COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

May 2, 2025

Jodi Schreiber
PFM Consulting LLC
1774 N. Couger Drive
Pueblo West, CO 81007

Re: Adequacy Review No. 2, 112c Regular Operation Construction Materials Permit Application Lascar Pit, Permit No. M-2025-004

Dear Ms. Schreiber,

The Division of Reclamation, Mining, and Safety (Division) has reviewed the content of your 112c Reclamation Permit Application for the Lascar Pit, File No. M-2025-004, and your responses to the Division's Preliminary Adequacy Review and submits the following comments. **The Division is required to make an approval or denial decision no later than May 8, 2025; therefore, a response to the following adequacy review concerns should be submitted to the Division as soon as possible.** To allow the Division adequate time to review your responses to the following items, please submit your adequacy responses to the Division no later than three days prior to the decision date.

Please respond to this adequacy review with the requested information as revised pages and summarize each response to the numbered items below, in a cover letter titled "Adequacy Review No. 2 Responses; M-2025-004".

The review consisted of comparing the application content with specific requirements of Rules 1, 3, 6.1, 6.2, and 6.4 of the Minerals Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials. Any inadequacies are identified under the respective exhibit heading.

EXHIBIT E: Reclamation Plan

1. Throughout the Exhibits, the Applicant updated the available topsoil amount and the amount of topsoil to be replaced to three inches. In the Reclamation Plan, under section 2. Topsoil Replacement, the Applicant states that three inches of topsoil will be replaced and six inches of overburden will be replaced.

   The Division requires that a minimum of six inches of topsoil is salvaged and replaced to help ensure the facilitation of plant growth. Attached is a copy of the NRCS report

the Division generated highlighting the soil profiles in the proposed main permit area. Please see the highlighted sections on the enclosed PDF pages 15-18 of the report. Soil unit numbers 77 and 91 compose the majority of the available soil in the main permit area. According to the soil profiles, there is between 0 and 10 inches of A profile material available across the site.

During the 2024 inspection of the current 111, M-2023-005 permit, the Operator stated that an additional topsoil stockpile was created through sorting overburden material. In the adequacy responses, this sorted material is labeled as overburden. However, due to the quality of the material, and because the Operator stated that six inches will be replaced in addition to the three inches of topsoil, the Division is comfortable with the re-soiling plan.

Attached for your review is a copy of the Division's Reclamation Cost Estimate of the site. Please provide comments/questions prior to the decision date or concur with the Division's estimate.

EXHIBIT J: Vegetation Information

2. A soils/vegetation text box description was added to the Existing Conditions map though the adequacy responses. However, the relation of the types of vegetation to existing topography is not shown. Please provide a map that shows this relationship. A common way that this is demonstrated is on a map generated from the NRCS website.

EXHIBIT S: Permanent Man-made Structures

3. The previously submitted Exhibit S stated that "Huerfano County has approved the Special Use Permit which addresses the County Road 650 conditions". As this language was removed with the re-submitted Exhibit S – please confirm that the Huerfano County SUP letter still acts as the structure agreement for County Road 650.

PUBLICATION REQUIREMENTS

4. An affidavit from the World Journal was included with the adequacy responses to provide the Division with proof of publication. The last date of publication indicates that it was February 6, 2025. This appears to be in error, but for clarity of the record please provide a revised and re-notarized affidavit indicating the dates of publication.

5. Please also provide a copy or photo of the published newspaper publication to demonstrate that the requirements of Rule 1.6.2(1)(d) were addressed.

The decision deadline for this application is **May 8, 2025**. If additional time is required to respond to these adequacy issues, please submit a written request for an extension of the decision date. The Division reserves the right to further supplement this document with additional adequacy issues and details as necessary.

If you need additional information or have any questions, please contact by telephone at (720) 836-0967, or by email at amber.gibson@state.co.us.

Sincerely,

Amber M. Gibson
Environmental Protection Specialist

Cc: Baxter Kirkland, President, Siete, Inc.
Jared Ebert, DRMS

Enclosures: *Division's Reclamation Cost Estimate*
NRCS Soils Report Soil Horizon Information Pages

COST SUMMARY WORK

Task description: **Reclamation Cost Estimate Summary**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 000 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-000
User: AMG

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Pit highwall reduction and regrading	DOZER	1	2.29	$778
002	Ripping access road	RIPPER	1	4.17	$1,437
003	Spread 3" topsoil over main permit area (23.2 acres)	SCRAPER1	1	11.20	$13,008
003b	Spread 6" overburden over main permit area (23.2 acres)	SCRAPER1	1	20.69	$24,024
004	Spread 3" topsoil over access road (6.8 acres)	SCRAPER1	1	5.41	$6,286
004b	Spread 6" overburden over access road (6.8 acres)	SCRAPER1	1	10.02	$11,635
005	Revegetate 30 acres	REVEGE	1	30.00	$27,394
006	Mob/Demob	MOBILIZE	1	4.94	$9,129
		SUBTOTALS:		**88.72**	**$93,691**

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	$1,893
Performance bond:	1.05	Total =	$984
Job superintendent:	44.36	Total =	$3,516
Profit:	10.00	Total =	$9,369
		TOTAL O & P =	$15,762
		CONTRACT AMOUNT (direct + O & P) =	$109,453

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	$500	Total =	$500
Engineering work and/or contract/bid preparation:	4.25	Total =	$4,652
Reclamation management and/or administration:	5.00		$5,473
CONTINGENCY:	0.00	Total =	$0
		TOTAL INDIRECT COST =	$26,386
		TOTAL BOND AMOUNT (direct + indirect) =	**$120,077**

BULLDOZER WORK

Task description: **Pit highwall reduction and regrading**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 001 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-001
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D8T - 8SU
Horsepower: 310
Blade Type: Semi-Universal
Attachment: 3-shank ripper
Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$173.32	NA
Operating Cost/Hour:	$109.71	100
Ripper own. Cost/Hour:	$14.53	NA
Ripper op. Cost/Hour:	$3.98	50
Operator Cost/Hour:	$38.59	NA

Total unit Cost/Hour: $340.12
Total Fleet Cost/Hour: **$340.12**

MATERIAL QUANTITIES

Initial Volume: 2,734
Swell factor: 1.230
Loose volume: **3,363** LCY

Source of estimated volume: Highwall calc, depth of excavation 20ft, max. highwall 700ft
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Average push distance: 50 feet
Unadjusted hourly production: 1,400.0 LCY/hr

Materials consistency description: Compacted fill or embankment 0.9

Average push gradient: -20 %
Average site altitude: 6,093 feet

Material weight: 2,100 lbs/LCY

Weight description: Earth - Loam

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	0.900	(CAT HB))
Dozing method:	1.200	(SLOT)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	1.000	(DOZ-OC)
Push gradient:	1.426	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.095	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 1.0498

Adjusted unit production: 1,469.72 LCY/hr

Adjusted fleet production: **1469.72** LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)
Unit cost: $0.231/LCY

Total job time: **2.29** Hours
Total job cost: **$778**

BULLDOZER RIPPING WORK

Task description: **Ripping access road**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 002 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: 2
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: Cat D8T - 8SU Horsepower: 310
Ripper Attachment: 3-Shank Ripper Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$173.32	NA
Operating Cost/Hour:	$109.71	100
Ripper Ownership Cost/Hour:	$14.53	NA
Ripper Operating Cost/Hour:	$7.95	100
Operator Cost/Hour:	$38.59	NA
Total Unit Cost/Hour:	$344.10	

Total Fleet Cost/Hour: **$344.10**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic: NA Bank Volume: NA BCY NA
Area: 2.91 acres Rip Depth (ft): 1.50 Volume: 7,042 BCY or CCY

Source of estimated quantity: Road dimensions 30’ and road length 4,224’

HOURLY PRODUCTION

Seismic:

Seismic Velocity: NA feet/second

Area:

Average Ripping Depth:	1.50	feet/pass
Average Ripping Width:	7.08	feet/pass
Average Ripping Length:	999.99	feet/pass
Average Dozer Speed:	88.00	feet/minute
Average Maneuver Time:	0.25	minutes/pass
Production per unit area:	0.840	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production: 0.840 Acres/hr

Site Altitude:	6,093	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier

Adjusted Hourly Unit Production: 0.70 Acres/hr
Adjusted Hourly Fleet Production: **0.70** Acres/hr

JOB TIME AND COST

Fleet size: 1 Grader(s) Total job time: **4.18** Hours

Unit cost: $493.717 Per acre Total job cost: **$1,437**

SCRAPER TEAM WORK

Task description: **Spread 3" topsoil over main permit area (23.2 acres)**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 003 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: 3
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	CAT 12M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	NA	NA	25	25
Ownership cost/hour:	$217.39	NA	NA	NA	$69.16	$11.65
Operating cost/hour:	$257.76	NA	NA	NA	$13.69	$5.61
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Ripper op. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Operator cost/hour:	$30.90	NA	NA	NA	$27.76	$21.12
Unit Subtotals:	$506.05	NA	NA	NA	$110.61	$38.39
Number of Units:	2	0	0	0	1	1
Group Subtotals:	Work:	$1,012.10	Support:	$0.00	Maint:	$149.00

Total work team cost/hour: **$1,161.10**

MATERIAL QUANTITIES

Initial volume: 9,357 CCY Swell factor: 1.215
Loose volume: **11,369** LCY

Source of estimated volume: Main permit acreage minus acces road (23.2 ac), 3" topsoil
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Material weight: 1,600 lbs/LCY
Material description: Top Soil
Rated Payload: 52,800 pounds
Payload Capacity: 33.00 LCY

Scraper Bowl (volume) Basis:

Struck Volume: 15.70 LCY
Heaped Volume: 22.00 LCY
Average Volume: 18.85 LCY
Adjusted Capacity: **18.85** LCY

Cycle Time:

Scraper Loading Time: 0.70 Minutes
Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction: Site Altitude: 6093 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	400.00	-3.00	3.00	0.00	2921	0.26

Haul Time: **0.26** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	400.00	3.00	3.00	6.00	2736	0.29

Return Time: **0.29** minutes

Total Scraper team cycle time: **1.85** minutes
Adjusted for job conditions: 507.42 LCY/Hour
Selected Number of Scrapers: 2 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,014.84 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,014.84** LCY/Hour

Unadjusted unit production/hour: 611.35 LCY/Hour
Optimal Number of Scrapers per push dozer:

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **11.20** Hours

Unit cost: $1.144 /LCY Total job cost: **$13,008**

SCRAPER TEAM WORK

Task description: **Spread 6" overburden over main permit area (23.2 acres)**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 003B State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-003b
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	CAT 12M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	NA	NA	25	25
Ownership cost/hour:	$217.39	NA	NA	NA	$69.16	$11.65
Operating cost/hour:	$257.76	NA	NA	NA	$13.69	$5.61
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Ripper op. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Operator cost/hour:	$30.90	NA	NA	NA	$27.76	$21.12
Unit Subtotals:	$506.05	NA	NA	NA	$110.61	$38.39
Number of Units:	2	0	0	0	1	1
Group Subtotals:	Work:	$1,012.10	Support:	$0.00	Maint:	$149.00

Total work team cost/hour: **$1,161.10**

MATERIAL QUANTITIES

Initial volume: 18,715 CCY Swell factor: 1.110
Loose volume: **20,774** LCY

Source of estimated volume: Main permit acreage minus acces road (23.2 ac), 6" overburde
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Material weight: 2,800 lbs/LCY
Material description: Clay - Natural bed
Rated Payload: 52,800 pounds
Payload Capacity: 18.86 LCY

Scraper Bowl (volume) Basis:

Struck Volume: 15.70 LCY
Heaped Volume: 22.00 LCY
Average Volume: 18.85 LCY
Adjusted Capacity: **18.85** LCY

Cycle Time:

Scraper Loading Time: 0.70 Minutes
Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction: Site Altitude: 6093 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	400.00	-3.00	3.00	0.00	2921	0.28

Haul Time: **0.28** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	400.00	3.00	3.00	6.00	2736	0.29

Return Time: **0.29** minutes

Total Scraper team cycle time: **1.87** minutes
Adjusted for job conditions: 501.99 LCY/Hour
Selected Number of Scrapers: 2 Scraper(s)
Adjusted single scraper team (unit) hourly production: 1,003.99 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **1,003.99** LCY/Hour

Unadjusted unit production/hour: 604.81 LCY/Hour
Optimal Number of Scrapers per push dozer:

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **20.69** Hours

Unit cost: $1.156 /LCY Total job cost: **$24,024**

SCRAPER TEAM WORK

Task description: **Spread 3" topsoil over access road (6.8 acres)**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 004 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-004
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	CAT 12M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	NA	NA	25	25
Ownership cost/hour:	$217.39	NA	NA	NA	$69.16	$11.65
Operating cost/hour:	$257.76	NA	NA	NA	$13.69	$5.61
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Ripper op. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Operator cost/hour:	$30.90	NA	NA	NA	$27.76	$21.12
Unit Subtotals:	$506.05	NA	NA	NA	$110.61	$38.39
Number of Units:	2	0	0	0	1	1
Group Subtotals:	Work:	$1,012.10	Support:	$0.00	Maint:	$149.00

Total work team cost/hour: **$1,161.10**

MATERIAL QUANTITIES

Initial volume: 2,743 CCY Swell factor: 1.215
Loose volume: **3,333** LCY

Source of estimated volume: Access Road 6.8 acres - 3" topsoil cover
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Scraper Bowl (volume) Basis:

Material weight: 1,600 lbs/LCY
Material description: Top Soil
Rated Payload: 52,800 pounds
Payload Capacity: 33.00 LCY

Struck Volume: 15.70 LCY
Heaped Volume: 22.00 LCY
Average Volume: 18.85 LCY
Adjusted Capacity: **18.85** LCY

Cycle Time:

Scraper Loading Time: 0.70 Minutes
Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction: Site Altitude: 6093 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2112.00	-1.20	3.00	1.80	2868	0.88

Haul Time: **0.88** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2112.00	1.20	3.00	4.20	2849	0.87

Return Time: **0.87** minutes

Total Scraper team cycle time: **3.05** minutes
Adjusted for job conditions: 307.78 LCY/Hour
Selected Number of Scrapers: 2 Scraper(s)
Adjusted single scraper team (unit) hourly production: 615.56 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **615.56** LCY/Hour

Unadjusted unit production/hour: 370.82 LCY/Hour
Optimal Number of Scrapers per push dozer:

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **5.41** Hours

Unit cost: $1.886 /LCY Total job cost: **$6,286**

SCRAPER TEAM WORK

Task description: **Spread 6" overburden over access road (6.8 acres)**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 004B State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-004b
User: AMG

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	CAT 12M
-Water Truck:	Water Tanker, 2,500 Gal.

Cost Breakdown:

	Scraper Work Team		Support Equipment		Maintenance Equipment	
	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	NA	NA	NA	25	25
Ownership cost/hour:	$217.39	NA	NA	NA	$69.16	$11.65
Operating cost/hour:	$257.76	NA	NA	NA	$13.69	$5.61
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Ripper op. cost/hour:	NA	NA	NA	NA	$0.00	$0.00
Operator cost/hour:	$30.90	NA	NA	NA	$27.76	$21.12
Unit Subtotals:	$506.05	NA	NA	NA	$110.61	$38.39
Number of Units:	2	0	0	0	1	1
Group Subtotals:	Work:	$1,012.10	Support:	$0.00	Maint:	$149.00

Total work team cost/hour: **$1,161.10**

MATERIAL QUANTITIES

Initial volume: 5,485 CCY Swell factor: 1.110
Loose volume: **6,088** LCY

Source of estimated volume: Access Road 6.8 acres - 6" overburden cover
Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Scraper Bowl (volume) Basis:

Material weight: 2,800 lbs/LCY
Material description: Clay - Natural bed
Rated Payload: 52,800 pounds
Payload Capacity: 18.86 LCY

Struck Volume: 15.70 LCY
Heaped Volume: 22.00 LCY
Average Volume: 18.85 LCY
Adjusted Capacity: **18.85** LCY

Cycle Time:

Scraper Loading Time: 0.70 Minutes
Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction: Site Altitude: 6093 feet

	Scraper	Push Dozer	Source
Altitude Adj:	1.000	NA	(CAT HB)
Job Efficiency:	0.830	NA	(CAT HB)
Net Correction:	0.830	NA	

Travel Time:

Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2112.00	-1.20	3.00	1.80	2868	0.92

Haul Time: **0.92** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	2112.00	1.20	3.00	4.20	2849	0.87

Return Time: **0.87** minutes

Total Scraper team cycle time: **3.09** minutes
Adjusted for job conditions: 303.80 LCY/Hour
Selected Number of Scrapers: 2 Scraper(s)
Adjusted single scraper team (unit) hourly production: 607.59 LCY/Hour
Adjusted multiple scraper team (fleet) hourly production: **607.59** LCY/Hour

Unadjusted unit production/hour: 366.02 LCY/Hour
Optimal Number of Scrapers per push dozer:

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **10.02** Hours

Unit cost: $1.911 /LCY Total job cost: **$11,635**

REVEGETATION WORK

Task description: **Revegetate 30 acres**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 005 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-005
User: AMG

Agency or organization name: DRMS

TILLING

Description	Cost /Acre
Chisel plowing {DMG}	$102.41
Total Tilling Cost/Acre	**$102.41**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Blue Grama - Native	1.20	19.59	$25.59
Sand Dropseed	0.10	11.94	$1.30
Galleta	1.60	5.84	$88.70
Western Wheatgrass - Arriba	16.00	40.40	$144.54
Winter Fat	0.10	0.25	$4.67
Totals Seed Mix	19.00	78.02	**$264.80**

Application

Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	$236.64
Total Seed Application Cost/Acre	**$236.64**

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Straw, delivered {MEANS 31 25 14.16 1200}	0.20	TON	$492.78	$98.56
Total Mulch Materials Cost/Acre				**$98.56**

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	$85.37
	$85.37

Total Mulch Application Cost/Acre	

JOB TIME AND COST

No. of Acres:	30	Cost /Acre:	$787.78
Estimated Failure Rate:	25%	Cost /Acre*:	$501.44
*Selected Replanting Work Items:	SEEDING		

Initial Job Cost:	**$23,633.40**
Reseeding Job Cost:	**$3,760.80**
Total Job Cost:	**$27,394**
Job Hours:	**30.00**

EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: **Mob/Demob**

Site: **Lascar Pit** Permit Action: 112c Application Permit/Job#: M2025004

PROJECT IDENTIFICATION

Task #: 006 State: Colorado Abbreviation: None
Date: 5/2/2025 County: Huerfano Filename: M004-006
User: AMG

Agency or organization name: DRMS

EQUIPMENT TRANSPORT RIG COST

Shift basis: 1 per day
Cost Data Source: CRG Data

Truck Tractor Description: GENERIC ON-HIGHWAY TRUCK TRACTOR, 6X4, DIESEL POWERED, 400 HP (2ND HALF, 2006)

Truck Trailer Description: GENERIC FOLDING GOOSENECK, DROP DECK EQUIPMENT TRAILER (25T, 50T, AND 100T)

Cost Breakdown:

Available Rig Capacities	0-25 Tons	26-50 Tons	51+ Tons
Ownership Cost/Hour:	$10.44	$22.18	$23.94
Operating Cost/Hour:	$26.48	$54.55	$55.65
Operator Cost/Hour:	$22.52	$22.52	$22.52
Helper Cost/Hour:	$0.00	$23.53	$23.53
Total Unit Cost/Hour:	$59.44	$122.78	$125.64

NON ROADABLE EQUIPMENT:

Machine Description	Weight/ Unit (TONS)	Owner ship Cost/hr/ unit	Haul Rig Cost/hr/unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet	DOT Permit Cost/ fleet
Cat D8T - 8SU	53.08	$187.85	$125.64	1	$313.49	$125.64	$250.00
Cat 627G	41.80	$217.39	$122.78	2	$680.34	$245.56	$500.00
Drill/Broadcast Seeder with Tractor	25.00	$41.02	$59.44	2	$200.92	$118.88	$500.00
Power Mulcher (Bowie LD-90)	6.00	$27.21	$59.44	1	$86.65	$59.44	$250.00
Subtotals:					**$1,281.40**	**$549.52**	**$1,500.00**

ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Light Duty Pickup, 4x4, 3/4 T.	$119.71	1	$119.71	$119.71
Water Tanker, 2,500 Gal.	$55.22	1	$55.22	$55.22
Fuel Tanker, 4x2, 170 HP	$55.22	1	$55.22	$55.22
Lube Truck, 4x2, 190 HP	$62.53	1	$62.53	$62.53
Subtotals:			**$292.68**	**$292.68**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region:	WALSENBURG	
Total one-way travel distance:	13.00	miles
Average Travel Speed:	55.00	mph

Total Non-Roadable Mob/Demob Cost * '* two round trips with haul rig:	$8,991.13
Total Roadable Mob/Demob Cost ** ** one round trip, no haul rig:	$138.36

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.24	0.24
Return Time (Hours):	0.24	0.24
Loading Time (Hours):	1.00	NA
Unloading Time (Hours):	1.00	NA
Subtotals:	2.47	0.47

JOB TIME AND COST

Total job time:	**4.95**	Hours
Total job cost:	**$9,129**	

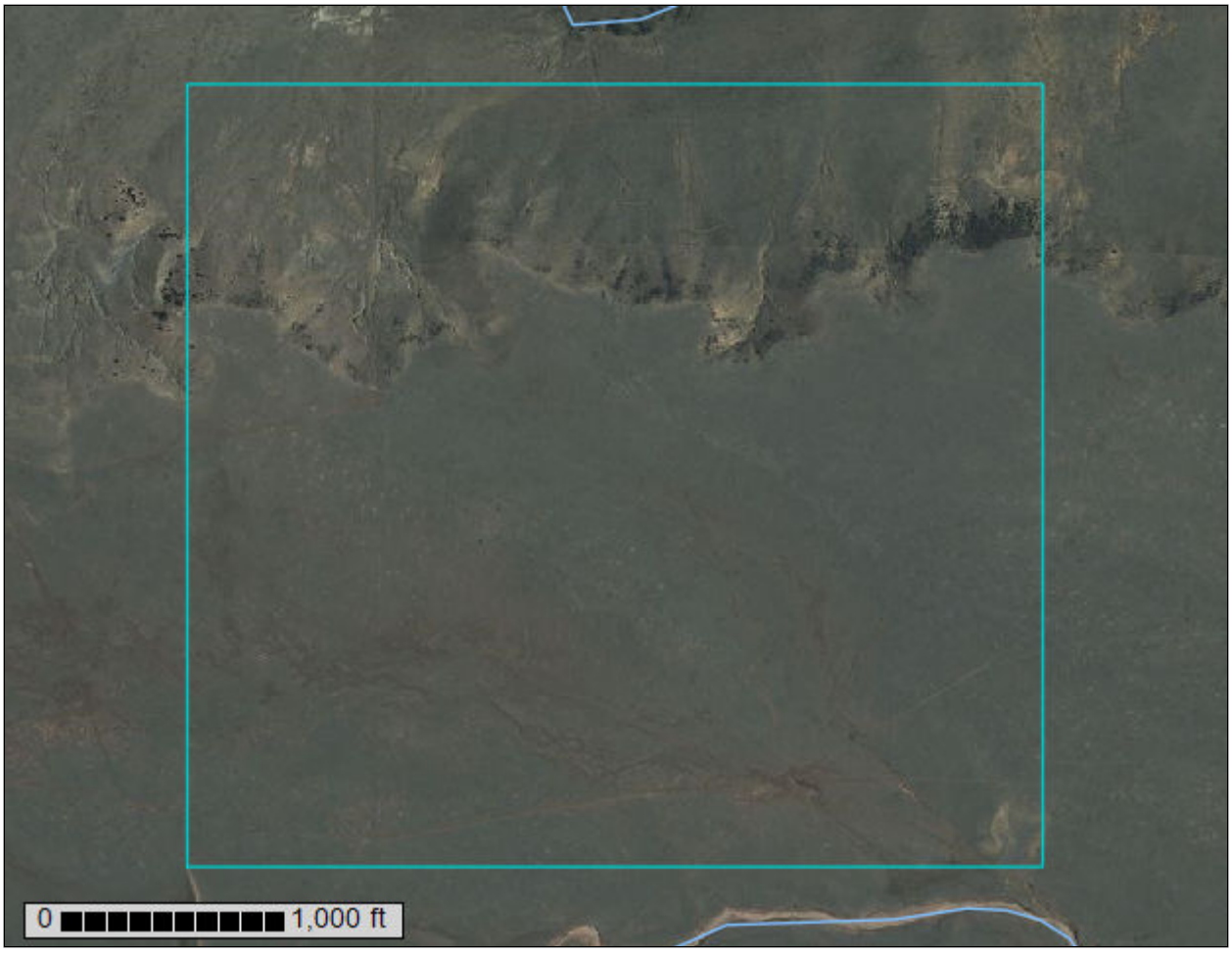
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Huerfano County Area, Colorado



April 8, 2025

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

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

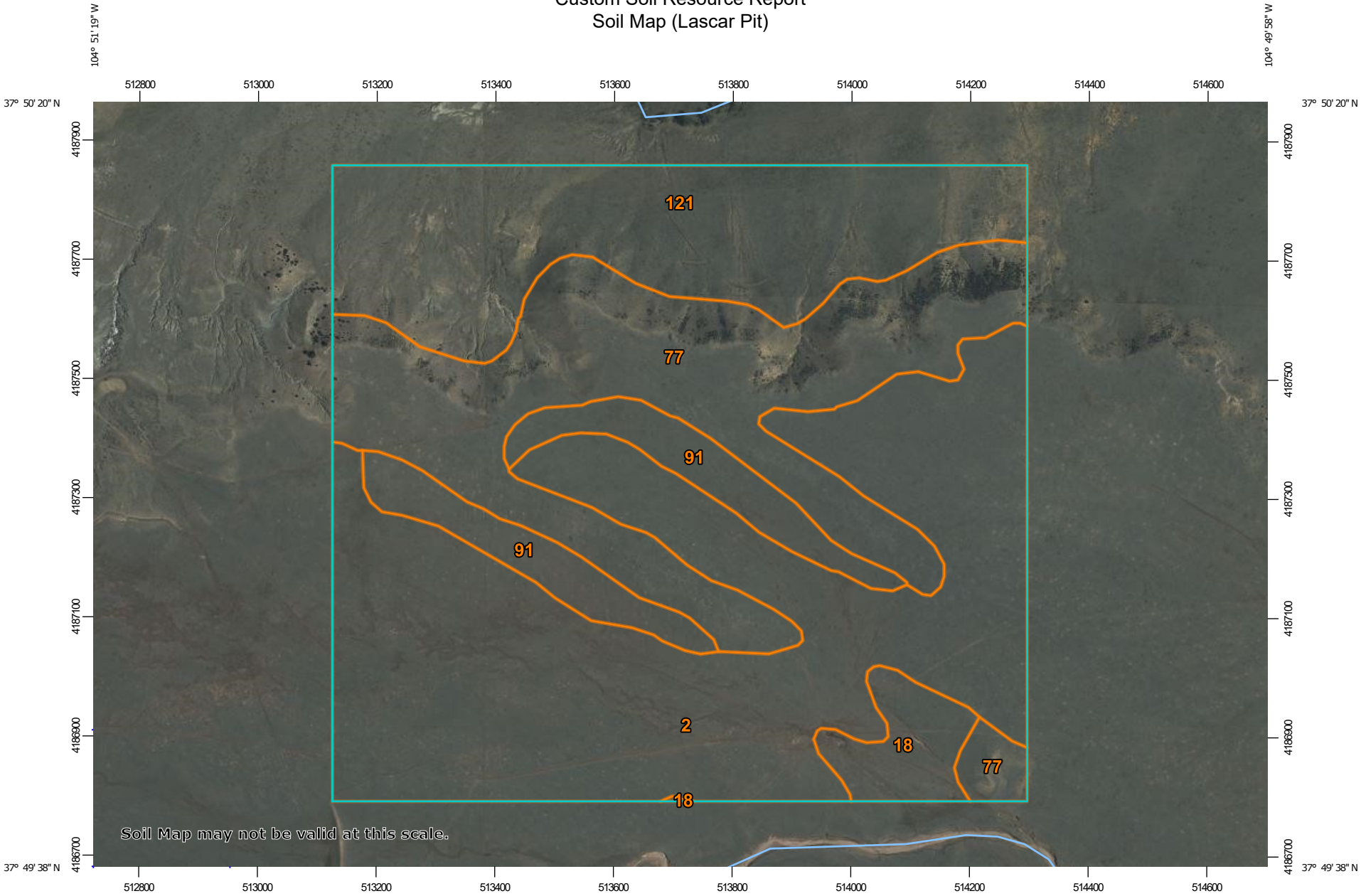
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map (Lascar Pit)



Map Scale: 1:9,050 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Huerfano County Area, Colorado
Survey Area Data: Version 21, Aug 29, 2024

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

Date(s) aerial images were photographed: Mar 31, 2020—May 18, 2020

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

Map Unit Legend (Lascar Pit)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Baca silt loam, 0 to 3 percent slopes, cool	133.2	43.0%
18	Fort Collins loam, 3 to 9 percent slopes	9.4	3.0%
77	Samsil-Chicosa complex, cool, 1 to 25 percent slopes	81.2	26.2%
91	Wiley-Kandrix complex, 1 to 6 percent slopes, cool	22.7	7.3%
121	Pierre silty clay, 2 to 5 percent slopes	63.6	20.5%
Totals for Area of Interest		**310.1**	**100.0%**

Map Unit Descriptions (Lascar Pit)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Huerfano County Area, Colorado

2—Baca silt loam, 0 to 3 percent slopes, cool

Map Unit Setting

National map unit symbol: 2rh18
Elevation: 6,000 to 6,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 140 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Baca, cool, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baca, Cool

Setting

Landform: Terraces, fans
Landform position (two-dimensional): Shoulder, summit, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from shale and siltstone

Typical profile

A - 0 to 6 inches: silt loam
Bt1 - 6 to 9 inches: silty clay loam
Bt2 - 9 to 25 inches: clay
Btk - 25 to 32 inches: silty clay loam
Bk1 - 32 to 45 inches: clay loam
Bk2 - 45 to 79 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains

Forage suitability group: Clayey (G069XW001CO)
Other vegetative classification: Loamy Plains #2 (067XY002CO_2), Clayey (G069XW001CO)
Hydric soil rating: No

Minor Components

Manzanst, cool
Percent of map unit: 5 percent
Landform: Closed depressions, fans
Landform position (two-dimensional): Toeslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY042CO - Clayey Plains
Other vegetative classification: Clayey (G069XW001CO)
Hydric soil rating: No

Wiley, cool
Percent of map unit: 5 percent
Landform: Fans
Landform position (two-dimensional): Shoulder
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Other vegetative classification: Loamy Plains #2 (067XY002CO_2), Loamy (G069XW017CO)
Hydric soil rating: No

18—Fort Collins loam, 3 to 9 percent slopes

Map Unit Setting
National map unit symbol: 2w4nz
Elevation: 5,650 to 6,790 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition
Fort collins and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Collins

Setting
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Old alluvium

Typical profile

A - 0 to 4 inches: loam
Bt - 4 to 19 inches: clay loam
Bk1 - 19 to 23 inches: clay loam
Bk2 - 23 to 79 inches: loam

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains
Hydric soil rating: No

Minor Components

Baca

Percent of map unit: 10 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Hydric soil rating: No

Olnest

Percent of map unit: 5 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY026CO - Sandy Plains
Hydric soil rating: No

77—Samsil-Chicosa complex, cool, 1 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2t512

Elevation: 5,400 to 6,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Samsil, cool, and similar soils: 50 percent
Chicosa and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Samsil, Cool

Setting

Landform: Fan remnants, pediments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 4 inches: clay loam
AC - 4 to 10 inches: clay
C - 10 to 18 inches: clay
Cr - 18 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 25 percent
Depth to restrictive feature: 13 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Gypsum, maximum content: 10 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R069XY046CO - Shaly Plains
Hydric soil rating: No

Description of Chicosa

Setting

Landform: Terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Old alluvium

Typical profile

A - 0 to 6 inches: gravelly loam
Bw - 6 to 20 inches: very gravelly loam
Bk - 20 to 37 inches: extremely gravelly sandy loam
C - 37 to 79 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 1 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.71 to 2.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Very slightly saline (2.0 to 3.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R069XY064CO - Gravel Breaks
Hydric soil rating: No

Minor Components

Baca, cool

Percent of map unit: 5 percent
Landform: Hillslopes, swales
Landform position (two-dimensional): Summit, footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Hydric soil rating: No

Kandrix, cool

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R069XY006CO - Loamy Plains
Hydric soil rating: No

91—Wiley-Kandrix complex, 1 to 6 percent slopes, cool

Map Unit Setting

National map unit symbol: 2t50r
Elevation: 6,000 to 6,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 145 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wiley, cool, and similar soils: 50 percent
Kandrix, cool, and similar soils: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wiley, Cool

Setting

Landform: Fans, interfluves
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and/or alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: silt loam
Bt - 6 to 11 inches: silty clay loam
Btk - 11 to 29 inches: silty clay loam
Bk1 - 29 to 43 inches: silt loam
Bk2 - 43 to 79 inches: silt loam

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains
Forage suitability group: Loamy (G069XW017CO)
Other vegetative classification: Loamy Plains #6 (069XY006CO_2), Loamy (G069XW017CO)
Hydric soil rating: No

Description of Kandrix, Cool

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loam
Bw - 6 to 19 inches: loam
Bk1 - 19 to 24 inches: clay loam
Bk2 - 24 to 50 inches: loam
Bk3 - 50 to 79 inches: loam

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.1 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R069XY006CO - Loamy Plains
Forage suitability group: Loamy (G069XW017CO)
Other vegetative classification: Loamy Plains #6 (069XY006CO_2), Loamy (G069XW017CO)
Hydric soil rating: No

Minor Components

Travessilla

Percent of map unit: 3 percent

Landform: Scarps
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R069XY053CO - Sandstone Breaks
Other vegetative classification: Sandstone Breaks #53 (069XY053CO_2), Needs Field Review (G069XW050CO)
Hydric soil rating: No

Chicosa

Percent of map unit: 2 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R069XY064CO - Gravel Breaks
Other vegetative classification: Loamy, Dry (G069XW019CO)
Hydric soil rating: No

121—Pierre silty clay, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t52b
Elevation: 5,400 to 6,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 140 days

Map Unit Composition

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

Description of Pierre

Setting

Landform: Pediments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 6 inches: silty clay
Bk - 6 to 25 inches: clay
Bky - 25 to 33 inches: clay
Cr - 33 to 79 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.5 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R069XY042CO - Clayey Plains
Forage suitability group: Needs Field Review (G069XW050CO)
Other vegetative classification: Needs Field Review (G069XW050CO)
Hydric soil rating: No

Minor Components

Samsil

Percent of map unit: 10 percent
Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R069XY046CO - Shaly Plains
Hydric soil rating: No

Manzanst

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY042CO - Clayey Plains
Other vegetative classification: Loamy Plains #6 (069XY006CO_2), Clayey (G069XW001CO)
Hydric soil rating: No

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