

Location Checklist



Operator / #	BONANZA CREEK ENERGY OPERATING COMPANY LLC / 8960		
Location ID & Name	305240 Park/33-4 Pad		
County	Weld, CO		
Well Information	Well Name:	PARK #33-4	
	Well API #:	05-123-22696	
	Lat/Long as Drilled:	40.339740 / -104.439930	
	Plug Date & Form 6s Doc #:	01/23/2019 & 401932708	
Facility Entities	<input checked="" type="checkbox"/>	Tank Battery (Off-Site)	Pits
	<input checked="" type="checkbox"/>	Wells	<input checked="" type="checkbox"/> On-Location Flowlines (Form 42) Doc #: 401912583
		Domestic Taps	<input checked="" type="checkbox"/> Off-Location Flowlines (Form 44) Doc #: 402026822
Equipment On-Site	<input checked="" type="checkbox"/>	None	Debris
		Pit mouse/rat holes, cellars backfilled	
Access Road	<input checked="" type="checkbox"/>	Regraded	<input checked="" type="checkbox"/> Contoured
		Culverts removed	<input checked="" type="checkbox"/> Gravel removed
		Pre-Existing (Must provide supporting documentation)	
Reclamation Status	<input checked="" type="checkbox"/>	Location and associated disturbances reclaimed	
		Subsidence	
Spills or Releases (Form 19)	<input checked="" type="checkbox"/>	No	<input type="checkbox"/> Yes
Remediation (Form 27/27A)	<input checked="" type="checkbox"/>	No	<input type="checkbox"/> Yes
On-Location Flowlines		No	<input checked="" type="checkbox"/> Yes
Off-Location Flowlines		No	<input checked="" type="checkbox"/> Yes
Inspection Corrective Actions		No	<input checked="" type="checkbox"/> Yes – Resolved 2017
Sundry Notice	Form 4 Doc # & Date:	401728975 & 05/15/2019	
	Purpose:	NOTICE OF CONTINUED TEMPORARILY ABANDONED STATUS. Indicate why the well is temporarily abandoned and describe future plans for utilization in the COMMENTS box below or provide as an attachment, as required by Rule 319.b.(3). Date well temporarily abandoned: 04/05/2017.	
	Comments:	This Form 4 is being submitted post P&A of this well as the form was returned to draft in Fall of 2018 due to insufficient comment. Since then, this well has been P&A'd (Form 6 SR Doc # 401932708). This Form 4 is being submitted to provide full record of TA status prior to PA.	
	Attachments:	Operations Summary Doc # 402015403	
Drone Information	Make & Model	DJI M300/DJI Mavic 3 Multispectral	
	Image Processing Software	Pix4dfields – RGB/Multispectral Imagery & Pix4dmatic – RGB Imagery	
	Pilot Name & FAA Certificate #	Sam Streeter, #4100157	
	Date of FAA Certificate Issuance	23 Dec 2023	

**SITE-SPECIFIC QUALITY ASSURANCE
& QUALITY CONTROL AUDIT**



Final Reclamation Complete Notice – Cropland Drone Imagery

PERMIT CLOSURE REPORT – CROPLAND

Location ID 305240

Location Name Park/33-4 Pad

Report Date

18 Feb 2025

Soil Sage has conducted a thorough data audit as part of our Quality Assurance and Quality Control (QA/QC) protocols. This report was developed in accordance with the ECMC Operator Guidance – Operator supplied cropland drone imagery and information for submitting a final reclamation complete notice.

Crop Year and Type

Crop 2024 – Corn

Quality Assurance & Quality Control Audit

Auditor	Soil Sage
Audit Date	13 Nov 2024

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	Park/33-4 Pad		
Location ID	305240		
Operator / #	BONANZA CREEK ENERGY OPERATING COMPANY LLC / 8960		
Field	WATTENBERG / 90750		
County, State	Weld, CO		
Lat/Long	40.339740 / -104.439930		
	Planned Location	<input checked="" type="checkbox"/>	As Drilled
Facility Status	CL	Location	NWSE 4 4N63W
Facility Status Date	01/23/2019		
Facility Entities	<input checked="" type="checkbox"/>	Tank Battery (Off-Site)	Pits
	<input checked="" type="checkbox"/>	Wells	<input checked="" type="checkbox"/> Off-Location Flowlines (Form 44)
		Domestic Taps	<input checked="" type="checkbox"/> On-Location Flowlines (Form 42)
		Electric Utilities	
Equipment on Site	<input checked="" type="checkbox"/>	No	Yes
		If yes, list:	
		Pit mouse/rat holes, cellars backfilled	
Access Road	<input checked="" type="checkbox"/>	Regraded	<input checked="" type="checkbox"/> Contoured
		Culverts Removed	<input checked="" type="checkbox"/> Gravel Removed
		Pre-Existing: must provide supporting documentation	
Environment Incidents & Remediation	<input checked="" type="checkbox"/>	None	Spill or Release (Form 19)
		Remediation (Form 27/27A)	
Variance Requests	No Variance Requests were detected during this QA & QC Audit.		
Inspection Corrective Actions (CA)s	<p>Corrective Actions (CA)s were detected during the QA & QC Audit.</p> <p>CA Overall Status: 2 of 2 CAs Completed</p> <p>CA-Approving Inspection Doc # & Date: 680703937 & 04/17/2017</p> <ul style="list-style-type: none"> ○ Inspector: Tom Peterson <p>Form FIRR Doc # & Submittal Date: 401240984 & 04/11/2017</p> <ul style="list-style-type: none"> ○ Overall Status: CAC ○ Originating Field Inspection Report (FIR) Doc #: 680703850 ○ CA#: 67127 Date Completed: 03/21/2017 <p>Repair or install berms or other secondary containment devices per Rule 605.a.(4).</p> <p>ECMC Decision: Approved pending re-inspection</p>		

	<ul style="list-style-type: none"> ○ CA#: 67128 Date Completed: 03/22/2017 Contact COGCC_Engineering@state.co.us with resolution plan. ECMC Decision: Approved
	Complete ECMC Inspection Search Results: Link
Sundry Notice (Form 4)	<p>Form 4 Doc # & Date: 401209520 & 03/31/2017</p> <ul style="list-style-type: none"> ○ Purpose: CHANGE OF WELL, FACILITY OR OIL & GAS LOCATION NAME OR NUMBER. From: Name PARK-64N63W Number 4NWSE To: Name Park Number 33-4 Pad Effective Date: 02/14/2017
	Form 4s were detected during the QA & QC Audit. See individual scout card data for details.
On Location Flowlines (Form 42)	Form 42s were detected during the QA & QC Audit. See individual scout card data for details.
Off-Location Flowlines (Form 44)	<p>Form 44 Doc # & Date: 402026822 & 07/27/2020</p> <ul style="list-style-type: none"> ○ Purpose: Abandonment ○ Abandonment Date: 02/08/2019 ○ ECMC Approval Date & Signee: 05/14/2019 by Jeff Robbins ○ Operator Comments: None <p>Flowline Facility Information</p> <ul style="list-style-type: none"> ○ ECMC Flowline ID: 463738 ○ Operator Flowline ID: Park 33-4 Flowline ○ Status & Date: CL & 02/08/2019 ○ Flowline Type: Wellhead Line ○ Type of Fluids Transported: Multiphase ○ Start Point Location ID: 305240 ○ Start Point Riser Lat/Long: 40.339741/-104.439974 (PARK #33-4 Well) ○ Equipment at Start Point: Well ○ End Point Location ID: 463360 ○ End Point Riser Lat/Long: 40.338269/-104.440693 (Park/33-4 Flowline Production Facilities) ○ Equipment at End Point Riser: Separator

<p>Field Inspection Form (Form INSP)</p>	<p>Form INSP Doc # & Date: 680703937 & 04/17/2017</p> <ul style="list-style-type: none"> ○ Status Summary: THIS IS A FOLLOW UP INSPECTION. NO FOLLOW UP INSPECTION REQUIRED. ○ Inspected Facilities: PARK 33-4 (Well) ○ Inspection Status: TA ○ Inspection Date & Inspector: 04/10/2017 by Tom Peterson ○ Comments: Panel. Automation array. Control Device N40.33823 W-104.44066. Horizontal Heated Separator N40.33810 W-104.44067. Berm condition noted in prior inspection document #680703850 has been corrected. See attached photo. HZ safety prep. Operator has contacted COGCC engineering regarding production reporting issues. Bradenhead valve is exposed at surface. ○ Attachments: Inspection Photos Doc # 680703938 <p>Form INSP Doc # & Date: 680703850 & 04/04/2017</p> <ul style="list-style-type: none"> ○ Status Summary: FOLLOW UP INSPECTION REQUIRED ○ Inspected Facilities: PARK 33-4 (Well) ○ Inspection Status: TA ○ Inspection Date & Inspector: 03/17/2017 by Tom Peterson ○ Comments: Emission Control Device N40.33823 W-104.44066. Meter run inlet has been shut-in, locked and tagged out. See attached photo. Horizontal Heated Separator N40.33810 W-104.44067. Berm walls have eroded down. See attached photo. Last reported gas production 10/2013. No current MIT on record or delinquent as required by Rule 326. Bradenhead valve is exposed at surface. Well production is currently being incorrectly reported to COGCC. ○ Attachments: Inspection Photos Doc # 680703851, 680703852, 680703853
<p>COGIS Tank Facilities Information (Scout Card)</p>	<p>No Tank Battery documents were detected during this QA/QC Audit. However, the Tank Battery is referenced in Form 44 Doc # 402026822 as the end point of the Off-Location Flowline and is located at Location ID 463360.</p>

COGIS Well Information (Scout Card)	<p>Well Name: PARK #33-4</p> <p>API#: 05-123-22696</p> <p>FACILITY ID: 275906</p> <ul style="list-style-type: none"> ○ Status & Date: PA & 01/23/2019 ○ Lat/Long as Drilled: 40.339740 / -104.439930 ○ Form 6 Doc # & Date: 401932708 & 06/29/2019 ○ Form 4 Doc # & Date: 401728975 & 05/15/2019 <p>Purpose: NOTICE OF CONTINUED TEMPORARILY ABANDONED STATUS. Indicate why the well is temporarily abandoned and describe future plans for utilization in the COMMENTS box below or provide as an attachment, as required by Rule 319.b.(3). Date well temporarily abandoned: 04/05/2017. Has Production Equipment been removed from site? Yes. Mechanical Integrity Test (MIT) required if shut in longer than 2 years. Date of last MIT 05/01/2017.</p> <p>Attachments: Operations Summary Doc # 402015403</p> <ul style="list-style-type: none"> ○ Form 42 Doc # & Date: 401912583 & 01/22/2019 <p>Purpose: START OF PLUGGING OPERATIONS - 48-hour notice required. Date: 01/23/2019.</p>
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ECMC Abbreviations: [Location & Facility Status Codes](#), [Inspection Types & Statuses](#) and [ECMC Help](#).

Audit Key Findings – Designation Land Use Observations

PREVIOUS LAND USE	CURRENT LAND USE
<p>Reference Imagery for Infrastructure: USGS DOW 1999; USGS NAIP 2013</p>	<p>Remotely Sensed Imagery: 29 Aug 2024; 15 Jan 2025</p>
<p>Designation: Oil & Gas Facility</p>	<p>Designation: Cropland</p>

The following imagery sources were reviewed during this Audit: EarthExplorer, DRCOG, USDA NAIP, ESRI, Google Earth and Soil Sage Remotely Sensed Imagery.

Site Observation Notes

No additional information.

In accordance with ECMC guidance, this cropland evaluation has demonstrated that this location has been returned to its original condition and crops are reflective of the cropland reference areas.

Closure Information

Location ID [305240](#) Park/33-4 Pad is in Weld County, Colorado near the intersection of County Road 50 and County Road 67. There is one plugged and abandoned well (PARK #33-4 API # [05-123-22696](#)). There is an Off-Location Flowline (Flowline ID [463738](#)) between this well and the Off-Site Production Facility at Location ID [463360](#).

There were two Corrective Actions at this location in March 2017 due to needing to repair or install berms or other secondary containment devices per Rule 605.a.(4). and needing to contact COGCC with resolution plan. These were resolved in April 2017 and an ECMC inspection approved the CA on April 17th, 2017.

PARK #33-4 well (API # [05-123-22696](#)) was plugged and abandoned on January 23rd, 2019. The access road was reclaimed at this time. The related Off-Site Production Facility, Location ID [463360](#), was closed and reclaimed at the same time. At some point in 2024, it appears the farmer needed to access his pivot for repairs, creating a small path through the crop just south of the PARK #33-4 well. This pivot repair path is not related to this Location, refer to Post-Plugging Overview Map and August 2024 Drone Cardinal Photos on Page 14 of this report.

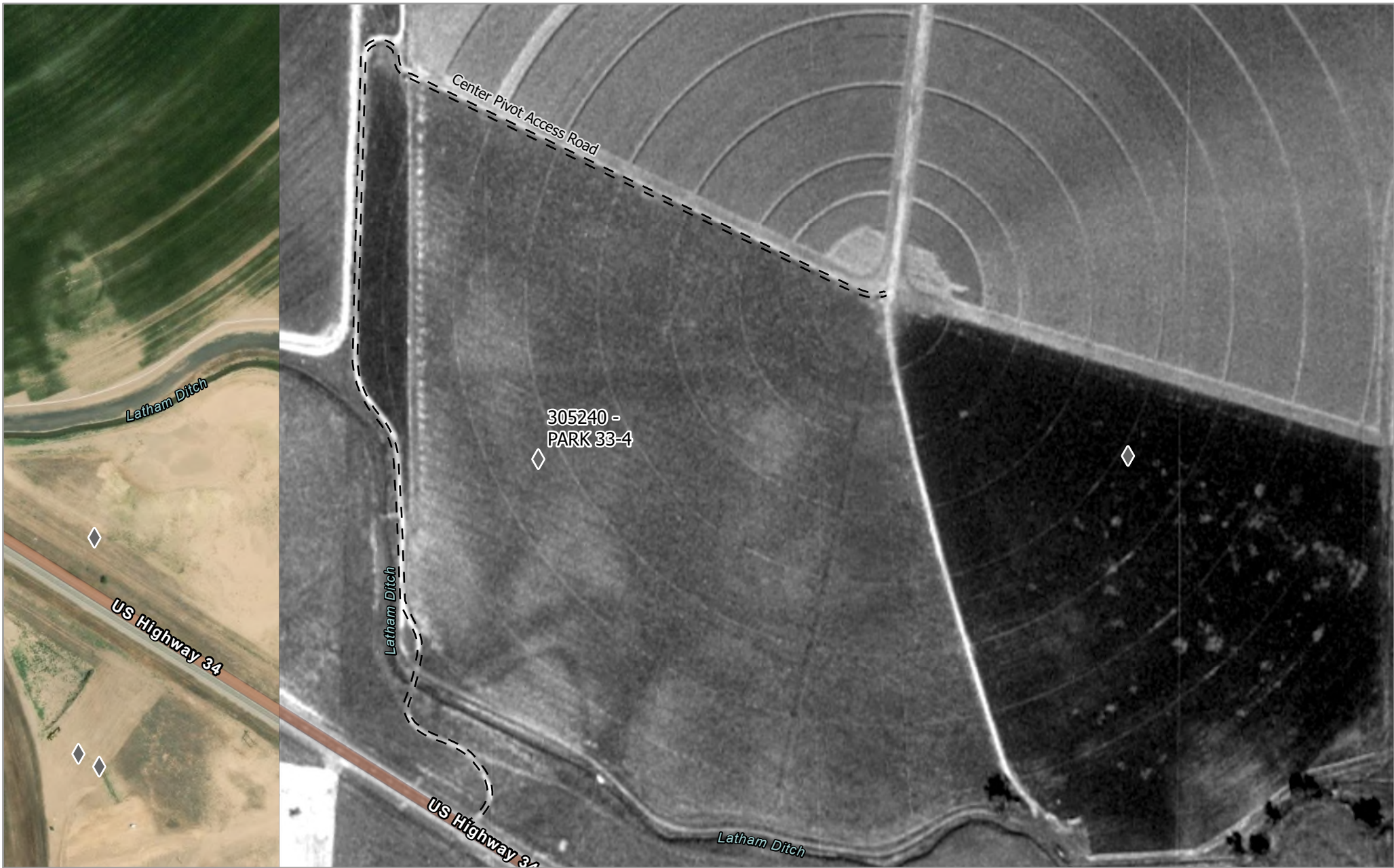
Soil Sage drone imagery confirms that no equipment was left on site at this location after reclamation activities occurred.

Summary Acreage Table

Description	Acres
Historic Disturbance Extent	0.64
Access Road	0.06
Flowline	Not Included
Tank Battery	Off-Site (Loc ID 463360)
Well Pad	0.58

Drone Information

Make	DJI
Model	M300/Mavic 3 Multispectral
Image Processing Software	Pix4dfields – RGB/Multispectral Imagery & Pix4dmatic – RGB Imagery
Pilot Name	Sam Streeter
Pilot FAA Certificate Number	4100157
Date of FAA Certificate Issuance	23 Dec 2023



CIV - 305240- Park 33-4
Map Extent - Pre-Infrastructure
Overview

Imagery: USGS DOQ
 Imagery Date: 1999
 Map Date: 23 Jan 2025
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

- ◆ Wells
- [- -] Center Pivot Road

0 45 90 180 Meters

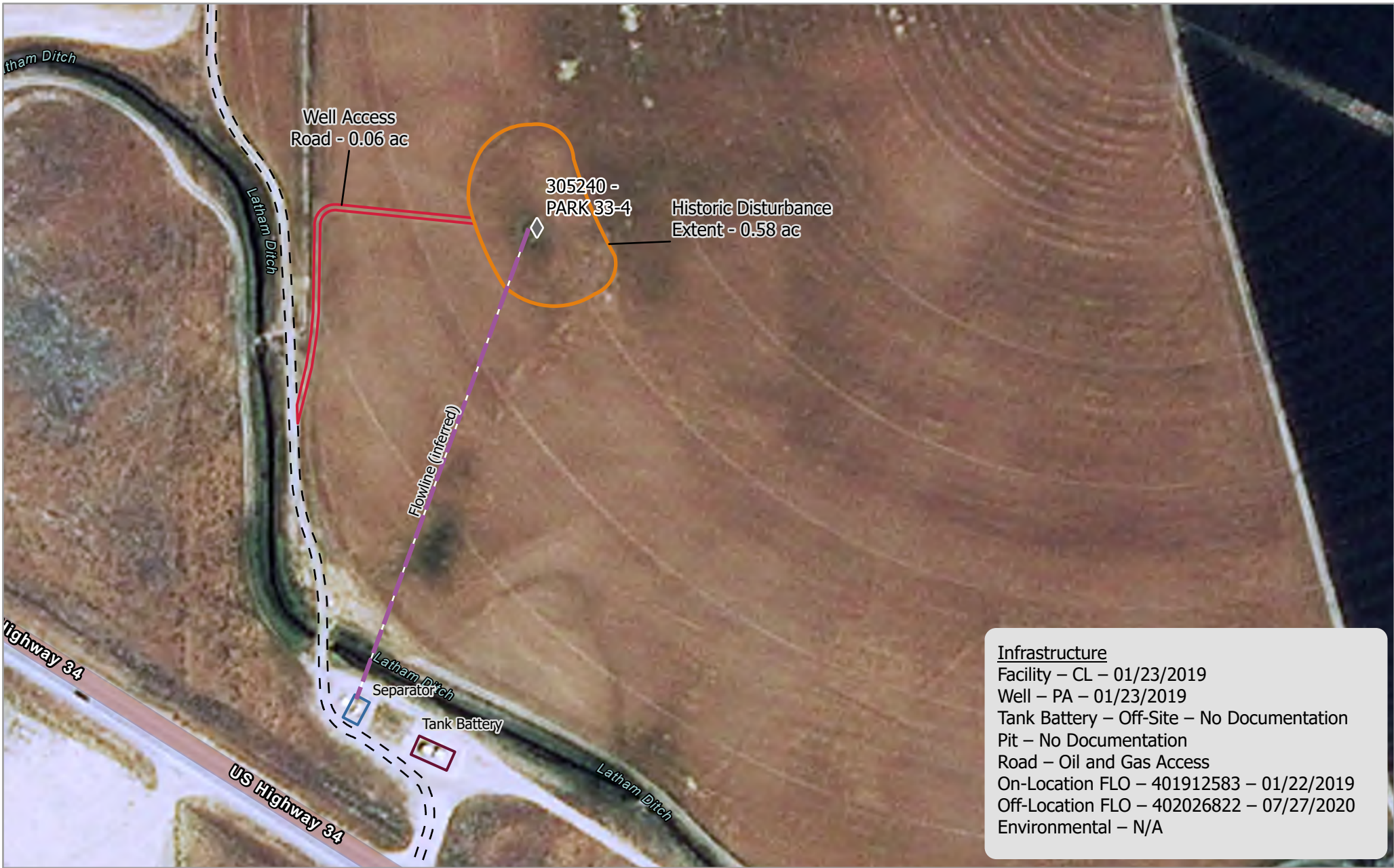
Scale: 1:3,200

Pad Location:
 40.339740
 -104.439930

N

Service Credits - Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community





Infrastructure
 Facility – CL – 01/23/2019
 Well – PA – 01/23/2019
 Tank Battery – Off-Site – No Documentation
 Pit – No Documentation
 Road – Oil and Gas Access
 On-Location FLO – 401912583 – 01/22/2019
 Off-Location FLO – 402026822 – 07/27/2020
 Environmental – N/A

**CIV - 305240- Park 33-4
 Map Extent - Pre-Plugging Overview**

Imagery: USGS NAIP
 Imagery Date: 2013
 Map Date: 16 Feb 2025
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

- ◆ Wells
- Flowline
- ▭ Historic Disturbance Extent
- ▭ Well Access Road
- ▭ Tank Battery
- ▭ Separator
- ▭ Center Pivot Access Road

0 25 50 100 Meters

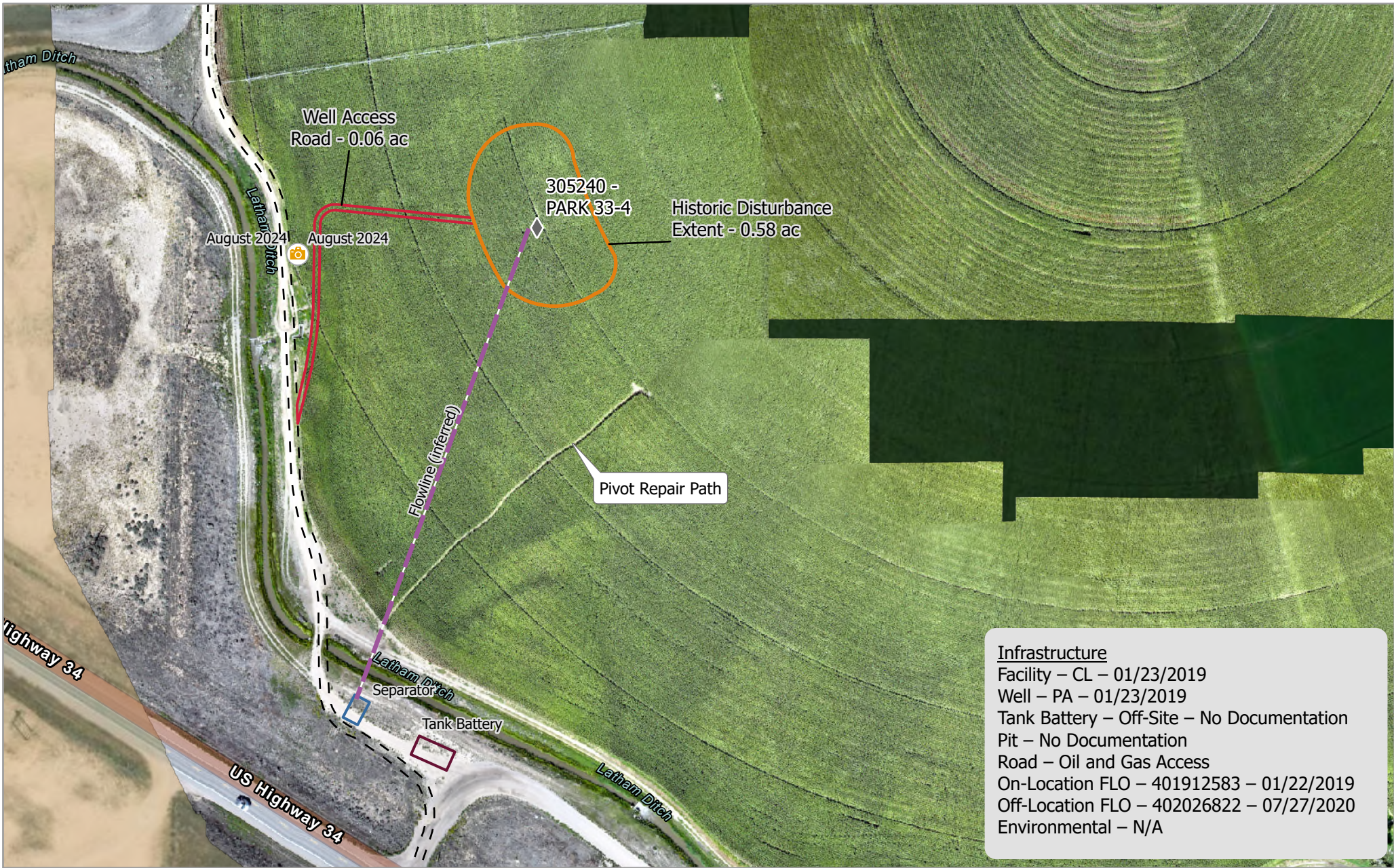
Total Disturbance: 0.64 Acres
 Scale: 1:1,800

Pad Location: 40.339740
 -104.439930

N



Service Credits - Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Infrastructure
 Facility – CL – 01/23/2019
 Well – PA – 01/23/2019
 Tank Battery – Off-Site – No Documentation
 Pit – No Documentation
 Road – Oil and Gas Access
 On-Location FLO – 401912583 – 01/22/2019
 Off-Location FLO – 402026822 – 07/27/2020
 Environmental – N/A

**CIV - 305240- Park 33-4
 Map Extent - Post-Plugging Overview**

Imagery: RS Orthomosaic
 Imagery Date: 29 Aug 2024
 Map Date: 16 Feb 2025
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

- ◆ Wells
- 📍 Observation Points
- Flowline
- ▭ Historic Disturbance Extent
- ▭ Well Access Road
- ▭ Tank Battery
- ▭ Separator
- ▭ Center Pivot Access Road

0 25 50 100 Meters

Total Disturbance: 0.64 Acres
 Scale: 1:1,800

Pad Location: 40.339740
 -104.439930



Service Credits - Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Cardinal Directional Drone Photos & Reference Area Photos

Site Investigation and Photos Date

29 Aug 2024

Drone Photo Height

160 feet

Cardinal directional photos of the site. Reference overview map.



In View – Well, Access Road, Flowline

NORTH – 40.339201 / -104.440021



In View – Well, Access Road, Flowline

NORTH – 40.339200 / -104.440036



In View – Well, Access Road, Flowline

EAST – 40.339737 / -104.440570



In View – Well, Access Road, Flowline
*Active Location ID [434077](#) in view

EAST – 40.339754 / -104.440571



In View – Well, Tank Battery (Loc ID [463360](#)), Access Road, Flowline

SOUTH – 40.340246 / -104.439956



In View – Well, Tank Battery (Loc ID [463360](#)), Access Road, Flowline **SOUTH** – 40.340249 / -104.439949
*Active Location ID [428521](#) in view



In View – Arrow Indicating Farmer Path for Pivot Repairs – Not Oil and Gas Related **SOUTHWEST** – 40.339387 / -104.439214



In View – Well, Access Road, Flowline

WEST – 40.339776 / -104.439076



In View – Well, Access Road, Flowline

WEST – 40.339776 / -104.439077

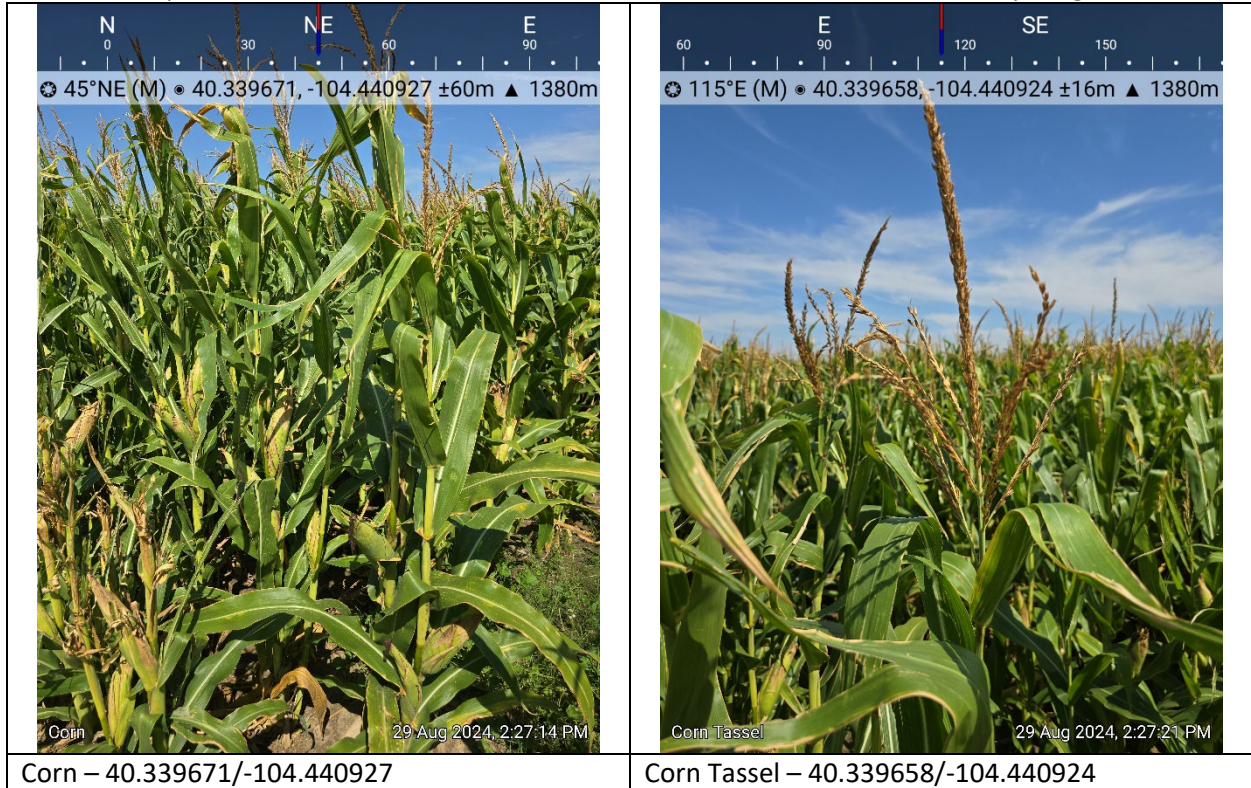
Well – Handheld Photographic Evidence

Site Investigation and Photos Date

29 Aug 2024

Handheld photos taken from the ditch road to the west of Location ID [305240](#) PARK #33-4 wellhead.

No handheld photos taken from Location ID [305240](#) PARK #33-4 wellhead due to crop height.





Corn Ear – 40.339667/-104.440926



Looking East – 40.339609/-104.440976

Cardinal Directional Drone Photos Showing No Equipment Remaining

Site Investigation and Photos Date

15 Jan 2025

Drone Photo Height

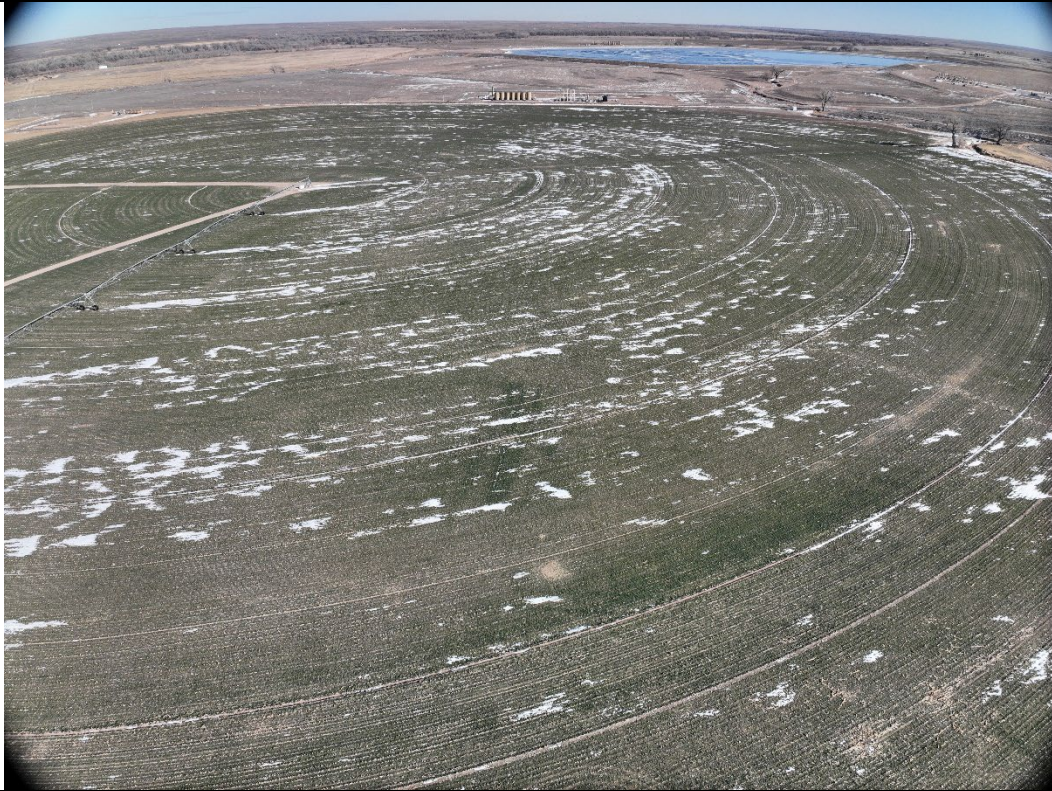
180 feet

Cardinal directional photos of the site. Reference overview map.



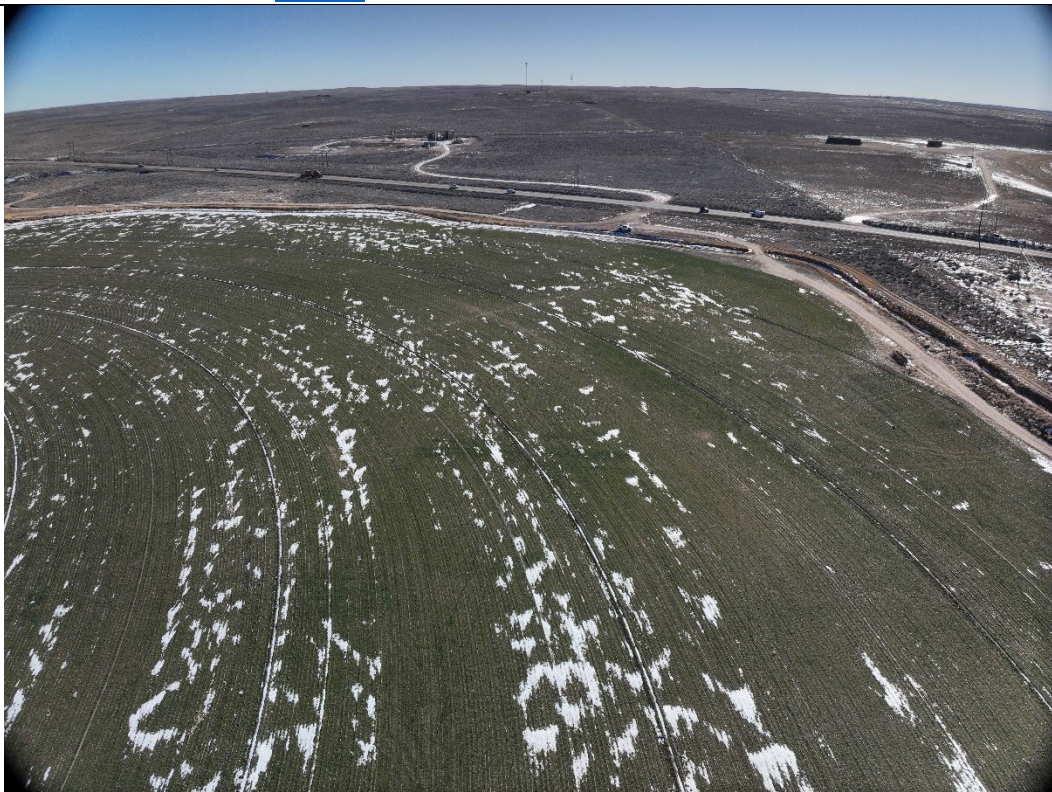
In View – Well, Access Road, Flowline

NORTH – 40.338995 / -104.439907



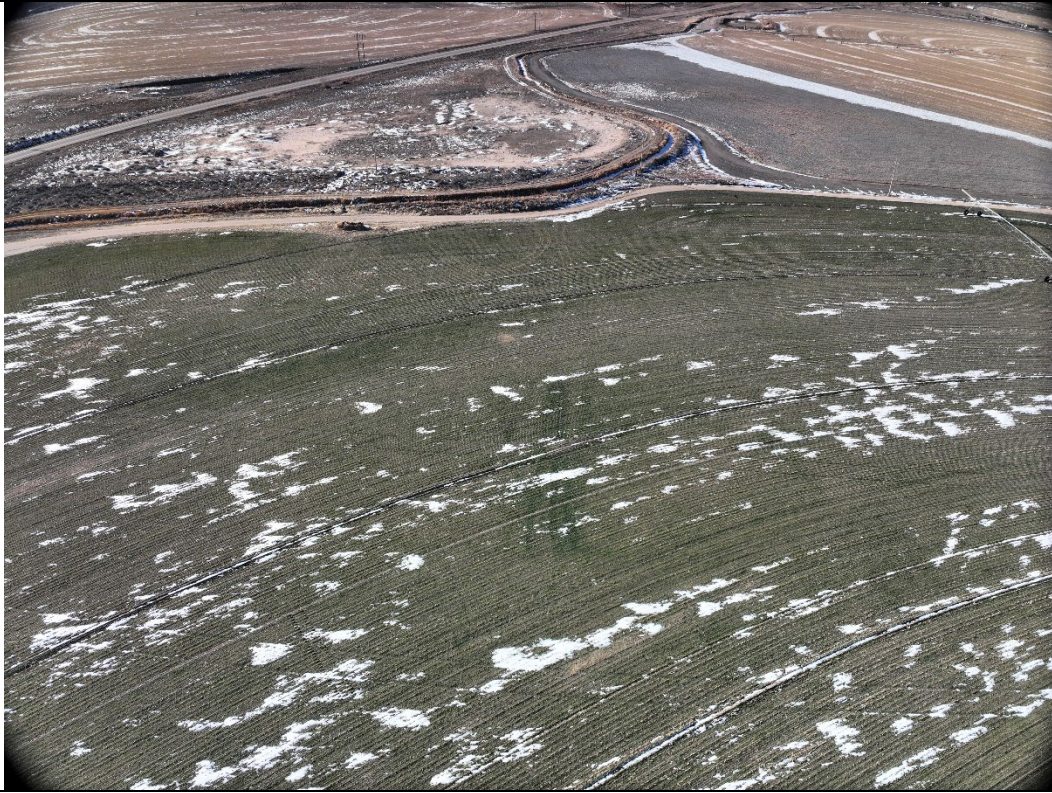
In View – Well, Access Road, Flowline
*Active Location ID [434077](#) in view

EAST – 40.339780 / -104.441098



In View – Well, Tank Battery (Loc ID [463360](#)), Access Road, Flowline
*Active Location ID [428521](#) in view

SOUTH – 40.340855 / -104.439984



In View – Well, Tank Battery (Loc ID [463360](#)), Access Road, Flowline **SOUTHWEST** – 40.339731 / -104.439965

ATTACHMENTS

Maps and Figures

Area Maps

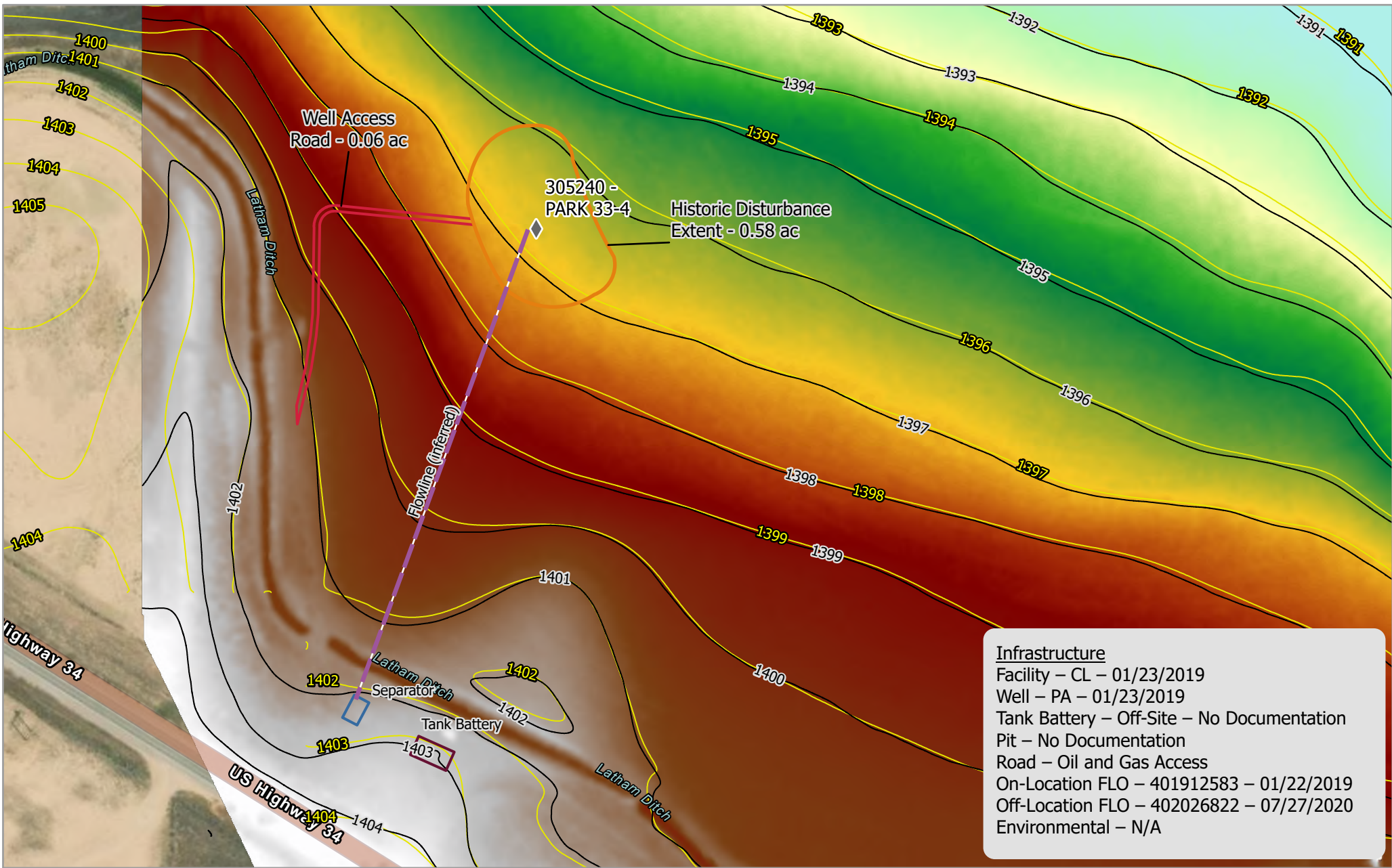
Elevation & Contours

Hydrology

Background Information

Natural Resources Conservation Service (NRCS) Map Unit Description

Reference Soil Document



Infrastructure
 Facility – CL – 01/23/2019
 Well – PA – 01/23/2019
 Tank Battery – Off-Site – No Documentation
 Pit – No Documentation
 Road – Oil and Gas Access
 On-Location FLO – 401912583 – 01/22/2019
 Off-Location FLO – 402026822 – 07/27/2020
 Environmental – N/A

CIV - 305240- Park 33-4
Map Extent - Elevation & Contours

Imagery: USGS, RS DSM
 Imagery Date: 2014, 2024
 Map Date: 16 Feb 2025
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

◆ Wells	▭ Tank Battery
— Flowline	▭ Separator
~ 1 Meter Contours (2024)	Elevation
~ 1 Meter Contours (2014)	Meters
▭ Historic Disturbance Extent	1411
▭ Well Access Road	1388

0 25 50 100 Meters

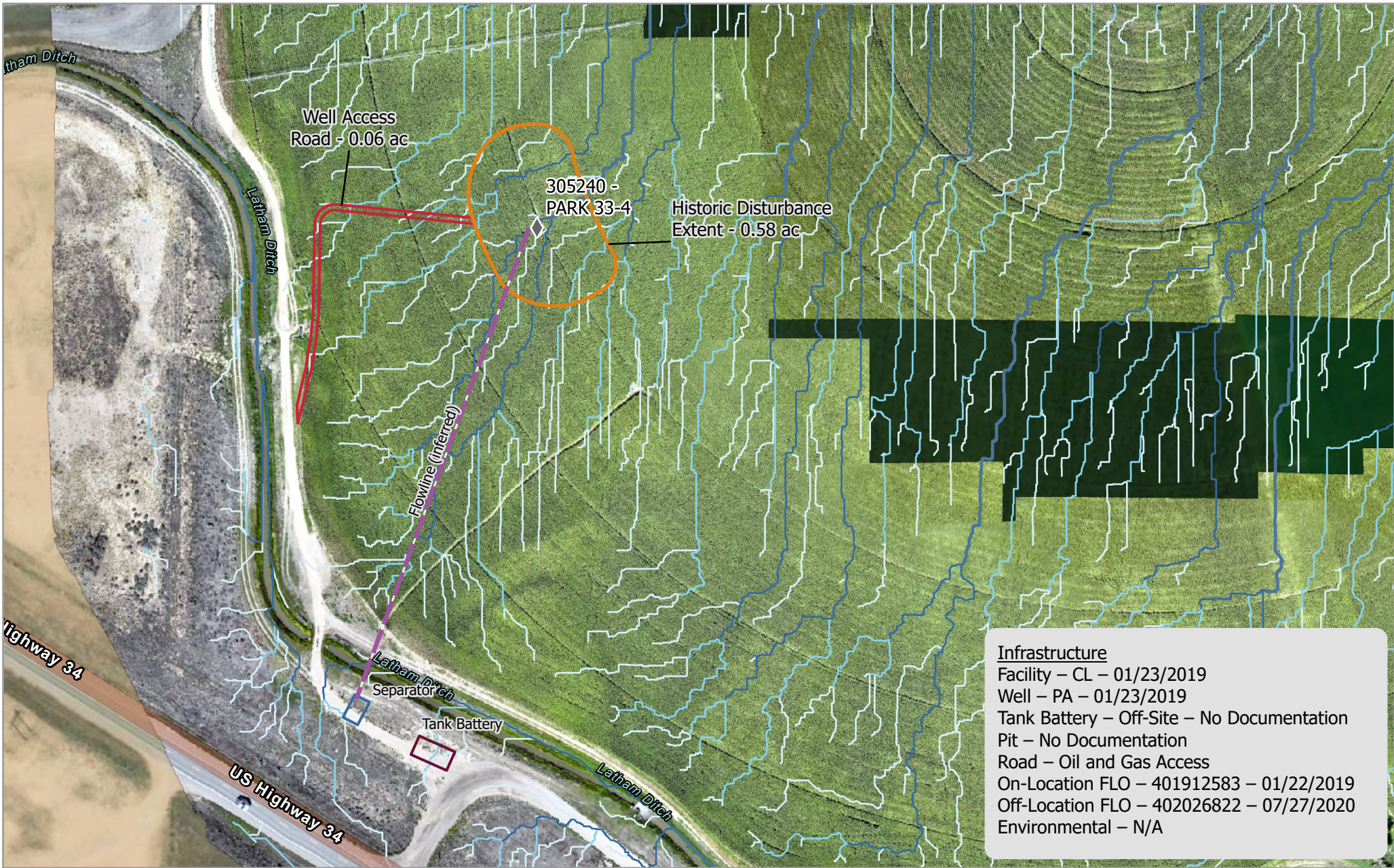
Total Disturbance: 0.64 Acres
 Scale: 1:1,800

Pad Location: 40.339740
 -104.439930

N

Service Credits - Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community





Infrastructure
 Facility – CL – 01/23/2019
 Well – PA – 01/23/2019
 Tank Battery – Off-Site – No Documentation
 Pit – No Documentation
 Road – Oil and Gas Access
 On-Location FLO – 401912583 – 01/22/2019
 Off-Location FLO – 402026822 – 07/27/2020
 Environmental – N/A

**CIV - 305240- Park 33-4
 Map Extent - Hydrology**

Imagery: RS DSM, RS Orthomosaic
 Imagery Date: 2025, 2024
 Map Date: 16 Feb 2025
 Datum: WGS 1984 UTM Zone 13N
 POC: Soil Sage

◆ Wells	Stream Order
— Flowline	— 1
— Historic Disturbance Extent	— 2
— Well Access Road	— 3
— Tank Battery	— 4
— Separator	

0 25 50 100 Meters

Total Disturbance: 0.64 Acres
 Scale: 1:1,800

Pad Location: 40.339740
 -104.439930

Service Credits - Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Soil Properties

USDA Soil Description

Reference Soil Information

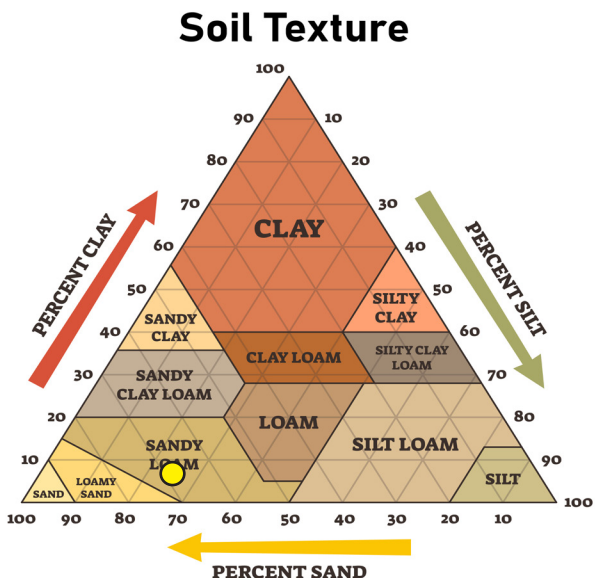
The location of the site is contained within one soil type, Vona Loamy Sand

Map Unit 77 Reference Soil Information - Vona Sandy Loam

This soil is formed from eolian deposits. Landform is plains. Ecological Site Description is Sandy Plains. Soils are well drained with a moderate water holding capacity, and slope 3 to 5 percent.

Depth (in)	Physical			Chemical			
	Texture	Bulk Density	Particle Size Percent sand, silt, clay	pH	EC	SAR	OM%
0-6	Sandy Loam	1.43	69-24-8	7.2	1.0	0.0	0.75
6-28	Fine Sandy Loam	1.45	67-20-13	7.5	2.0	0.0	0.75
28-60	Sandy Loam	1.50	67-24-9	8.5	2.0	0.0	0.25

Soil Texture Triangle reflect the 0-10 in depth



Erosion Potential (10 inches)

- K Factor, Whole soil - .28. 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 – 3. 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 – Sandy Plains Ecology

Climate

Average Annual Precipitation 14 to 17 inches annually - average 15 inches

Average Annual Air Temperature ranges from 50 to 52 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 70-85% grasses and grass-like plants, 10-15% forbs, and 5-15% woody plants. The dominant tall warm season grasses are prairie sandreed, sand bluestem and switchgrass. Blue grama dominates the understory. Important cool season grasses and grass-likes are needle and thread and sun sedge. Key forbs and shrubs are American vetch, pacific peavine (manystem pea), purple prairie clover, and spreading buckwheat.

Drought has increased mortality of blue grama in some locations.

Well suited for carbon sequestration.

Reference Vegetation – Sandy Plains Ecology

At Risk Plant Community

Key species from the Reference Plant Community, sand bluestem, prairie sandreed, switchgrass, leadplant and western sandcherry have decreased in frequency and production. Blue grama has increased. Sand dropseed, Fendler threeawn, hairy goldaster, croton, slimflower scurfpea, western ragweed, stickleaf, heath aster, lupine, loco, milkvetch and plains pricklypear cactus have increased. Soils that have a sandy loam or coarser subsoil will show an increase in sand sagebrush.

The risk of losing key warm-season tallgrasses, important forbs and shrubs is a major concern. Blue grama is increasing at the expense of the tallgrasses and deep-rooted shrubs. Water cycle, nutrient cycle and energy flow may become impaired due to a shift in root structure and species composition. Less litter is being produced.

Vegetation

Sandy Plains Ecosystem Vegetative Community Composition

Common Name	Scientific Name
Blue Grama	<i>Bouteloua gracilis</i>
Prairie Sandreed	<i>Calamovilfa longifolia</i>
Sand Bluestem	<i>Andropogon hallii</i>
Switchgrass	<i>Panicum virgatum</i>
Needle and Thread	<i>Hesperostipa comata</i>
Western Wheatgrass	<i>Pascopyrum smithii</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Indiangrass	<i>Sorghastrum nutans</i>
Sideoats Grama	<i>Bouteloua curtipendula</i>
Sand Dropseed	<i>Sporobolus cryptandrus</i>
Indian Ricegrass	<i>Achnatherum hymenoides</i>
Buffalograss	<i>Bouteloua dactyloides</i>
Thin Paspalum	<i>Paspalum setaceum</i>
Purple Prairie Clover	<i>Dalea purpurea</i>
Upright Prairie Coneflower	<i>Ratibida columnifera</i>
Scarlet Globemallow	<i>Sphaeralcea coccinea</i>
American Vetch	<i>Vicia americana</i>
White Heath Aster	<i>Symphyotrichum ericoides</i>
Winged Buckwheat	<i>Eriogonum alatum</i>
White sagebrush	<i>Artemisia ludoviciana</i>