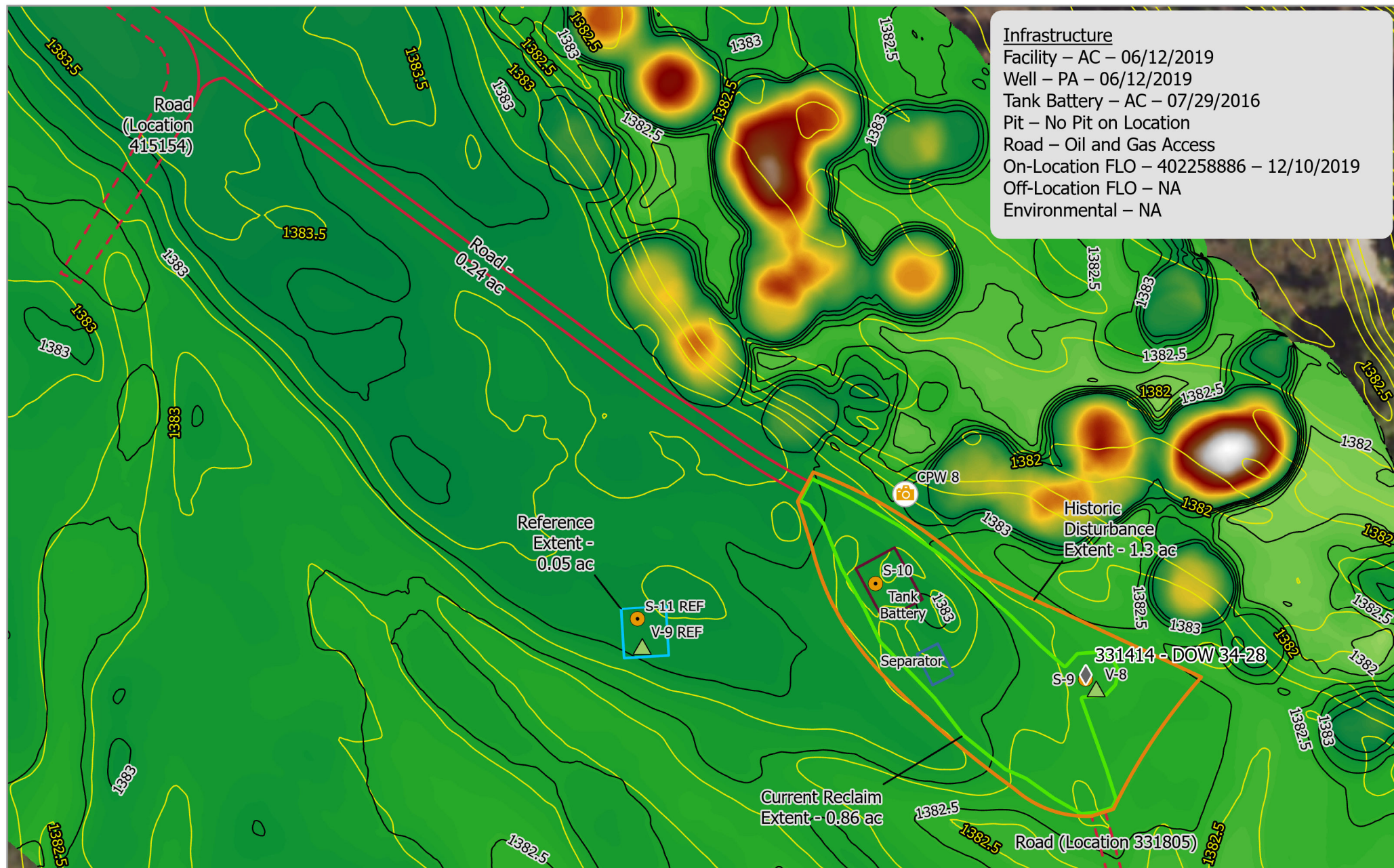
Scale: 1:1,500

Pad Location:
40.364790
-104.439190



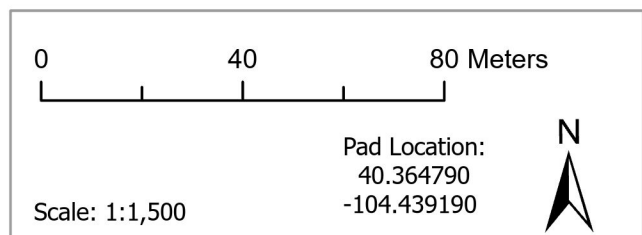
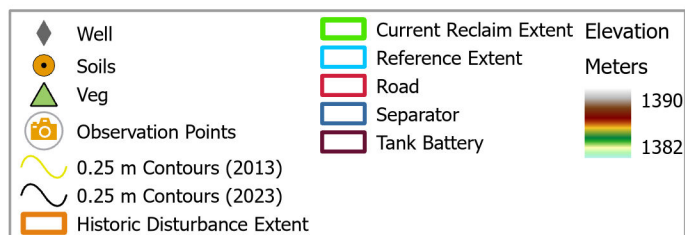
Service Credits -





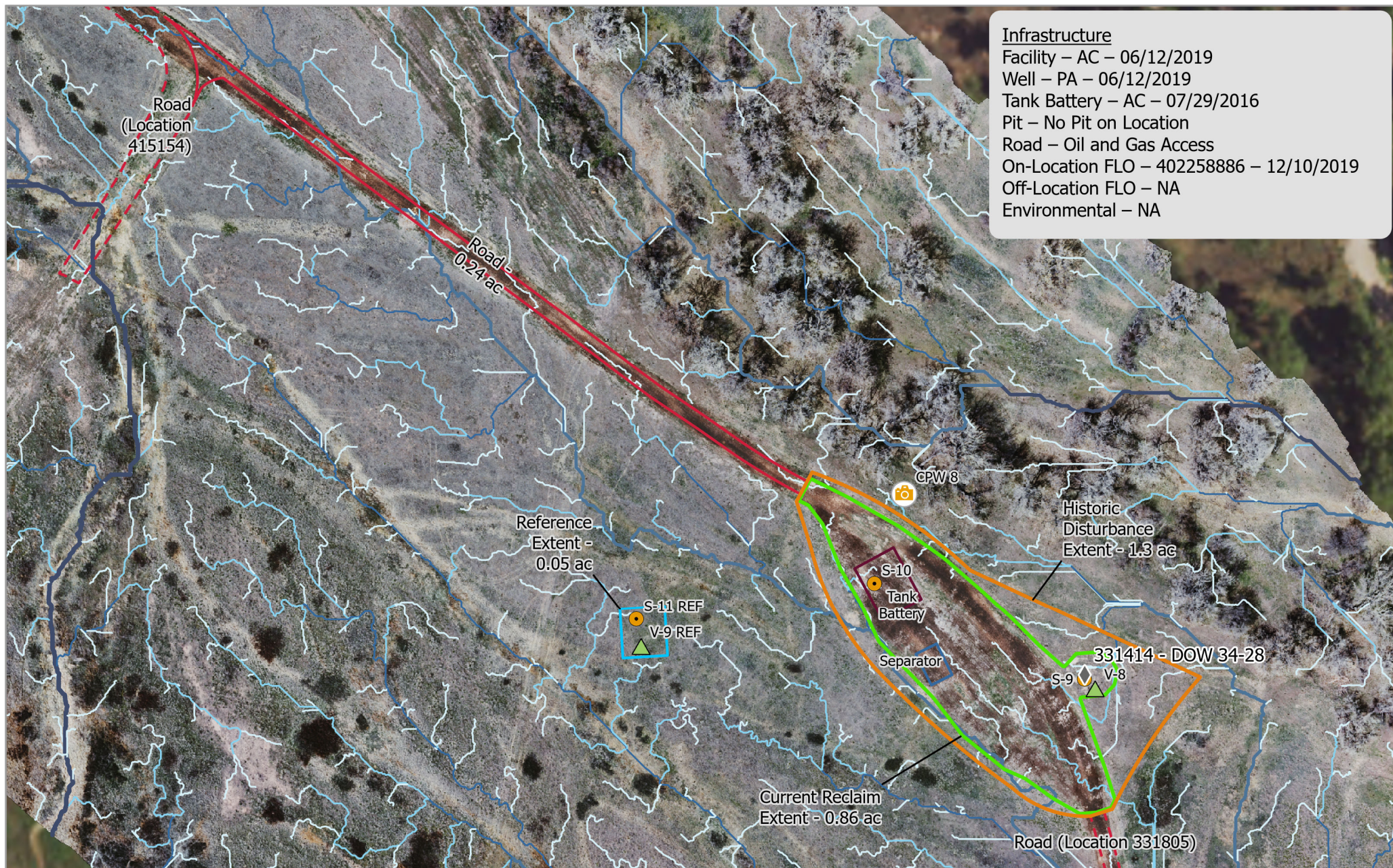
CIV - 331414 - DOW 34-28 **Map Extent - Elevation & Contours**

Imagery: RS DSM, USGS
 Imagery Date: 2 May 2023, 2013
 Map Date: 14 Sep 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage



Service Credits -

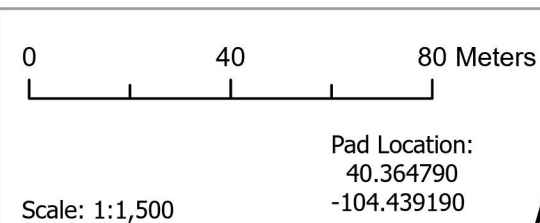
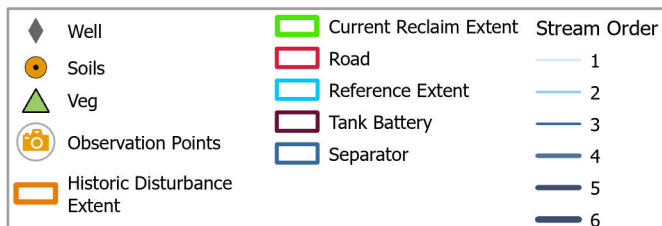




Infrastructure
 Facility – AC – 06/12/2019
 Well – PA – 06/12/2019
 Tank Battery – AC – 07/29/2016
 Pit – No Pit on Location
 Road – Oil and Gas Access
 On-Location FLO – 402258886 – 12/10/2019
 Off-Location FLO – NA
 Environmental – NA

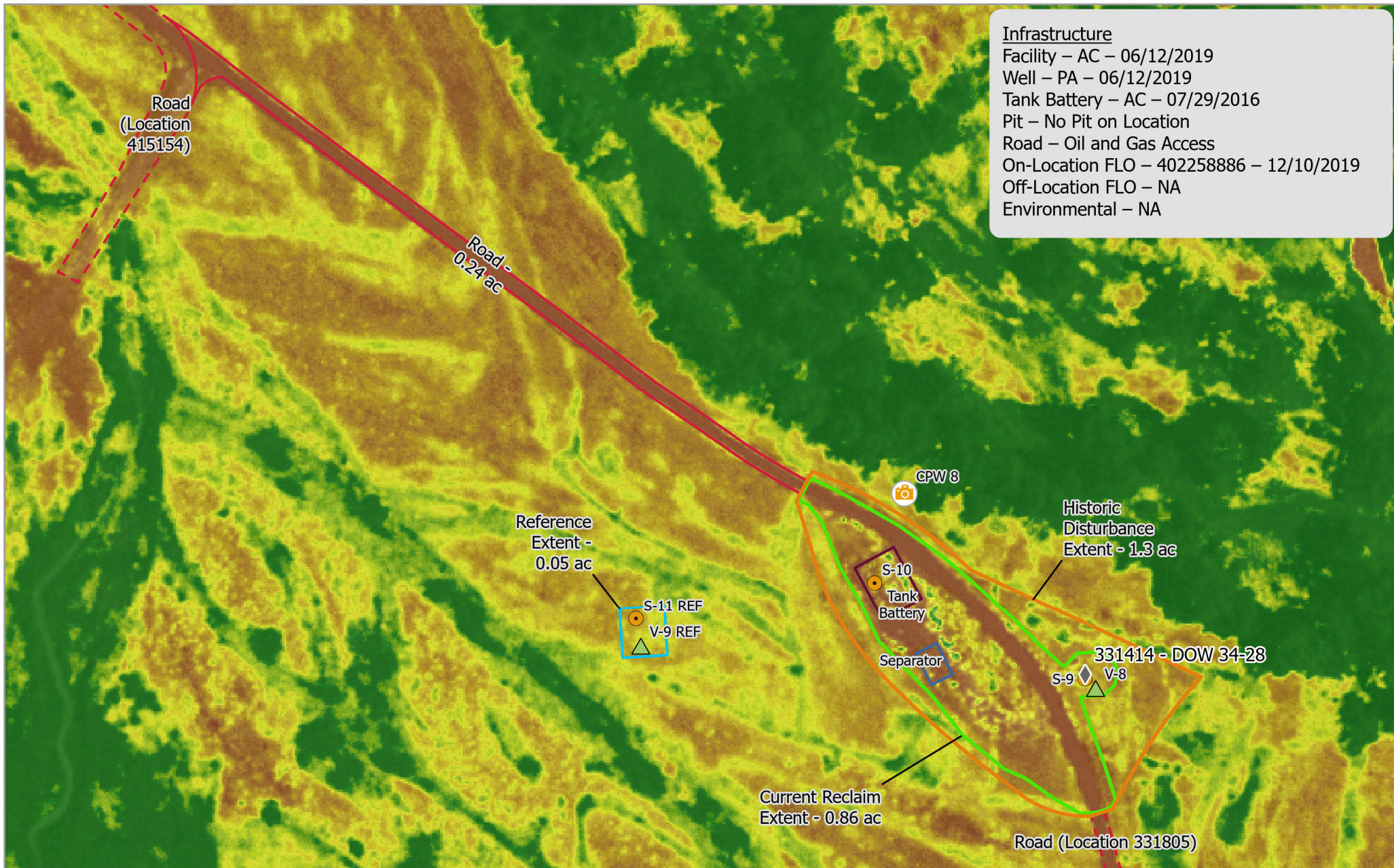
CIV - 331414 - DOW 34-28 Map Extent - Hydrology

Imagery: RS Orthomosaic & DSM
 Imagery Date: 2 May 2023
 Map Date: 14 Sep 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage



Service Credits -





Infrastructure

Facility – AC – 06/12/2019

Well – PA – 06/12/2019

Tank Battery – AC – 07/29/2016

Pit – No Pit on Location

Road – Oil and Gas Access

On-Location FLO – 402258886 – 12/10/2019

Off-Location FLO – NA

Environmental – NA

Service Credits - Esri, USDA Farm Service Agency



CIV - 331414 - DOW 34-28 Map Extent - NAIP NDVI Composite

Imagery: USDA NAIP

Imagery Date: 2011-2021

Map Date: 14 Sep 2023

Datum: WGS 1984 UTM Zone 13N

POC: Soil Sage

Legend

◆ Well

● Soils

▲ Veg

📷 Observation Points

📏 Historic Disturbance Extent

🟩 Current Reclaim Extent

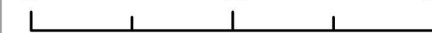
🔴 Road

🔵 Reference Extent

🟪 Tank Battery

🟦 Separator

0 40 80 Meters



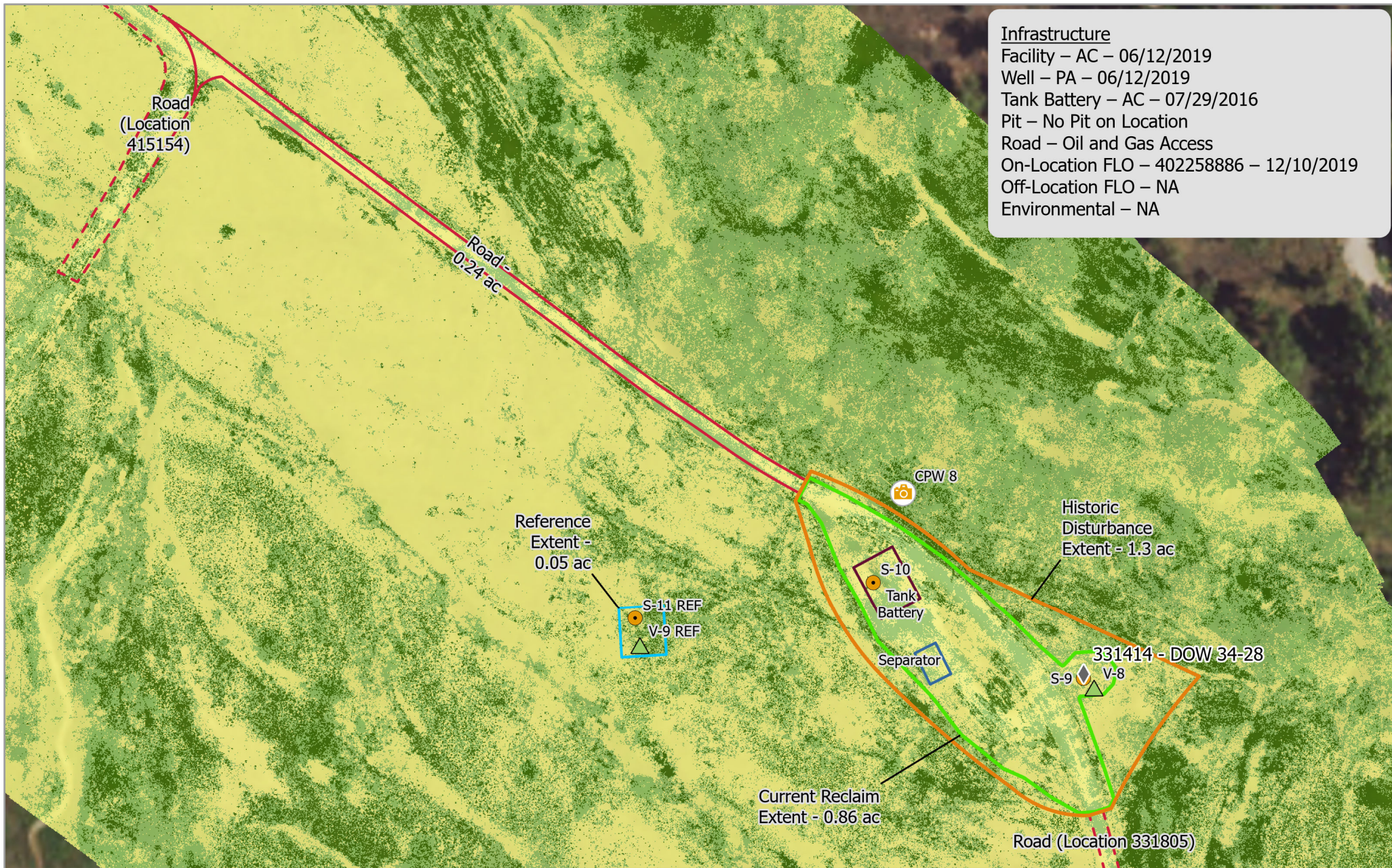
Scale: 1:1,500

Pad Location:

40.364790

-104.439190





Infrastructure
 Facility – AC – 06/12/2019
 Well – PA – 06/12/2019
 Tank Battery – AC – 07/29/2016
 Pit – No Pit on Location
 Road – Oil and Gas Access
 On-Location FLO – 402258886 – 12/10/2019
 Off-Location FLO – NA
 Environmental – NA

CIV - 331414 - DOW 34-28
Map Extent - NDVI

Imagery: RS Multispectral
 Imagery Date: 2 May 2023
 Map Date: 14 Sep 2023
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

<ul style="list-style-type: none"> Well Soils Veg Observation Points Historic Disturbance Extent Current Reclaim Extent 	<ul style="list-style-type: none"> Reference Extent NDVI Road Tank Battery Separator 	Classes <ul style="list-style-type: none"> 1-Veg 2-Veg 3-Non Veg 4-Non Veg 5-Non Veg
---	--	--

0 40 80 Meters

Scale: 1:1,500

Pad Location:
 40.364790
 -104.439190

N



CPW Soil and Vegetation

South Side Reference



Site Soils

These soils were analyzed to establish current soil physicochemical properties.

Soil Analytical Spreadsheet

Map Unit(s) – 3

The CPW_South_SoilData_17MAY2023 - contains 5 soil references.

Overview of the 0-12 inch

- Soil texture is a Sandy Loam / Loamy Sand with Sandy Clay Loam intermixed
- pH 7.4
- ECe 4.5
- Organic Matter % - 3.1
- SAR 11
- N-P-K – 25-52-279
- Nitrate-N Lbs/A = 46
- Sodium – 743 ppm
- Chloride – 218 ppm
- Sulfate – 208 ppm

NOTE: The native soils have elevated sodium levels in 4 of the 5 samples in the top 12 inches which has a direct correlation to the higher ECe and SAR values.

Vegetation Analysis

Ecological Site observations serve as the baseline vegetation cover.

Table represents the present cover observations.

During the time of sampling the site contained bare ground no vegetation analysis performed.

Sample Number	Bare Ground	Grass	Forbs	Shrubs	Litter	Weeds	Field Notes
2	0	10	5	0	85	0	
4	0	0	1	0	99	0	
5	30	0	0	0	50	20	
9	0	0	15	0	85	0	
13	3	95	0	0	2	0	
15	0	80	0	0	20	0	

Site Average for Vegetative Cover and Total Percent Cover based on field sampling.

Grasses	Forbs	Total Percent Cover	Site Target Recovery (80%)
31	4	35	20

Weeds

Weed Summary Reference based on 2-4 May 2023 Monitoring

Common Name	Weed List Type	Percent Cover (%)
Field Bindweed	List C Noxious	20

Reference Soil and Vegetation Field Observation Photos



Site Photos – Soil 2 – S2 REF

Lat/Long: 40.367876 / -104.448531

Nearest Facility #: 415157

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location

Site Photos – Soil 4 – S4 REF

Lat/Long: 40.367339 / -104.448087

Nearest Facility #: 447280

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

 A close-up photograph showing a soil profile. A metal rod is visible on the left, partially buried in dark, moist soil. The soil is surrounded by dry, yellowish-brown grass and straw.	 A wide-angle photograph of a grassy field. The field is covered in dry, yellowish-brown grass. In the background, there are some buildings and a fence under a blue sky with scattered clouds.
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location

Site Photos – Soil 6 – S6 REF

Lat/Long: 40.360312 / -104.434017

Nearest Facility #: 331805 and 423850

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.



Soil Picture 1



Soil Picture 2 Vegetation at Soil Location



Site Photos – Soil 11 – S11 REF

Lat/Long: 40.364939 / -104.440725

Nearest Facility #: 331414

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location




Site Photos – Soil 16 – S16 REF

Lat/Long: 40.370877 / -104.446062

Nearest Facility #: 332761 and 331380

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Soil Picture 1	Soil Picture 2 Vegetation at Soil Location
	
Soil Picture 3	

Site Photos – Vegetation 2 – V2 REF

Lat/Long: 40.367921 / -104.448596

Nearest Facility #: 415157

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

					
Veg				Veg - North	
					
Veg - East				Veg - South	

		
Veg – West		




Site Photos – Vegetation 4 – V4 REF



Lat/Long: 40.367312 / -104.448183

Nearest Facility #: 415157 and 447280

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Veg	Veg - North
	
Veg - East	Veg - South

	
Veg – West	Grass ssp.





Site Photos – Vegetation 5 – V5 REF

Lat/Long: 40.360376 / -104.434149

Nearest Facility #: 331805 and 423850

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Veg	Veg - North
	
Veg - East	Veg - South

	
Veg – West	Mullein – <i>Verbascum</i> spp. – Native
	
Grass ssp.	



Site Photos – Vegetation 9 – V9 REF


Lat/Long: 40.364869 / -104.44071

Nearest Facility #: 331414

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Veg	Veg - North
	
Veg - East	Veg - South

	
<p>Veg – West</p>	<p>Brome ssp.</p>
	
<p>Field Bindweed – <i>Convolvulus arvensis</i> – Colorado List C Noxious Weed</p>	

Site Photos – Vegetation 13 – V13 REF

Lat/Long: 40.370867 / -104.446245

Nearest Facility #: 332761

Date Range: 2-4 May 2023

Photo locations correspond with the overview map and vegetation table.

	
Veg	Veg - North
	
Veg - East	Veg - South



Veg – West



Grass ssp.

Observation 8 – Adjacent to Riparian - South

40.365264 / -104.439799



Straw waddles

Soil Properties

USDA Soil Description

Reference Soil Information

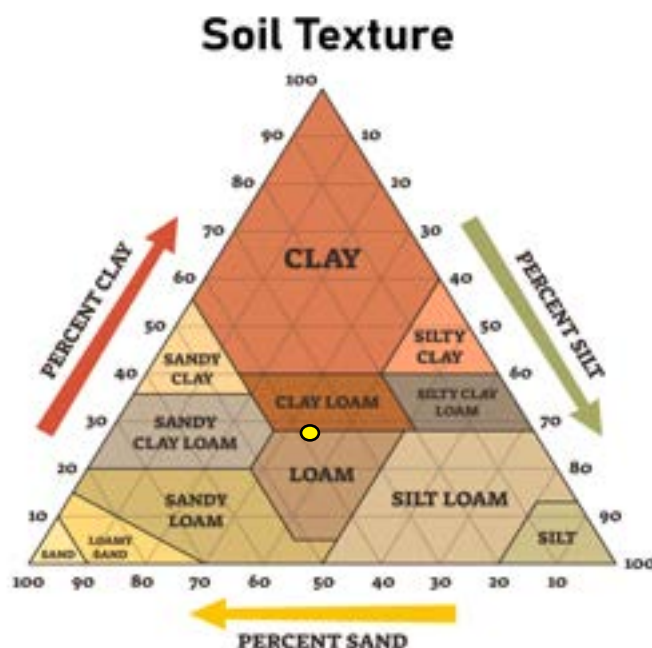
The location of the site is contained within one soil type, Aquolls and Aquent, gravelley substratum.

Map Unit 3 Reference Soil information - Aquolls and Aquent, gravelley substratum

This soil is formed from recent alluvium. Landform is stream terraces, with the Salt Meadow Ecological Site. Soils are poorly drained with a moderate water holding capacity, and slope 0-3 percent.

Depth (in)	Physical			Chemical			
	Texture	Bulk Density	Partical Size Percent sand, silt, clay	pH	EC	SAR	OM%
0-10	Variable	1.28	39-35-26	7.9	2.0	0.0	2.00
10-20	Variable	1.28	39-35-26	7.9	2.0	0.0	2.00
20-30	Variable	1.28	39-35-26	7.9	2.0	0.0	2.00
30-40	Variable	1.28	39-35-26	7.9	2.0	0.0	2.00
40-50	Variable	1.35	51-29-21	7.9	2.0	0.0	1.70
50 +	Very Gravelly Sand	1.62	97-2-2	7.9	2.0	0.0	0.50

Soil Texture Triangle reflect the 0-10 in depth



Erosion Potential (10 inches)

- K Factor, Whole soil - .24. 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.
- Wind Erodibility Group – 8. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

Soil Reference Information

There is a general relationship of soil bulk density to root growth based on soil texture. Bulk densities ideal for root growth are less than 1.60 g/cc for sandy textures, less than 1.40 g/cc for loamy textures, and less than 1.10 g/cc for clayey textures. Bulk densities that restrict root growth are greater than 1.80 g/cc for sandy textures, 1.65 g/cc for loamy textures, and 1.47 g/cc for clayey textures.

Vegetation

Reference vegetation – Salt Meadow Ecology

Climate

Average Annual Precipitation 14 to 17 inches annually

Average Annual Air Temperature 50 degrees F

Drought conditions in effect

Long-term effects of these latest drought events have yet to be determined. Growth of native cool-season plants begin about April 1 and continue to mid-June. Native warm-season plants begin growth about May 1 and continue to about August 15. Regrowth of cool-season plants occur in September in most years, depending on moisture.

Reference dynamics

The Reference State is characterized by warm-season bunchgrass (alkali sacaton, switchgrass), cool-season midgrass (western wheatgrass), warm-season tall rhizomatous grass, and a minor component of cool-season grasslike (Nebraska sedge). The Warm-Season Shortgrass State is characterized by a warm-season short rhizomatous grass (inland saltgrass). The Increased Bare Ground State is characterized by early successional cool-season grass (foxtail barley), annual grasses, and annual forbs.

Drought has increased mortality of blue grama in some locations

The major grasses in the Reference Plant Community include tall and mid warm and cool-season grasses. Major grasses include alkali sacaton, switchgrass, prairie cordgrass and western wheatgrass. Other grasses and grass-like occurring on the community include big bluestem, little bluestem, alkali cordgrass, Nebraska sedge, and Baltic rush. Key forbs and shrubs include American licorice, prairie gentian, rag sumpweed, and fourwing saltbush.

Well suited for carbon sequestration

Vegetation

Reference Vegetation – Salt Meadow Ecology

At Risk Plant Community

Key species from the Reference Plant Community, Alkali sacaton, prairie cordgrass, switchgrass, Indiangrass, little bluestem, Canada wildrye and Nebraska sedge have decreased. Western wheatgrass may initially increase or decrease depending upon the season of use. Forbs and shrubs are still present in reduced amounts. This plant community is at risk of losing warm-season tall grasses, palatable forbs and shrubs.

This community has decreased in plant frequency and production. Less litter can be expected however, the soil remains stable and can become very resistant to change depending on the degree to which the inland saltgrass has increased.

Salt Meadow Ecosystem Vegetative Community Composition

Common Name	Scientific Name
Alkali Sacaton	<i>Sporobolus airoides</i>
Western Wheatgrass	<i>Pascopyrum smithii</i>
Switchgrass	<i>Panicum virgatum</i>
Prairie Cordgrass	<i>Spartina pectinata</i>
Big Bluestem	<i>Andropogon gerardii</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Indiangrass	<i>Sorghastrum nutans</i>
Slender Wheatgrass	<i>Elymus trachycaulus</i>
Saltgrass	<i>Distichlis spicata</i>
Foxtail Barley	<i>Hordeum jubatum</i>
American Licorice	<i>Glycyrrhiza lepidota</i>
Showy Prairie Gentian	<i>Eustoma exaltatum</i> ssp. <i>russellianum</i>
Leafy False Goldenweed	<i>Oenopsis foliosa</i> var. <i>foliosa</i>
Illinois Bundleflower	<i>Desmanthus illinoensis</i>

Change Detection

Normalized Difference Vegetation (NDVI)

Section will primarily focus on the NDVI imagery for vegetation reference and current analytics.

The composite NAIP NDVI imagery from 2010-2020, this data set does not contain the NDVI values to perform statistical analysis. The imagery foot print encompasses the site extent and a vegetation reference extent for vegetative analysis.

Remotely sensed data was gathered on 2 - 4 May 2023, which reflects the current vegetative cover statistics.

NDVI calculations used the Near Infrared from the multispectral sensors. The NDVI reflects the measurements from the plant's topmost layer of leaves, typically used during spring emergence into mid-season growth.

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62336 Depth : 0 - 10
ID : CIV-CPWN-SOIL 2

1:1 Soil pH	9.0
Soluble Salts 1:1, mmho/cm	1.10
Excess Lime Rating	NONE
Organic Matter LOI, %	2.2
Nitrate-N KCl, ppm N	1.3
Nitrate-N, lbs N / Acre	4
Phosphorus M3, ppm P	66
Potassium NH ₄ OAc, ppm K	703
Sulfate M-3, ppm S	150.6
Zinc DTPA, ppm Zn	0.81
Iron DTPA, ppm Fe	7.7
Manganese DTPA, ppm Mn	5.0
Copper DTPA, ppm Cu	0.99
Calcium NH ₄ OAc, ppm Ca	1756
Magnesium NH ₄ OAc, ppm Mg	726
Sodium NH ₄ OAc, ppm Na	979
Chloride Ca-NO ₃ , ppm Cl	145.6
Boron Hot Water, ppm B	6.08

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
20.9	0	9	42	29	20

Saturated Soil Paste Analysis (SAR)

Saturation, %	54
Sat Paste pH	8.2
Sat Paste E _{Ce} , mmho/cm	3.40
HCO ₃ , ppm	341
Cl, ppm	586
Ca, ppm	59
Mg, ppm	50
Na, ppm	616
S, ppm	274.0
Sodium Adsorption Ratio	14.2

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 3 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Clay Loam	63	16	21

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62337 Depth : 0 - 8
ID : CIV-CPWN-SOIL 4

1:1 Soil pH	7.5
Soluble Salts 1:1, mmho/cm	3.40
Excess Lime Rating	NONE
Organic Matter LOI, %	5.9
Nitrate-N KCl, ppm N	3.1
Nitrate-N, lbs N / Acre	7
Phosphorus M3, ppm P	95
Potassium NH ₄ OAc, ppm K	694
Sulfate M-3, ppm S	500.2
Zinc DTPA, ppm Zn	2.29
Iron DTPA, ppm Fe	10.6
Manganese DTPA, ppm Mn	4.8
Copper DTPA, ppm Cu	0.90
Calcium NH ₄ OAc, ppm Ca	1958
Magnesium NH ₄ OAc, ppm Mg	648
Sodium NH ₄ OAc, ppm Na	1046
Chloride Ca-NO ₃ , ppm Cl	527.1
Boron Hot Water, ppm B	4.09

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
21.5	0	8	45	25	21

Saturated Soil Paste Analysis (SAR)

Saturation, %	70
Sat Paste pH	7.2
Sat Paste ECe, mmho/cm	7.74
HCO ₃ , ppm	194
Cl, ppm	915
Ca, ppm	419
Mg, ppm	227
Na, ppm	1096
S, ppm	816.2
Sodium Adsorption Ratio	10.7

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 5 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Loam	45	28	27

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
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Results For : CIV
Location : CPWN

Lab No. : 62342 Depth : 0 - 6
ID : CIV-CPWN-SOIL 6.1

1:1 Soil pH	8.7
Soluble Salts 1:1, mmho/cm	0.76
Excess Lime Rating	LOW
Organic Matter LOI, %	4.7
Nitrate-N KCl, ppm N	43.4
Nitrate-N, lbs N / Acre	78
Phosphorus M3, ppm P	59
Potassium NH ₄ OAc, ppm K	399
Sulfate M-3, ppm S	62.3
Zinc DTPA, ppm Zn	3.59
Iron DTPA, ppm Fe	8.6
Manganese DTPA, ppm Mn	4.0
Copper DTPA, ppm Cu	7.33
Calcium NH ₄ OAc, ppm Ca	3062
Magnesium NH ₄ OAc, ppm Mg	1091
Sodium NH ₄ OAc, ppm Na	642
Chloride Ca-NO ₃ , ppm Cl	52.9
Boron Hot Water, ppm B	6.14

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
28.2	0	4	54	32	10

Saturated Soil Paste Analysis (SAR)

Saturation, %	58
Sat Paste pH	8.0
Sat Paste ECe, mmho/cm	1.74
HCO ₃ , ppm	217
Cl, ppm	124
Ca, ppm	198
Mg, ppm	35
Na, ppm	268
S, ppm	54.6
Sodium Adsorption Ratio	4.6

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5/17/2023

Copy : 1

Page 15 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Clay	35	24	41

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
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Results For : CIV
Location : CPWN

Lab No. : 62343 Depth : 6 - 12
ID : CIV-CPWN-SOIL 6.2

1:1 Soil pH	8.9
Soluble Salts 1:1, mmho/cm	0.89
Excess Lime Rating	HIGH
Organic Matter LOI, %	2.7
Nitrate-N KCl, ppm N	16.6
Nitrate-N, lbs N / Acre	30
Phosphorus M3, ppm P	21
Potassium NH ₄ OAc, ppm K	190
Sulfate M-3, ppm S	110.7
Zinc DTPA, ppm Zn	1.29
Iron DTPA, ppm Fe	8.9
Manganese DTPA, ppm Mn	3.9
Copper DTPA, ppm Cu	2.36
Calcium NH ₄ OAc, ppm Ca	3751
Magnesium NH ₄ OAc, ppm Mg	990
Sodium NH ₄ OAc, ppm Na	845
Chloride Ca-NO ₃ , ppm Cl	73.2
Boron Hot Water, ppm B	7.03

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
31.2	0	2	60	26	12

Saturated Soil Paste Analysis (SAR)

Saturation, %	58
Sat Paste pH	8.4
Sat Paste E _{Ce} , mmho/cm	2.23
HCO ₃ , ppm	296
Cl, ppm	185
Ca, ppm	35
Mg, ppm	29
Na, ppm	420
S, ppm	139.8
Sodium Adsorption Ratio	12.6

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 17 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Clay Loam	47	24	29

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62344 Depth : 12 - 18
ID : CIV-CPWN-SOIL 6.3

1:1 Soil pH	8.9
Soluble Salts 1:1, mmho/cm	1.50
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.1
Nitrate-N KCl, ppm N	1.8
Nitrate-N, lbs N / Acre	3
Phosphorus M3, ppm P	5
Potassium NH ₄ OAc, ppm K	58
Sulfate M-3, ppm S	445.9
Zinc DTPA, ppm Zn	0.33
Iron DTPA, ppm Fe	9.6
Manganese DTPA, ppm Mn	3.4
Copper DTPA, ppm Cu	0.94
Calcium NH ₄ OAc, ppm Ca	3671
Magnesium NH ₄ OAc, ppm Mg	848
Sodium NH ₄ OAc, ppm Na	1017
Chloride Ca-NO ₃ , ppm Cl	163.6
Boron Hot Water, ppm B	4.19

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
30.0	0	0	61	24	15

Saturated Soil Paste Analysis (SAR)

Saturation, %	43
Sat Paste pH	8.4
Sat Paste ECe, mmho/cm	5.47
HCO ₃ , ppm	155
Cl, ppm	371
Ca, ppm	125
Mg, ppm	104
Na, ppm	987
S, ppm	684.5
Sodium Adsorption Ratio	15.7

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 19 of 132

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	60	21	19

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62345 Depth : 18 - 24
ID : CIV-CPWN-SOIL 6.4

1:1 Soil pH	8.7
Soluble Salts 1:1, mmho/cm	0.38
Excess Lime Rating	LOW
Organic Matter LOI, %	0.6
Nitrate-N KCl, ppm N	2.8
Nitrate-N, lbs N / Acre	5
Phosphorus M3, ppm P	13
Potassium NH ₄ OAc, ppm K	40
Sulfate M-3, ppm S	85.8
Zinc DTPA, ppm Zn	0.57
Iron DTPA, ppm Fe	7.2
Manganese DTPA, ppm Mn	2.0
Copper DTPA, ppm Cu	0.53
Calcium NH ₄ OAc, ppm Ca	1530
Magnesium NH ₄ OAc, ppm Mg	245
Sodium NH ₄ OAc, ppm Na	133
Chloride Ca-NO ₃ , ppm Cl	36.9
Boron Hot Water, ppm B	0.96

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
10.4	0	1	73	20	6

Saturated Soil Paste Analysis (SAR)

Saturation, %	37
Sat Paste pH	8.1
Sat Paste E _{Ce} , mmho/cm	1.25
HCO ₃ , ppm	137
Cl, ppm	87
Ca, ppm	57
Mg, ppm	37
Na, ppm	159
S, ppm	109.7
Sodium Adsorption Ratio	4.0

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 21 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Loamy Sand	86	9	5

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62354 Depth : 0 - 6
ID : CIV-CPWN-SOIL 9.1

1:1 Soil pH	8.6
Soluble Salts 1:1, mmho/cm	0.19
Excess Lime Rating	LOW
Organic Matter LOI, %	1.5
Nitrate-N KCl, ppm N	1.2
Nitrate-N, lbs N / Acre	2
Phosphorus M3, ppm P	58
Potassium NH ₄ OAc, ppm K	375
Sulfate M-3, ppm S	36.0
Zinc DTPA, ppm Zn	4.41
Iron DTPA, ppm Fe	7.7
Manganese DTPA, ppm Mn	2.9
Copper DTPA, ppm Cu	4.52
Calcium NH ₄ OAc, ppm Ca	3736
Magnesium NH ₄ OAc, ppm Mg	397
Sodium NH ₄ OAc, ppm Na	51
Chloride Ca-NO ₃ , ppm Cl	3.2
Boron Hot Water, ppm B	1.13

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
23.2	0	4	81	14	1

Saturated Soil Paste Analysis (SAR)

Saturation, %	37
Sat Paste pH	7.9
Sat Paste ECe, mmho/cm	0.38
HCO ₃ , ppm	179
Cl, ppm	10
Ca, ppm	43
Mg, ppm	12
Na, ppm	23
S, ppm	8.8
Sodium Adsorption Ratio	0.8

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 39 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	64	19	17

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62355 Depth : 6 - 12
ID : CIV-CPWN-SOIL 9.2

1:1 Soil pH	8.8
Soluble Salts 1:1, mmho/cm	0.16
Excess Lime Rating	HIGH
Organic Matter LOI, %	0.7
Nitrate-N KCl, ppm N	1.1
Nitrate-N, lbs N / Acre	2
Phosphorus M3, ppm P	16
Potassium NH ₄ OAc, ppm K	73
Sulfate M-3, ppm S	24.1
Zinc DTPA, ppm Zn	1.15
Iron DTPA, ppm Fe	6.8
Manganese DTPA, ppm Mn	2.6
Copper DTPA, ppm Cu	1.64
Calcium NH ₄ OAc, ppm Ca	2966
Magnesium NH ₄ OAc, ppm Mg	356
Sodium NH ₄ OAc, ppm Na	103
Chloride Ca-NO ₃ , ppm Cl	0.8
Boron Hot Water, ppm B	0.93

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
18.4	0	1	80	16	2

Saturated Soil Paste Analysis (SAR)

Saturation, %	42
Sat Paste pH	8.5
Sat Paste E _{Ce} , mmho/cm	0.35
HCO ₃ , ppm	153
Cl, ppm	4
Ca, ppm	20
Mg, ppm	8
Na, ppm	48
S, ppm	6.5
Sodium Adsorption Ratio	2.3

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 41 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	78	13	9

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62356 Depth : 12 - 18
ID : CIV-CPWN-SOIL 9.3

1:1 Soil pH	8.8
Soluble Salts 1:1, mmho/cm	0.20
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.4
Nitrate-N KCl, ppm N	2.5
Nitrate-N, lbs N / Acre	5
Phosphorus M3, ppm P	33
Potassium NH ₄ OAc, ppm K	142
Sulfate M-3, ppm S	34.8
Zinc DTPA, ppm Zn	2.96
Iron DTPA, ppm Fe	12.8
Manganese DTPA, ppm Mn	3.3
Copper DTPA, ppm Cu	3.85
Calcium NH ₄ OAc, ppm Ca	3383
Magnesium NH ₄ OAc, ppm Mg	461
Sodium NH ₄ OAc, ppm Na	195
Chloride Ca-NO ₃ , ppm Cl	5.9
Boron Hot Water, ppm B	1.39

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
22.0	0	2	77	17	4

Saturated Soil Paste Analysis (SAR)

Saturation, %	47
Sat Paste pH	8.3
Sat Paste E _{Ce} , mmho/cm	0.49
HCO ₃ , ppm	173
Cl, ppm	6
Ca, ppm	20
Mg, ppm	8
Na, ppm	76
S, ppm	14.4
Sodium Adsorption Ratio	3.7

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 43 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	63	20	17

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62357 Depth : 18 - 24
ID : CIV-CPWN-SOIL 9.4

1:1 Soil pH	9.0
Soluble Salts 1:1, mmho/cm	0.32
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.2
Nitrate-N KCl, ppm N	3.6
Nitrate-N, lbs N / Acre	7
Phosphorus M3, ppm P	25
Potassium NH ₄ OAc, ppm K	141
Sulfate M-3, ppm S	64.0
Zinc DTPA, ppm Zn	2.79
Iron DTPA, ppm Fe	13.4
Manganese DTPA, ppm Mn	2.1
Copper DTPA, ppm Cu	3.34
Calcium NH ₄ OAc, ppm Ca	3877
Magnesium NH ₄ OAc, ppm Mg	370
Sodium NH ₄ OAc, ppm Na	184
Chloride Ca-NO ₃ , ppm Cl	50.4
Boron Hot Water, ppm B	1.11

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
23.6	0	2	82	13	3

Saturated Soil Paste Analysis (SAR)

Saturation, %	37
Sat Paste pH	8.5
Sat Paste E _{Ce} , mmho/cm	1.25
HCO ₃ , ppm	76
Cl, ppm	161
Ca, ppm	87
Mg, ppm	24
Na, ppm	134
S, ppm	78.3
Sodium Adsorption Ratio	3.3

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 45 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	67	18	15

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62358 Depth : 0 - 6
ID : CIV-CPWN-SOIL 10.1

1:1 Soil pH	8.5
Soluble Salts 1:1, mmho/cm	1.50
Excess Lime Rating	LOW
Organic Matter LOI, %	3.5
Nitrate-N KCl, ppm N	81.7
Nitrate-N, lbs N / Acre	147
Phosphorus M3, ppm P	730
Potassium NH ₄ OAc, ppm K	2652
Sulfate M-3, ppm S	229.2
Zinc DTPA, ppm Zn	8.57
Iron DTPA, ppm Fe	19.1
Manganese DTPA, ppm Mn	9.1
Copper DTPA, ppm Cu	1.64
Calcium NH ₄ OAc, ppm Ca	2540
Magnesium NH ₄ OAc, ppm Mg	501
Sodium NH ₄ OAc, ppm Na	501
Chloride Ca-NO ₃ , ppm Cl	202.1
Boron Hot Water, ppm B	2.40

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
25.8	0	26	49	16	8

Saturated Soil Paste Analysis (SAR)

Saturation, %	50
Sat Paste pH	7.9
Sat Paste E _{Ce} , mmho/cm	7.10
HCO ₃ , ppm	673
Cl, ppm	573
Ca, ppm	121
Mg, ppm	88
Na, ppm	482
S, ppm	477.1
Sodium Adsorption Ratio	8.1

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 47 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	71	12	17

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62359 Depth : 6 - 12
ID : CIV-CPWN-SOIL 10.2

1:1 Soil pH	8.4
Soluble Salts 1:1, mmho/cm	3.61
Excess Lime Rating	LOW
Organic Matter LOI, %	1.4
Nitrate-N KCl, ppm N	105.0
Nitrate-N, lbs N / Acre	189
Phosphorus M3, ppm P	120
Potassium NH ₄ OAc, ppm K	2128
Sulfate M-3, ppm S	339.2
Zinc DTPA, ppm Zn	2.22
Iron DTPA, ppm Fe	13.2
Manganese DTPA, ppm Mn	9.4
Copper DTPA, ppm Cu	1.20
Calcium NH ₄ OAc, ppm Ca	3100
Magnesium NH ₄ OAc, ppm Mg	363
Sodium NH ₄ OAc, ppm Na	613
Chloride Ca-NO ₃ , ppm Cl	451.1
Boron Hot Water, ppm B	1.70

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
26.6	0	20	58	11	10

Saturated Soil Paste Analysis (SAR)

Saturation, %	56
Sat Paste pH	7.9
Sat Paste ECe, mmho/cm	8.00
HCO ₃ , ppm	191
Cl, ppm	735
Ca, ppm	283
Mg, ppm	120
Na, ppm	694
S, ppm	578.1
Sodium Adsorption Ratio	8.7

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 49 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	67	18	15

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62360 Depth : 12 - 18
ID : CIV-CPWN-SOIL 10.3

1:1 Soil pH	8.5
Soluble Salts 1:1, mmho/cm	2.80
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.0
Nitrate-N KCl, ppm N	83.9
Nitrate-N, lbs N / Acre	151
Phosphorus M3, ppm P	69
Potassium NH ₄ OAc, ppm K	577
Sulfate M-3, ppm S	208.3
Zinc DTPA, ppm Zn	1.37
Iron DTPA, ppm Fe	4.8
Manganese DTPA, ppm Mn	3.0
Copper DTPA, ppm Cu	0.83
Calcium NH ₄ OAc, ppm Ca	3484
Magnesium NH ₄ OAc, ppm Mg	445
Sodium NH ₄ OAc, ppm Na	691
Chloride Ca-NO ₃ , ppm Cl	509.1
Boron Hot Water, ppm B	1.56

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
25.6	0	6	68	14	12

Saturated Soil Paste Analysis (SAR)

Saturation, %	44
Sat Paste pH	7.8
Sat Paste E _{Ce} , mmho/cm	7.53
HCO ₃ , ppm	95
Cl, ppm	1110
Ca, ppm	378
Mg, ppm	157
Na, ppm	991
S, ppm	362.3
Sodium Adsorption Ratio	10.8

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 51 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	63	20	17

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62361 Depth : 18 - 24
ID : CIV-CPWN-SOIL 10.4

1:1 Soil pH	8.7
Soluble Salts 1:1, mmho/cm	1.04
Excess Lime Rating	HIGH
Organic Matter LOI, %	0.9
Nitrate-N KCl, ppm N	43.2
Nitrate-N, lbs N / Acre	78
Phosphorus M3, ppm P	46
Potassium NH ₄ OAc, ppm K	264
Sulfate M-3, ppm S	115.4
Zinc DTPA, ppm Zn	1.28
Iron DTPA, ppm Fe	7.4
Manganese DTPA, ppm Mn	2.4
Copper DTPA, ppm Cu	1.18
Calcium NH ₄ OAc, ppm Ca	3560
Magnesium NH ₄ OAc, ppm Mg	397
Sodium NH ₄ OAc, ppm Na	897
Chloride Ca-NO ₃ , ppm Cl	299.1
Boron Hot Water, ppm B	1.77

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
25.7	0	3	69	13	15

Saturated Soil Paste Analysis (SAR)

Saturation, %	40
Sat Paste pH	8.1
Sat Paste E _{Ce} , mmho/cm	4.64
HCO ₃ , ppm	138
Cl, ppm	957
Ca, ppm	85
Mg, ppm	32
Na, ppm	753
S, ppm	174.9
Sodium Adsorption Ratio	17.6

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 53 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	65	18	17

Ag Testing - Consulting

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62362 Depth : 0 - 6
ID : CIV-CPWN-SOIL 11.1

1:1 Soil pH	6.6
Soluble Salts 1:1, mmho/cm	0.69
Excess Lime Rating	NONE
Organic Matter LOI, %	3.6
Nitrate-N KCl, ppm N	48.9
Nitrate-N, lbs N / Acre	88
Phosphorus M3, ppm P	92
Potassium NH ₄ OAc, ppm K	378
Sulfate M-3, ppm S	55.8
Zinc DTPA, ppm Zn	2.29
Iron DTPA, ppm Fe	68.1
Manganese DTPA, ppm Mn	14.9
Copper DTPA, ppm Cu	0.92
Calcium NH ₄ OAc, ppm Ca	855
Magnesium NH ₄ OAc, ppm Mg	216
Sodium NH ₄ OAc, ppm Na	611
Chloride Ca-NO ₃ , ppm Cl	97.6
Boron Hot Water, ppm B	1.41

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
9.7	0	10	44	19	27

Saturated Soil Paste Analysis (SAR)

Saturation, %	46
Sat Paste pH	5.8
Sat Paste E _{Ce} , mmho/cm	2.93
HCO ₃ , ppm	42
Cl, ppm	311
Ca, ppm	51
Mg, ppm	16
Na, ppm	513
S, ppm	140.2
Sodium Adsorption Ratio	16.0

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 55 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	53	28	19

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62363 Depth : 6 - 12
ID : CIV-CPWN-SOIL 11.2

1:1 Soil pH	8.5
Soluble Salts 1:1, mmho/cm	3.91
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.9
Nitrate-N KCl, ppm N	14.0
Nitrate-N, lbs N / Acre	25
Phosphorus M3, ppm P	23
Potassium NH ₄ OAc, ppm K	320
Sulfate M-3, ppm S	999.9
Zinc DTPA, ppm Zn	0.50
Iron DTPA, ppm Fe	9.2
Manganese DTPA, ppm Mn	3.4
Copper DTPA, ppm Cu	0.52
Calcium NH ₄ OAc, ppm Ca	3887
Magnesium NH ₄ OAc, ppm Mg	438
Sodium NH ₄ OAc, ppm Na	2328
Chloride Ca-NO ₃ , ppm Cl	181.1
Boron Hot Water, ppm B	3.47

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
34.0	0	2	57	11	30

Saturated Soil Paste Analysis (SAR)

Saturation, %	62
Sat Paste pH	8.0
Sat Paste E _{Ce} , mmho/cm	11.26
HCO ₃ , ppm	180
Cl, ppm	356
Ca, ppm	284
Mg, ppm	108
Na, ppm	2576
S, ppm	1858.7
Sodium Adsorption Ratio	32.9

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 57 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Clay Loam	51	26	23

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62364 Depth : 12 - 18
ID : CIV-CPWN-SOIL 11.3

1:1 Soil pH	9.0
Soluble Salts 1:1, mmho/cm	5.09
Excess Lime Rating	HIGH
Organic Matter LOI, %	1.2
Nitrate-N KCl, ppm N	4.2
Nitrate-N, lbs N / Acre	8
Phosphorus M3, ppm P	9
Potassium NH ₄ OAc, ppm K	221
Sulfate M-3, ppm S	1357.0
Zinc DTPA, ppm Zn	0.17
Iron DTPA, ppm Fe	5.2
Manganese DTPA, ppm Mn	2.0
Copper DTPA, ppm Cu	0.58
Calcium NH ₄ OAc, ppm Ca	3796
Magnesium NH ₄ OAc, ppm Mg	581
Sodium NH ₄ OAc, ppm Na	3107
Chloride Ca-NO ₃ , ppm Cl	230.1
Boron Hot Water, ppm B	3.58

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
37.9	0	1	50	13	36

Saturated Soil Paste Analysis (SAR)

Saturation, %	59
Sat Paste pH	8.6
Sat Paste ECe, mmho/cm	14.86
HCO ₃ , ppm	138
Cl, ppm	451
Ca, ppm	177
Mg, ppm	149
Na, ppm	3761
S, ppm	2554.9
Sodium Adsorption Ratio	50.1

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 59 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Clay Loam	50	26	24

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62365 Depth : 18 - 24
ID : CIV-CPWN-SOIL 11.4

1:1 Soil pH	9.0
Soluble Salts 1:1, mmho/cm	2.94
Excess Lime Rating	HIGH
Organic Matter LOI, %	0.5
Nitrate-N KCl, ppm N	1.2
Nitrate-N, lbs N / Acre	2
Phosphorus M3, ppm P	6
Potassium NH ₄ OAc, ppm K	104
Sulfate M-3, ppm S	642.2
Zinc DTPA, ppm Zn	0.14
Iron DTPA, ppm Fe	5.7
Manganese DTPA, ppm Mn	1.4
Copper DTPA, ppm Cu	0.31
Calcium NH ₄ OAc, ppm Ca	2803
Magnesium NH ₄ OAc, ppm Mg	472
Sodium NH ₄ OAc, ppm Na	1695
Chloride Ca-NO ₃ , ppm Cl	110.6
Boron Hot Water, ppm B	1.62

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
25.6	0	1	55	15	29

Saturated Soil Paste Analysis (SAR)

Saturation, %	41
Sat Paste pH	8.5
Sat Paste E _{Ce} , mmho/cm	9.64
HCO ₃ , ppm	107
Cl, ppm	280
Ca, ppm	187
Mg, ppm	134
Na, ppm	2131
S, ppm	1563.4
Sodium Adsorption Ratio	29.0

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 61 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	80	9	11

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62381 Depth : 0 - 6
ID : CIV-CPWN-SOIL 16.1

1:1 Soil pH	7.3
Soluble Salts 1:1, mmho/cm	0.28
Excess Lime Rating	NONE
Organic Matter LOI, %	2.6
Nitrate-N KCl, ppm N	21.5
Nitrate-N, lbs N / Acre	39
Phosphorus M3, ppm P	83
Potassium NH ₄ OAc, ppm K	244
Sulfate M-3, ppm S	14.3
Zinc DTPA, ppm Zn	6.61
Iron DTPA, ppm Fe	32.8
Manganese DTPA, ppm Mn	4.2
Copper DTPA, ppm Cu	4.46
Calcium NH ₄ OAc, ppm Ca	1519
Magnesium NH ₄ OAc, ppm Mg	280
Sodium NH ₄ OAc, ppm Na	18
Chloride Ca-NO ₃ , ppm Cl	26.5
Boron Hot Water, ppm B	0.85

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
10.6	0	6	71	22	1

Saturated Soil Paste Analysis (SAR)

Saturation, %	48
Sat Paste pH	6.6
Sat Paste E _{Ce} , mmho/cm	0.75
HCO ₃ , ppm	60
Cl, ppm	41
Ca, ppm	94
Mg, ppm	27
Na, ppm	13
S, ppm	18.6
Sodium Adsorption Ratio	0.3

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 93 of 132

Account No. : 19356

Soil Analysis Report

**DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA**

CO 80003

**Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023**

**Results For : CIV
Location : CPWN**

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	66	14	20

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62382 Depth : 6 - 12
ID : CIV-CPWN-SOIL 16.2

1:1 Soil pH	7.8
Soluble Salts 1:1, mmho/cm	0.13
Excess Lime Rating	NONE
Organic Matter LOI, %	1.0
Nitrate-N KCl, ppm N	8.2
Nitrate-N, lbs N / Acre	15
Phosphorus M3, ppm P	35
Potassium NH ₄ OAc, ppm K	143
Sulfate M-3, ppm S	6.5
Zinc DTPA, ppm Zn	2.16
Iron DTPA, ppm Fe	10.6
Manganese DTPA, ppm Mn	4.6
Copper DTPA, ppm Cu	3.88
Calcium NH ₄ OAc, ppm Ca	1008
Magnesium NH ₄ OAc, ppm Mg	177
Sodium NH ₄ OAc, ppm Na	19
Chloride Ca-NO ₃ , ppm Cl	3.7
Boron Hot Water, ppm B	0.57

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
7.0	0	5	72	21	1

Saturated Soil Paste Analysis (SAR)

Saturation, %	41
Sat Paste pH	7.1
Sat Paste ECe, mmho/cm	0.42
HCO ₃ , ppm	58
Cl, ppm	12
Ca, ppm	46
Mg, ppm	13
Na, ppm	14
S, ppm	11.0
Sodium Adsorption Ratio	0.5

Reviewed By : Raymond Ward

5/17/2023

Copy : 1

Page 95 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	76	13	11

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Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
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ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62383 Depth : 12 - 18
ID : CIV-CPWN-SOIL 16.3

1:1 Soil pH	8.4
Soluble Salts 1:1, mmho/cm	0.14
Excess Lime Rating	NONE
Organic Matter LOI, %	0.9
Nitrate-N KCl, ppm N	5.9
Nitrate-N, lbs N / Acre	11
Phosphorus M3, ppm P	30
Potassium NH ₄ OAc, ppm K	151
Sulfate M-3, ppm S	10.1
Zinc DTPA, ppm Zn	0.89
Iron DTPA, ppm Fe	6.7
Manganese DTPA, ppm Mn	2.9
Copper DTPA, ppm Cu	1.72
Calcium NH ₄ OAc, ppm Ca	1426
Magnesium NH ₄ OAc, ppm Mg	162
Sodium NH ₄ OAc, ppm Na	23
Chloride Ca-NO ₃ , ppm Cl	2.1
Boron Hot Water, ppm B	0.55

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
9.0	0	4	80	15	1

Saturated Soil Paste Analysis (SAR)

Saturation, %	46
Sat Paste pH	7.7
Sat Paste E _{Ce} , mmho/cm	0.37
HCO ₃ , ppm	109
Cl, ppm	8
Ca, ppm	48
Mg, ppm	11
Na, ppm	15
S, ppm	6.7
Sodium Adsorption Ratio	0.5

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5/17/2023

Copy : 1

Page 97 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	79	10	11

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Account No. : 19356

Soil Analysis Report

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CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Lab No. : 62384 Depth : 18 - 24
ID : CIV-CPWN-SOIL 16.4

1:1 Soil pH	8.7
Soluble Salts 1:1, mmho/cm	0.24
Excess Lime Rating	LOW
Organic Matter LOI, %	1.0
Nitrate-N KCl, ppm N	8.4
Nitrate-N, lbs N / Acre	15
Phosphorus M3, ppm P	10
Potassium NH ₄ OAc, ppm K	69
Sulfate M-3, ppm S	33.3
Zinc DTPA, ppm Zn	0.45
Iron DTPA, ppm Fe	5.5
Manganese DTPA, ppm Mn	2.6
Copper DTPA, ppm Cu	0.69
Calcium NH ₄ OAc, ppm Ca	3748
Magnesium NH ₄ OAc, ppm Mg	284
Sodium NH ₄ OAc, ppm Na	72
Chloride Ca-NO ₃ , ppm Cl	21.9
Boron Hot Water, ppm B	0.68

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
21.6	0	1	87	11	1

Saturated Soil Paste Analysis (SAR)

Saturation, %	41
Sat Paste pH	7.9
Sat Paste ECe, mmho/cm	0.74
HCO ₃ , ppm	119
Cl, ppm	67
Ca, ppm	86
Mg, ppm	18
Na, ppm	46
S, ppm	22.1
Sodium Adsorption Ratio	1.2

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5/17/2023

Copy : 1

Page 99 of 132

Account No. : 19356

Soil Analysis Report

DANIELS, JUDY
SOIL SAGE LLC
8323 DEPEW WAY
ARVADA

CO 80003

Invoice No. : 1401762
Date Received : 05/10/2023
Date Reported : 05/12/2023

Results For : CIV
Location : CPWN

Soil Texture	Sand, %	Silt, %	Clay, %
Sandy Loam	76	8	16

Grass Seeding Planned and Applied Worksheet

Grass Seeding PART I - Planned

Cooperator	Area 3 loamy soil seed mix			Date	
Tract/Field No				Acres	
Soil Survey Area				Map Unit (s)	1
Contract No.				CIN	
Seeding dates	Nov 1 - Apr 30			Purpose	Other
Seedbed preparation	No Till			Seed rate	20
Drill type	no-till grass			Acres to be seeded	1.00
Planting depth-Drill spacing (in)	.25 ----7-10inches				
Planned fertilizer application (lb/ac)	N	P ₂ O ₅	K ₂ O	A Nutrient Management Plan is not required for the establishment of vegetative conservation practices.	
Planned weed control activities	Description	Herbicide		Attach WIN-PST Soil-Pesticide Interaction Risk Report for all chemical suppression activities	
	Date(s)	as needed			
Planned residue cover or mulch	Type	Other NRCS approved cover			
	Amount (lb/ac)				
	Application method				

Seed Mix Recommendation, † ‡

Common name N=native, I=introduced	Genus, species	Recommended Cultivar	% of seed mix	Pounds (lbs) pure live seed (PLS)
Grasses, forbs				
Switchgrass	Native <i>Panicum virgatum</i>	Blackwell	30.0	0.67
Little bluestem	Native <i>Schizachyrium scoparium</i>	Aldous, cimm.,camper, blaze	10.0	0.34
Yellow indiagrass	Native <i>Sorghastrum nutans</i>	cheyenne	12.0	0.61
Big bluestem	Native <i>Andropogon gerardii</i>	bison, champ, kaw	10.0	0.55
Green needlegrass	Native <i>Nassella viridula</i>	Iodorm	4.0	0.19
Indian ricegrass	Native <i>Achnatherum hymenoides</i>	Rimrock	1.0	0.06
Blanketflower	Native <i>Gaillardia aristata</i>		3.0	0.13
Maxmilian sunflower	Native <i>Helianthus maximiliani</i>		3.0	0.15
Prairie Coneflower	Native <i>Ratibida columnifera</i>		3.0	0.03
Purple prairie clover	Native <i>Dalea purpurea purpurea</i>		2.0	0.06
Annual sunflower	Native <i>Helianthus annuus</i>		2.0	0.29
Small burnet	Introduce <i>Sanguisorba minor</i>		3.0	0.62
Alfalfa	Introduce <i>Medicago sativa</i>		3.0	0.12
Sainfoin	Introduce <i>Onobrychis vicifolia</i>		3.0	0.87
Yellow sweetclover	Introduce <i>Melilotus officinale</i>		3.0	0.10
Western Yarrow	Native <i>Achillea lanulosa</i>		2.0	0.01
Blue flax	Native <i>Linum lewisii</i>		2.0	0.06
Black-eyed Susan	Native <i>Rudbeckia hirta</i>		3.5	0.02

Shrubs

Winterfat	Native <i>Krascheninnikovia lanata</i>			0.04
fourwing saltbush	Native <i>Atriplex canescens</i>			0.10
skunkbush sumac	Native <i>Rhus trilobata</i>			0.17
Shrubs				0.31
Grasses, Forbs				4.86
Total lbs PLS				5.17
Seed Rate (lbs PLS/acre)				5.17

Additional Recommendations

All native legumes must be inoculated. Seed MUST be sorted by size and type (e.g., large hard, small, fluffy).

† Certified Seed is required for all NRCS cost share programs

‡ Complete a Tree and Shrub Establishment 612 Job Sheet for bare-root shrub plantings

REPORT NUMBER

22-272-0302 v2

COMPLETED DATE

Oct 10, 2022

RECEIVED DATE

Sep 29, 2022

ACCOUNT

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PAGE 1/8

TODAY'S DATE

Oct 10, 2022**QUANDARY CONSULTANTS****Michael Dinkel****10603 E 6th pl****Aurora CO 80010**

IDENTIFICATION

MIKE DINKEL**SOIL ANALYSIS REPORT**

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O. I.		PHOSPHORUS						NEUTRAL AMMONIUM ACETATE(EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C.	PERCENT BASE SATURATION (COMPUTED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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LAB NUMBER	NITRATE-N (FIA)										SULFUR S ICAP		ZINC Zn DTPA		MANGANESE Mn DTPA		IRON Fe DTPA		COPPER Cu DTPA		BORON B SORB. DTPA		EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/ cm		
	SURFACE			SUBSOIL 1			SUBSOIL 2			Total lbs/A																
	ppm	lbs/A	depth (in)	ppm	lbs/A	depth (in)	ppm	lbs/A	depth (in)																	
400	ppm	lbs/A	depth (in)	ppm	lbs/A	depth (in)	ppm	lbs/A	depth (in)	Total lbs/A	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		mmhos/ cm	RATE			
37771	75	270	0-12							270	28	VH	0.5	VL	2	VL	7	L	0.5	L	0.5	L	M	0.8	L	
37772	101	364	0-12							364	33	VH	3.7	H	7	L	12	M	1.2	M	1.0	M	M	1.2	M	
37773	14	50	0-12							50	21	H	3.3	H	5	L	23	H	1.2	M	0.9	M	M	0.4	L	
37774	30	108	0-12							108	27	VH	5.4	H	3	VL	25	VH	1.3	H	1.0	M	M	0.5	L	

REV.10/17

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REPORT NUMBER

22-272-0302 v2

COMPLETED DATE

Oct 10, 2022

RECEIVED DATE

Sep 29, 2022

ACCOUNT

65502



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IDENTIFICATION

MIKE DINKEL

PAGE 2/8

TODAY'S DATE

Oct 10, 2022

QUANDARY CONSULTANTS

Michael Dinkel

10603 E 6th pl

Aurora CO 80010

ADDITIONAL SOIL ANALYSIS

Labnum *400*	Sample ID	E.C. EC electrode mmhos/cm
37771	5501 <i>Depth: 0-12</i>	2.0
37772	5502 <i>Depth: 0-12</i>	3.4
37773	5503 <i>Depth: 0-12</i>	0.7
37774	5504 <i>Depth: 0-12</i>	1.0

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TODAY'S DATE

Oct 10, 2022**QUANDARY CONSULTANTS**

Michael Dinkel
10603 E 6th pl
Aurora CO 80010

IDENTIFICATION

MIKE DINKEL**SODIUM ADSORPTION RATIO REPORT**

Method Lab Number Units	Sample Id	CALCULATED Sodium Adsorption Ratio	SATURATED PASTE EXTRACTION		
			Sodium (Water Soluble) mg/L	Magnesium (Water Soluble) mg/L	Calcium (Water Soluble) mg/L
400377715501		0.5	37	64	257
400377725502		2.0	166	98	334
400377735503		0.6	25	20	78
400377745504		0.9	43	31	122

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TODAY'S DATE

Oct 10, 2022**QUANDARY CONSULTANTS**

Michael Dinkel
10603 E 6th pl
Aurora CO 80010

IDENTIFICATION

MIKE DINKEL**SOIL FERTILITY RECOMMENDATIONS (POUNDS PER ACRE)**

YOUR SAMPLE NUMBER (LAB NUMBER)	INTENDED CROP	YIELD GOAL	PREVIOUS CROP	SOIL AMENDMENTS				N NITROGEN	P ₂ O ₅ PHOSPHATE	K ₂ O POTASH	Mg MAGNE- SIUM	S SULFUR	Zn ZINC	Mn MANGA- NESE	Fe IRON	Cu COPPER	B BORON
				LIME LBS/A OF	LIME TON	GYPSTUM TONS/A	ELEMENTAL SULFUR LBS/A										
5501 (40037771)	BROME/ORCHRD GRS-ton	3.0	UNKNOWN					--	--	--	--	--	0.8	--	--	--	--
5502 (40037772)	BROME/ORCHRD GRS-ton	3.0	UNKNOWN			0.2	OR 30	--	--	--	--	--	--	--	--	--	--
5503 (40037773)	BROME/ORCHRD GRS-ton	3.0	UNKNOWN					--	--	--	--	--	--	--	--	--	--
5504 (40037774)	BROME/ORCHRD GRS-ton	3.0	UNKNOWN					--	--	--	--	--	--	--	--	--	--

REV. 12/03

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QUANDARY CONSULTANTS**Michael Dinkel****10603 E 6th pl****Aurora CO 80010****IDENTIFICATION****MIKE DINKEL****SOIL HEALTH ASSESSMENT****ANALYTICAL LABORATORY FINDINGS**

SAMPLE IDENTIFICATION		5501				
LABORATORY NUMBER		40037771				
ANALYTE	UNITS	RESULTS	LOW	MEDIUM	OPTIMUM	VERY HIGH
H3A EXTRACTION						
ORTHOPHOSPHATE-P	ppm	169.5				
PHOSPHORUS	ppm	177				
POTASSIUM	ppm	169				
MAGNESIUM	ppm	344				
CALCIUM	ppm	2818				
SODIUM	ppm	41				
IRON	ppm	23				
ALUMINUM	ppm	81				
WATER SOLUBLE						
NITRATE-N	ppm	75				
AMMONIACAL-N	ppm	1.5				
ORTHOPHOSPHATE-P	ppm	12.35				
CARBON	ppm	130.7				
TOTAL NITROGEN	ppm	77.6				
1 DAY CO ₂ C BURST						
ORGANIC CARBON	ppm	130.7				
ORGANIC NITROGEN	ppm	1.1				
ORGANIC C/N RATIO		118.8				
ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST:			N/A. Sample depth not 0-6"			
NITROGEN RECOMMENDATIONS MAY INCLUDE ADDITIONAL NITROGEN CREDITS BASED ON PREVIOUS CROPS AND NITROGEN MINERALIZATION RATES.						
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SOIL HEALTH CALCULATION

13.3 

The **H3A Soil Extractant** was developed by Haney*. This extract is designed to mimic organic acids produced by living plant root systems. These organic acids increase nutrient availability in the root zone.

The **Water Soluble Extract** provides a snapshot of nutrients that are immediately available to the plants.

The **CO₂ Burst** test is very good indicator of soil health. This test measures the amount of CO₂ naturally released from the soil due to the activity of the soil microbes through microbial respiration. This test is very dependent on the amount of carbon that is available to the soil microbes and the form that the carbon is in. As the available carbon increases in your soil the Microbial respiration will increase.

Organic Carbon is the available total water extractable organic carbon from your soil. This pool of carbon is roughly 80 times smaller than the Soil Organic Matter. The organic carbon pool reflects the energy/food source that is driving the soil microbes.

The **Organic Nitrogen** pool is replenished by fresh plant residues, manure, composts, and dying soil microbes.

The **Organic C/N ratio** is a critical component of the nutrient cycle. A soil C/N ratio above 20 generally indicates that Nitrogen will be tied up and not available to plants. The ideal range for the Organic C/N ratio will be from 8:1 to 15:1.

The **Soil Health Calculation** uses the CO₂ Burst, Organic Carbon, Organic Nitrogen, and the C/N ratio to generate the soil health number. This calculation looks at the balance of soil carbon and nitrogen and their relationship to microbial activity. This number represents the overall health of your system. Soil values will range from 0 to 25. A soil with a value below 7 would be considered low. You want to see this number increase as you make changes and adjustments. Keeping track of this number will allow you to gauge the effects of your management practices over time.

*Modifications to the New Soil Extractant H3A-1: A Multinutrient Extractant
R.L. Haney (a); E.B. Haney (b); L.R. Hossner (c); J.G. Arnold (a)

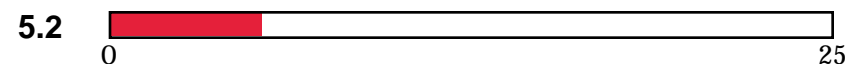
QUANDARY CONSULTANTS**Michael Dinkel****10603 E 6th pl****Aurora CO 80010**

IDENTIFICATION

MIKE DINKEL

SOIL HEALTH ASSESSMENT**ANALYTICAL LABORATORY FINDINGS**

SAMPLE IDENTIFICATION		5502				
LABORATORY NUMBER		40037772				
ANALYTE	UNITS	RESULTS	LOW	MEDIUM	OPTIMUM	VERY HIGH
H3A EXTRACTION						
ORTHOPHOSPHATE-P	ppm	135.3				
PHOSPHORUS	ppm	140				
POTASSIUM	ppm	260				
MAGNESIUM	ppm	350				
CALCIUM	ppm	2791				
SODIUM	ppm	139				
IRON	ppm	43				
ALUMINUM	ppm	64				
WATER SOLUBLE						
NITRATE-N	ppm	101				
AMMONIACAL-N	ppm	1.2				
ORTHOPHOSPHATE-P	ppm	9.75				
CARBON	ppm	122.0				
TOTAL NITROGEN	ppm	103.9				
1 DAY CO ₂ C BURST						
ORGANIC CARBON	ppm	122.0				
ORGANIC NITROGEN	ppm	1.7				
ORGANIC C/N RATIO		71.8				
ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST:			N/A. Sample depth not 0-6"			
NITROGEN RECOMMENDATIONS MAY INCLUDE ADDITIONAL NITROGEN CREDITS BASED ON PREVIOUS CROPS AND NITROGEN MINERALIZATION RATES.						
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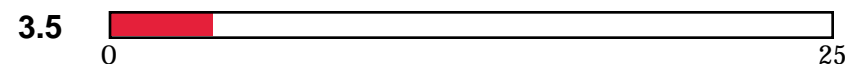
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R.L. Haney (a); E.B. Haney (b); L.R. Hossner (c); J.G. Arnold (a)

QUANDARY CONSULTANTS**Michael Dinkel****10603 E 6th pl****Aurora CO 80010****IDENTIFICATION****MIKE DINKEL****SOIL HEALTH ASSESSMENT****ANALYTICAL LABORATORY FINDINGS**

SAMPLE IDENTIFICATION		5503				
LABORATORY NUMBER		40037773				
ANALYTE	UNITS	RESULTS	LOW	MEDIUM	OPTIMUM	VERY HIGH
H3A EXTRACTION						
ORTHOPHOSPHATE-P	ppm	141.2				
PHOSPHORUS	ppm	148				
POTASSIUM	ppm	203				
MAGNESIUM	ppm	298				
CALCIUM	ppm	2922				
SODIUM	ppm	38				
IRON	ppm	26				
ALUMINUM	ppm	45				
WATER SOLUBLE						
NITRATE-N	ppm	16				
AMMONIACAL-N	ppm	2.1				
ORTHOPHOSPHATE-P	ppm	10.87				
CARBON	ppm	106.9				
TOTAL NITROGEN	ppm	21.4				
1 DAY CO ₂ C BURST		21.00				
ORGANIC CARBON	ppm	106.9				
ORGANIC NITROGEN	ppm	3.3				
ORGANIC C/N RATIO		32.4				
ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST: N/A. Sample depth not 0-6"						
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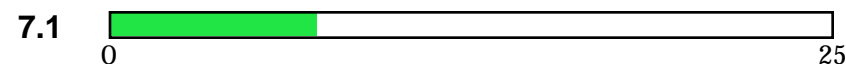
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R.L. Haney (a); E.B. Haney (b); L.R. Hossner (c); J.G. Arnold (a)

QUANDARY CONSULTANTS**Michael Dinkel****10603 E 6th pl****Aurora CO 80010****IDENTIFICATION****MIKE DINKEL****SOIL HEALTH ASSESSMENT****ANALYTICAL LABORATORY FINDINGS**

SAMPLE IDENTIFICATION		5504				
LABORATORY NUMBER		40037774				
ANALYTE	UNITS	RESULTS	LOW	MEDIUM	OPTIMUM	VERY HIGH
H3A EXTRACTION						
ORTHOPHOSPHATE-P	ppm	185.7				
PHOSPHORUS	ppm	196				
POTASSIUM	ppm	176				
MAGNESIUM	ppm	317				
CALCIUM	ppm	2521				
SODIUM	ppm	60				
IRON	ppm	45				
ALUMINUM	ppm	78				
WATER SOLUBLE						
NITRATE-N	ppm	34				
AMMONIACAL-N	ppm	0.7				
ORTHOPHOSPHATE-P	ppm	11.27				
CARBON	ppm	160.3				
TOTAL NITROGEN	ppm	37.2				
1 DAY CO ₂ C BURST		52.00				
ORGANIC CARBON	ppm	160.3				
ORGANIC NITROGEN	ppm	2.5				
ORGANIC C/N RATIO		64.1				
ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST: N/A. Sample depth not 0-6"						
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