

STATE OF
COLORADO

Renfro - DNR, Joel <joel.renfro@state.co.us>

TR-03 Adequacy Comments

Renfro - DNR, Joel <joel.renfro@state.co.us>
To: Jason McGraw <jason.mcgraw@generalshale.com>

Thu, Dec 28, 2023 at 11:55 AM

Hi Jason,

After reviewing your adequacy response to me, I have an updated cost estimation which is attached to this email. Please review it and provide any comments you have so we can make changes as needed. I have not yet approved TR-03 just in case you want to make any changes to affect the total bond. If everything looks okay, let me know and I will approve the TR and we can move on to the Surety Increase process. Just a reminder, the decision date is on January 3, 2024. I know you're on vacation right now and may need extra time to review, so please send me an extension request if you think you'll require more time.

Thanks again for your cooperation through this process, we're almost at the finish line.

Best,

Joel

[Quoted text hidden]



Navajo Tr-03 Cost Estimate.pdf
700K

COST SUMMARY WORK

Task description: Cost Estimate Updated for TR-03

Site: Navajo Clay Pit

Permit Action: TR-03

Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 000

State: Colorado

Abbreviation: None

Date: 11/29/2023

County: Elbert

Filename: M004-000

User: JR2

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Backfill pit with overburden	DOZER	2	29.68	\$25,325
002	Push check dam bricks into pit	DOZER	1	1.03	\$440
003	Haul and fill pit with remaining scrap brick	SCRAPER1	1	0.65	\$1,097
004	Cut and fill remaining highwalls to 3H:1V	DOZER	1	46.13	\$19,679
005	Scrape overburden from stockpile pad and fill pit	SCRAPER1	1	22.48	\$37,912
006	Rip compacted areas	RIPPER	1	20.44	\$9,162
007	Retopsoil pit area	SCRAPER1	1	10.44	\$17,599
008	Retopsoil stockpile area	SCRAPER1	1	5.57	\$9,387
009	Retopsoil access road	SCRAPER1	1	5.75	\$6,573
010	Revegetate 25 acres	REVEGE	1	25.00	\$53,294
011	Mobilization/demobilization of equipment	MOBILIZE	1	8.20	\$17,111
<u>SUBTOTALS:</u>				175.37	\$197,579

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance: 2.02
 Performance bond: 1.05
 Job superintendent: 87.68
 Profit: 10.00

Total = \$3,991
 Total = \$2,075
 Total = \$5,706
 Total = \$19,758

TOTAL O & P = \$31,530

CONTRACT AMOUNT (direct + O & P) = \$229,109

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs): \$500
 Engineering work and/or contract/bid preparation: 0.00
 Reclamation management and/or administration: 5.00

Total = \$500
 Total = \$0
\$11,455

CONTINGENCY: 0.00

Total = \$0

TOTAL INDIRECT COST = \$43,485

TOTAL BOND AMOUNT (direct + indirect) = \$241,064

BULLDOZER WORK

Task description: Backfill pit with overburden

Site: Navajo Clay Pit Permit Action: TR-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 001 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-001
 User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: \$426.60
 Total Fleet Cost/Hour: \$853.20

MATERIAL QUANTITIES

Initial Volume: 24,200
 Swell factor: 1.125
 Loose volume: 27,225 LCY

Source of estimated volume: 1.5ac pit x 10ft
 Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Average push distance: 150 feet
 Unadjusted hourly production: 634.3 LCY/hr

Materials consistency description: Consolidated stockpile 1.0

Average push gradient: -5 %
 Average site altitude: 6,150 feet

Material weight: 2,650 lbs/LCY

Weight description: Decomposed rock - 25% Rock, 75% Earth

Job Condition Correction Factor

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.000	(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:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.868	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.7230

Adjusted unit production: 458.60 LCY/hr

Adjusted fleet production: **917.2 LCY/hr**

JOB TIME AND COST

Fleet size: 2 Dozer(s)

Unit cost: \$0.930/LCY

Total job time: **29.68 Hours**

Total job cost: **\$25,325**

BULLDOZER WORKTask description: Push check dam bricks into pitSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 002State: ColoradoAbbreviation: NoneDate: 12/22/2023County: ElbertFilename: M004-002User: JR2Agency or organization name: DRMS**HOURLY EQUIPMENT COST**Basic Machine: Cat D8T - 8SUHorsepower: 310Blade Type: Semi-UniversalAttachment: NAShift Basis: 1 per dayData Source: (CRG)**Cost Breakdown:**

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: \$426.60Total Fleet Cost/Hour: \$426.60**MATERIAL QUANTITIES**Initial Volume: 231Swell factor: 1.000Loose volume: 231 LCYSource of estimated volume: Estimated 25 check dams + additional 25% volume of OBSource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Average push distance: 200 feetUnadjusted hourly production: 491.9 LCY/hrMaterials consistency description: Rock, avg. ripped or blasted 0.7Average push gradient: -5 %Average site altitude: 6,150 feetMaterial weight: 2,950 lbs/LCYWeight description: Slag - broken**Job Condition Correction Factor**

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	0.700	(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:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.780	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4548

Adjusted unit production: 223.72 LCY/hr

Adjusted fleet production: 223.72 LCY/hr

JOB TIME AND COST

Fleet size: 1 Dozer(s)

Unit cost: \$1.907/LCY

Total job time: 1.03 Hours

Total job cost: \$440

SCRAPER TEAM WORK

Task description: Haul and fill pit with remaining scrap brick

Site: Navajo Clay Pit Permit Action: Tr-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 003 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-003
 User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-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	50	NA	50	50
Ownership cost/hour:	\$230.18	NA	\$241.38	NA	\$149.33	\$11.35
Operating cost/hour:	\$281.21	NA	\$71.96	NA	\$46.40	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$542.29	NA	\$354.64	NA	\$224.28	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,084.58		Support: \$354.64		Maint: \$247.09	

Total work team cost/hour: \$1,686.31

MATERIAL QUANTITIES

Initial volume: 500 CCY Swell factor: 1.000
 Loose volume: 500 LCY

Source of estimated volume: Operator will import 500 cy of scrap brick for pit backfill
 Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

		Scraper Bowl (volume) Basis:	
Material weight:	<u>2,950 lbs/LCY</u>	Struck Volume:	<u>15.70</u> LCY
Material description:	<u>Slag - broken</u>	Heaped Volume:	<u>22.00</u> LCY
Rated Payload:	<u>52,800 pounds</u>	Average Volume:	<u>18.85</u> LCY
Payload Capacity:	<u>17.90 LCY</u>	Adjusted Capacity:	<u>17.90</u> LCY

Cycle Time:

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

Job Condition Correction:

Site Altitude: 6150 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: Rutted dirt, little maintenance, no water, 2" tire penetration 5.0

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	5.00	5.00	10.00	1068	0.69

Haul Time: 0.69 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	-5.00	5.00	0.00	2921	0.33

Return Time: 0.33 minutes

Total Scraper team cycle time: 2.32 minutes
 Adjusted for job conditions: 384.20 LCY/Hour
 Selected Number of Scrapers: 2 Scraper(s)
 Adjusted single scraper team (unit) hourly production: 768.39 LCY/Hour
 Adjusted multiple scraper team (fleet) hourly production: 768.39 LCY/Hour

Unadjusted unit production/hour: 462.89 LCY/Hour
 Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: 0.65 Hours
 Unit cost: \$2.195 /LCY Total job cost: \$1,097

BULLDOZER WORK

Task description: **Cut and fill remaining highwalls to 3H:1V**

Site: **Navajo Clay Pit** Permit Action: **TR-03** Permit/Job#: **M1993004**

PROJECT IDENTIFICATION

Task #: 004 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-004
 User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		<u>Utilization %</u>
Ownership Cost/Hour:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper own. Cost/Hour:	\$0.00	NA
Ripper op. Cost/Hour:	\$0.00	0
Operator Cost/Hour:	\$41.30	NA

Total unit Cost/Hour: \$426.60
 Total Fleet Cost/Hour: **\$426.60**

MATERIAL QUANTITIES

Initial Volume: 14,583
 Swell factor: 1.125
 Loose volume: **16,406 LCY**

Source of estimated volume: 1,740 ft L x 30 ft H, 1H:1V to 3H:1V Slopes
 Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Average push distance: 200 feet
 Unadjusted hourly production: 491.9 LCY/hr

Materials consistency description: Consolidated stockpile 1.0

Average push gradient: -5 %
 Average site altitude: 6,150 feet

Material weight: 2,650 lbs/LCY

Weight description: Decomposed rock - 25% Rock, 75% Earth

Job Condition Correction Factor

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.000	(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:	1.115	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	0.868	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.7230

Adjusted unit production: 355.64 LCY/hr

Adjusted fleet production: **355.64 LCY/hr**

JOB TIME AND COST

Fleet size: 1 Dozer(s)

Unit cost: \$1.200/LCY

Total job time: **46.13 Hours**

Total job cost: **\$19,679**

SCRAPER TEAM WORK

Task description: Scrape overburden from stockpile pad and fill pit

Site: Navajo Clay Pit Permit Action: Tr-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 005 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-005
 User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-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	50	NA	50	50
Ownership cost/hour:	\$230.18	NA	\$241.38	NA	\$149.33	\$11.35
Operating cost/hour:	\$281.21	NA	\$71.96	NA	\$46.40	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$542.29	NA	\$354.64	NA	\$224.28	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,084.58		Support: \$354.64		Maint: \$247.09	

Total work team cost/hour: \$1,686.31

MATERIAL QUANTITIES

Initial volume: 16,456 CCY Swell factor: 1.125
 Loose volume: 18,513 LCY

Source of estimated volume: 3.4 ac area x 3 ft depth
 Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

Scraper Bowl (volume) Basis:

Material weight: 2,650 lbs/LCY Struck Volume: 15.70 LCY
 Material description: Decomposed rock - 25% Rock, Heaped Volume: 22.00 LCY
75% Earth
 Rated Payload: 52,800 pounds Average Volume: 18.85 LCY
 Payload Capacity: 19.92 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: 6150 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	800.00	5.00	3.00	8.00	1381	0.64

Haul Time: 0.64 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	800.00	-5.00	3.00	-2.00	2938	0.34

Return Time: 0.34 minutes

Total Scraper team cycle time: 2.28 minutes

Adjusted for job conditions: 411.72 LCY/Hour

Selected Number of Scrapers: 2 Scraper(s)

Adjusted single scraper team (unit) hourly production: 823.45 LCY/Hour

Adjusted multiple scraper team (fleet) hourly production: 823.45 LCY/Hour

Unadjusted unit production/hour: 496.05 LCY/Hour

Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COST

Fleet size: 1 Team(s)

Total job time: 22.48 Hours

Unit cost: \$2.048 /LCY

Total job cost: \$37,912

BULLDOZER RIPPING WORK

Task description: Rip compacted areas

Site: Navajo Clay Pit Permit Action: TR-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 006 State: Colorado Abbreviation: None
Date: 12/22/2023 County: Elbert Filename: M004-006
User: JR2

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:	\$241.38	NA
Operating Cost/Hour:	\$143.92	100
Ripper Ownership Cost/Hour:	\$14.11	NA
Ripper Operating Cost/Hour:	\$7.45	100
Operator Cost/Hour:	\$41.30	NA
Total Unit Cost/Hour:	\$448.16	
Total Fleet Cost/Hour:	\$448.16	

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic: NA Bank Volume: NA BCY NA
Area: 13.70 acres Rip Depth (ft): 1.50 Volume: 33,154 BCY or CCY

Source of estimated quantity: 16 ac total disturbance - 2 ac pit floor - 0.3 ac pond

HOURLY PRODUCTION

Seismic:

Seismic Velocity: NA feet/second

Area:

Average Ripping Depth: 2.56 feet/pass
Average Ripping Width: 7.08 feet/pass
Average Ripping Length: 350.00 feet/pass
Average Dozer Speed: 88.00 feet/minute
Average Maneuver Time: 0.25 minutes/pass
Production per unit area: 0.807 acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production: 0.807 Acres/hr
Site Altitude: 6,150 feet
Altitude Adj: 1.00 (CAT HB)
Job Efficiency: 0.83 (1 shift/day)
Net Correction: 0.83 multiplier

Adjusted Hourly Unit Production: 0.67 Acres/hr
Adjusted Hourly Fleet Production: 0.67 Acres/hr

JOB TIME AND COST

Fleet size: 1 Grader(s) Total job time: 20.44 Hours
Unit cost: \$668.730 Per acre Total job cost: \$9,162

SCRAPER TEAM WORK

Task description: Retopsoil pit area

Site: Navajo Clay Pit

Permit Action: Tr-03

Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 007

State: Colorado

Abbreviation: None

Date: 12/22/2023

County: Elbert

Filename: M004-007

User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-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	50	NA	50	50
Ownership cost/hour:	\$230.18	NA	\$241.38	NA	\$149.33	\$11.35
Operating cost/hour:	\$281.21	NA	\$71.96	NA	\$46.40	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$542.29	NA	\$354.64	NA	\$224.28	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work: \$1,084.58		Support: \$354.64		Maint: \$247.09	

Total work team cost/hour: \$1,686.31

MATERIAL QUANTITIES

Initial volume: 6,776

CCY

Swell factor: 1.215

Loose volume: 8,233

LCY

Source of estimated volume: Pit area = 6.3 ac x 8 in depth

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: 6150 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	900.00	5.00	3.00	8.00	1381	0.70

Haul Time: 0.70 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	900.00	-5.00	3.00	-2.00	2938	0.38

Return Time: 0.38 minutes

Total Scraper team cycle time: 2.38 minutes
 Adjusted for job conditions: 394.42 LCY/Hour
 Selected Number of Scrapers: 2 Scraper(s)
 Adjusted single scraper team (unit) hourly production: 788.85 LCY/Hour
 Adjusted multiple scraper team (fleet) hourly production: 788.85 LCY/Hour

Unadjusted unit production/hour: 475.21 LCY/Hour
 Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: 10.44 Hours
 Unit cost: \$2.138 /LCY Total job cost: \$17,599

SCRAPER TEAM WORK

Task description: Retopsoil stockpile area

Site: Navajo Clay Pit Permit Action: Tr-03 Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 008 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-008
 User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-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	50	NA	50	50
Ownership cost/hour:	\$230.18	NA	\$241.38	NA	\$149.33	\$11.35
Operating cost/hour:	\$281.21	NA	\$71.96	NA	\$46.40	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$542.29	NA	\$354.64	NA	\$224.28	\$22.81
Number of Units:	2	0	1	0	1	1
Group Subtotals:	Work:	\$1,084.58	Support:	\$354.64	Maint:	\$247.09

Total work team cost/hour: \$1,686.31

MATERIAL QUANTITIES

Initial volume: 5,001 CCY Swell factor: 1.215
 Loose volume: 6,076 LCY

Source of estimated volume: Stockpile area = (6.5 ac - 0.3 ac pond) x 6 in depth
 Source of estimated swell factor: Cat Handbook

HOURLY PRODUCTION

	<u>Scraper Bowl (volume) Basis:</u>	
Material weight: <u>1,600 lbs/LCY</u>	Struck Volume: <u>15.70</u>	LCY
Material description: <u>Top Soil</u>	Heaped Volume: <u>22.00</u>	LCY
Rated Payload: <u>52,800 pounds</u>	Average Volume: <u>18.85</u>	LCY
Payload Capacity: <u>33.00 LCY</u>	Adjusted Capacity: <u>18.85</u>	LCY

Cycle Time:

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

Job Condition Correction:

Site Altitude: 6150 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	200.00	1.00	3.00	4.00	2665	0.25

Haul Time: 0.25 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	-1.00	3.00	2.00	2905	0.17

Return Time: 0.17 minutes

Total Scraper team cycle time: 1.72 minutes
 Adjusted for job conditions: 545.77 LCY/Hour
 Selected Number of Scrapers: 2 Scraper(s)
 Adjusted single scraper team (unit) hourly production: 1,091.55 LCY/Hour
 Adjusted multiple scraper team (fleet) hourly production: 1,091.55 LCY/Hour

Unadjusted unit production/hour: 657.56 LCY/Hour
 Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: 5.57 Hours
 Unit cost: \$1.545 /LCY Total job cost: \$9,387

SCRAPER TEAM WORK

Task description: Retopsoil access road

Site: Navajo Clay Pit

Permit Action: Tr-03

Permit/Job#: M1993004

PROJECT IDENTIFICATION

Task #: 009

State: Colorado

Abbreviation: None

Date: 12/22/2023

County: Elbert

Filename: M004-009

User: JR2

Agency or organization name: DRMS

HOURLY EQUIPMENT

COSTShift basis: 1 per day

	Equipment Description
-Scraper:	Cat 627G
-Dozer:	NA
Support Equipment -Load Area:	Cat D8T - 8SU
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-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	50	NA	50	50
Ownership cost/hour:	\$230.18	NA	\$241.38	NA	\$149.33	\$11.35
Operating cost/hour:	\$281.21	NA	\$71.96	NA	\$46.40	\$11.46
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	NA	\$0.00	NA	\$0.00	\$0.00
Operator cost/hour:	\$30.90	NA	\$41.30	NA	\$28.56	\$0.00
Unit Subtotals:	\$542.29	NA	\$354.64	NA	\$224.28	\$22.81
Number of Units:	1	0	1	0	1	1
Group Subtotals:	Work: \$542.29		Support: \$354.64		Maint: \$224.28	\$22.81

Total work team cost/hour: \$1,144.02

MATERIAL QUANTITIES

Initial volume: 2,581

CCY

Swell factor: 1.215

Loose volume: 3,136

LCY

Source of estimated volume: Access road = 3.2 ac x 6 in depth

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: 6150 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	200.00	1.00	3.00	4.00	2665	0.25

Haul Time: 0.25 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	200.00	-1.00	3.00	2.00	2905	0.17

Return Time: 0.17 minutes

Total Scraper team cycle time: 1.72 minutes
 Adjusted for job conditions: 545.77 LCY/Hour
 Selected Number of Scrapers: 1 Scraper(s)
 Adjusted single scraper team (unit) hourly production: 545.77 LCY/Hour
 Adjusted multiple scraper team (fleet) hourly production: 545.77 LCY/Hour

Unadjusted unit production/hour: 657.56 LCY/Hour
 Optimal Number of Scrapers per push dozer: _____

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: 5.75 Hours
 Unit cost: \$2.096 /LCY Total job cost: \$6,573

REVEGETATION WORKTask description: Revegetate 25 acresSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**Task #: 010State: ColoradoAbbreviation: NoneDate: 12/22/2023County: ElbertFilename: M004-010User: JR2Agency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Potassium nitrate, 13-46-0	307.00	pound	\$0.68	\$208.76
			Total Fertilizer Materials Cost/Acre	\$208.76

Application

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	\$41.82
Total Fertilizer Application Cost/Acre	
	\$41.82

TILLING

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	\$112.82
Weed control spraying (MEANS 31 31 16.13 3100)	\$338.80
Total Tilling Cost/Acre	
	\$451.62

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Switchgrass - Blackwell	1.35	12.06	\$15.53
Blue Grama - Lovington	0.30	4.90	\$4.79
Sideoats Grama - Vaughn	0.90	2.95	\$7.54
Western Wheatgrass - Arriba	3.20	8.08	\$20.80
Prairie Sandreed - Goshen	1.95	12.22	\$20.18
Totals Seed Mix		7.70	\$68.84

Application

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Description	Cost /Acre
Drill Seeding (DRMS Survey Cost)	\$232.00
Total Seed Application Cost/Acre	\$232.00

MULCHING and MISCELLANEOUS

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
Hay, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$429.79	\$859.57
Total Mulch Materials Cost/Acre				\$859.57

Application

Description	Cost /Acre
Crimping, with tractor {DMG survey data}	\$74.46
Weed spray, hand, aquatic area, annuals [DMG]	\$119.47
Total Mulch Application Cost/Acre	\$193.93

NURSERY STOCK PLANTING

Common Name	No / Acre	Type and Size	Planting Cost	Fertilizer Pellet Cost	Cost /Acre
					\$
Totals Nursery Stock Cost / Acre					\$0.00

JOB TIME AND COST

No. of Acres:	<u>25</u>	Cost /Acre:	<u>\$2,056.54</u>
Estimated Failure Rate:	<u>25%</u>	Cost /Acre*:	<u>\$300.84</u>
*Selected Replanting Work Items:	<u>SEEDING</u>		
Initial Job Cost:	<u>\$51,413.50</u>		
Reseeding Job Cost:	<u>\$1,880.25</u>		
Total Job Cost:	<u>\$53,294</u>		
Job Hours:	<u>25.00</u>		

EQUIPMENT MOBILIZATION/DEMobilIZATIONTask description: Mobilization/demobilization of equipmentSite: Navajo Clay PitPermit Action: TR-03Permit/Job#: M1993004**PROJECT IDENTIFICATION**

Task #: 011 State: Colorado Abbreviation: None
 Date: 12/22/2023 County: Elbert Filename: M004-011
 User: JR2

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:	\$20.26	\$36.04	\$47.05
Operating Cost/Hour:	\$39.51	\$76.08	\$82.85
Operator Cost/Hour:	\$22.52	\$22.52	\$22.52
Helper Cost/Hour:	\$0.00	\$23.53	\$23.53
Total Unit Cost/Hour:	\$82.29	\$158.17	\$175.95

NON ROADABLE EQUIPMENT:

Machine Description	Weight/ Unit (TONS)	Owner ship Cost/hr/ unit	Haul Rig Cost/hr/uni t	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet	DOT Permit Cost/ fleet
Cat D8T - 8SU	47.71	\$241.38	\$158.17	1	\$399.55	\$158.17	\$250.00
Cat D8T - 8SU	53.08	\$255.49	\$175.95	1	\$431.44	\$175.95	\$250.00
CAT 14M	23.57	\$149.33	\$82.29	1	\$231.62	\$82.29	\$250.00
Drill/Broadcast Seeder with Tractor	25.00	\$6.73	\$82.29	1	\$89.02	\$82.29	\$250.00
Cat 627G	41.80	\$230.18	\$158.17	2	\$776.70	\$316.34	\$500.00

Subtotals: **\$1,928.33** **\$815.04** **\$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.	\$15.83	1	\$15.83	\$15.83
Water Tanker, 2,500 Gal.	\$34.27	1	\$34.27	\$34.27

Subtotals: **\$50.10** **\$50.10**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region: AURORA
 Total one-way travel distance: 40.00 miles
 Average Travel Speed: 50.00 mph

Total Non-Roadable Mob/Demob Cost * \$17,031.04
 * * two round trips with haul rig:
 Total Roadable Mob/Demob Cost ** \$80.16
 ** one round trip, no haul rig:

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.80	0.80
Return Time (Hours):	0.80	0.80
Loading Time (Hours):	1.25	NA
Unloading Time (Hours):	1.25	NA
Subtotals:	4.10	1.60

JOB TIME AND COST

Total job time: 8.20 Hours

Total job cost: \$17,111