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

March 24, 2023

Garrett Varra
Raptor Materials LLC
8120 Gage Street
Frederick, CO 80516

Re: Two Rivers Sand, Gravel and Reservoir Project; File No. M-2022-013; 112c Permit Application; Reclamation Cost Estimate

Dear Mr. Varra:

Please find attached to this letter the Division's reclamation cost estimate for the Two Rivers Sand, Gravel and Reservoir Project. If you have any questions, please contact me at rob.zuber@state.co.us or (720) 601-2276.

Sincerely,

Robert D. Zuber, P.E.
Environmental Protection Specialist

Enclosure

Copied with enclosure: Brad Janes, RM; Kevin Jeakins, RM;
Peter Christianson, RESPEC;
Michael Cunningham, DRMS

COST SUMMARY WORK

Task description: **2023 Application Cost Summary**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 000 State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-000
User: RDZ

Agency or organization name: DRMS

TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
01a	Dewater pit - initial pumping	PUMPING	1	423.90	$50,818
01b	Dewater pit - continual pumping	PUMPING	1	488.58	$8,956
02a	Grade slope under liner	DOZER	2	23.74	$13,650
02b	Haul liner material to pit area	TRUCK1	1	272.99	$106,214
02c	Mix material for liner	DOZER	2	27.45	$15,781
02d	Compact liner	COMPACT	2	29.00	$13,814
03a	Haul subsoil from NE stockpile to pit area	TRUCK1	1	1,403.94	$546,244
03b	Compact fill above liner	COMPACT	2	37.28	$17,761
03c	Haul topsoil to pit area	TRUCK1	1	16.70	$6,497
03d	Spread topsoil on pond bank	DOZER	2	3.72	$2,138
03e	Seed banks of pond	REVEGE	1	9.00	$19,016
04a	Demo and remove concrete and conveyor	DEMOLISH	1	175.00	$37,426
05a	Rip processing area, wash pond area	RIPPER	2	21.89	$12,588
05c	Haul topsoil to process and wash pond areas	TRUCK1	1	52.75	$20,526
05d	Spread topsoil on process and wash pond areas	DOZER	2	8.44	$4,851
05e	Seed processing area and wash pond area	REVEGE	1	22.00	$47,785
06a	Mobilization and Demob.	MOBILIZE	1	0.50	$3,585
		SUBTOTALS:		**3016.88**	**$927,650**

INDIRECT COSTS

OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	$18,739
Performance bond:	1.05	Total =	$9,740
Job superintendent:	1,508.44	Total =	$113,329
Profit:	10.00	Total =	$92,765
		TOTAL O & P =	$234,573
		CONTRACT AMOUNT (direct + O & P) =	$1,162,223

LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	$500	Total =	$500
Engineering work and/or contract/bid preparation:	0.00	Total =	$0
Reclamation management and/or administration:	5.00		$58,111
CONTINGENCY:	0.00	Total =	$0

TOTAL INDIRECT COST =	$293,184
TOTAL BOND AMOUNT (direct + indirect) =	**$1,220,834**

PUMPING WORK

Task description: **Dewater pit - initial pumping**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 01A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-01a
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

	Description	Quantity
Make and Model:	Submersible pump - 460v, 8 in.	5
Attachment 1:	Suction hose - 6 in. diam., 25 ft.	5
Attachment 2:	Discharge hose - 6 in. D., 25 ft.	5
Labor Unit 1:	Pump operator	1

Horsepower: 95
Shift Basis: 1 per day
Weight: 0.70 (US Tons)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$71.90	NA
Operating Cost/Hour:	$19.75	100
Operator Cost/Hour:	$28.23	NA
Total Unit Cost/Hour:	$119.88	

Total Fleet Cost/Hour: $119.88

PUMPING QUANTITIES

Initial Pond Volume: 388,437,229.00 Conversion factor: 1.0000
Final Pond Volume: **388,437,229.00** gallons
Total Pond Inflow Surface Area: 300,000 Sq. ft. Unit inflow rate in gph/sq. ft.: 0.0000
Total Pond Inflow Volume per Hour: 0.00 gallons

Source of estimated volume: Exh L, pages 4 - 5

PUMPING TIME

Maximum Pump Capacity:	170,000	gph/pump
Estimated Suction Head:	0	feet
Estimated Discharge Head:	15	feet
Total Head:	15	feet
CPB Pump Capacity:	168,000	gph/pump
Site Altitude:	4,680	feet

Adjusted Pumping Capacity:	840,000	gph
Initial Unadjusted Pumping Time:	462.43	hours
Inflow during Initial Pumping:	0	gallons
Net Unadjusted Pumping Time:	462.43	Hours
Altitude Adjustment Factor:	1.0000	(3% rule)
Pump Efficiency Factor:	0.9167	(55 min./hr.)
Total Adjusted Pumping Time:	423.91	hours

JOB TIME AND COST

Total job time: **423.91** Hours

Unit cost: $0.000131 /Gallon Total job cost: **$50,818**

PUMPING WORK

Task description: **Dewater pit - continual pumping**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 01B State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-01b
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

	Description	Quantity
Make and Model:	Submersible pump - 460v, 8 in.	1
Attachment 1:	Suction hose - 6 in. diam., 25 ft.	1
Attachment 2:	Discharge hose - 6 in. D., 25 ft.	1
Labor Unit 1:	Pump operator	0

Horsepower: 95
Shift Basis: 1 per day
Weight: 0.70 (US Tons)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$14.38	NA
Operating Cost/Hour:	$3.95	100
Operator Cost/Hour:	$0.00	NA
Total Unit Cost/Hour:	$18.33	

Total Fleet Cost/Hour: $18.33

PUMPING QUANTITIES

Initial Pond Volume: 89,541,681.00 Conversion factor: 1.0000
Final Pond Volume: **89,541,681.00** gallons
Total Pond Inflow Surface Area: 300,000 Sq. ft. Unit inflow rate in gph/sq. ft.: 0.0000
Total Pond Inflow Volume per Hour: 0.00 gallons

Source of estimated volume: Exh L, pages 4 - 5

PUMPING TIME

Maximum Pump Capacity:	170,000	gph/pump
Estimated Suction Head:	0	feet
Estimated Discharge Head:	15	feet
Total Head:	15	feet
CPB Pump Capacity:	168,000	gph/pump
Site Altitude:	4,680	feet

Adjusted Pumping Capacity:	168,000	gph
Initial Unadjusted Pumping Time:	532.99	hours
Inflow during Initial Pumping:	0	gallons
Net Unadjusted Pumping Time:	532.99	Hours
Altitude Adjustment Factor:	1.0000	(3% rule)
Pump Efficiency Factor:	0.9167	(55 min./hr.)
Total Adjusted Pumping Time:	488.59	hours

JOB TIME AND COST

Total job time: **488.59** Hours

Unit cost: $0.000100 /Gallon Total job cost: **$8,956**

BULLDOZER WORK

Task description: **Grade slope under liner**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 02A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-02a
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$124.85	NA
Operating Cost/Hour:	$97.63	100
Ripper own. Cost/Hour:	$16.38	NA
Ripper op. Cost/Hour:	$8.60	100
Operator Cost/Hour:	$40.04	NA

Total unit Cost/Hour: $287.50
Total Fleet Cost/Hour: **$574.99**

MATERIAL QUANTITIES

Initial Volume: 26,424
Swell factor: 1.215
Loose volume: **32,105** LCY

Source of estimated volume: Calculated from 10,810 lf, 66' length, 1' deep.
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: Partly consolidated stockpile 1.1

Average push gradient: 20 %
Average site altitude: 4,680 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	1.100	(CAT HB)
Dozing method:	1.000	(GEN.)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	0.545	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.4830

Adjusted unit production: 676.20 LCY/hr

Adjusted fleet production: **1352.4** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.425/LCY

Total job time: **23.74** Hours
Total job cost: **$13,650**

TRUCK/LOADER TEAM WORK

Task description: **Haul liner material to pit area**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 02B State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-02b
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Generic 12-18 cy, 6x4
-Loader:	CAT 966H high lift
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	NA
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	NA	100
Ownership cost/hour:	$24.21	$49.15	NA	NA	NA	$14.98
Operating cost/hour:	$57.28	$43.04	NA	NA	NA	$33.32
%Utilization-riper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Ripper op. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Operator cost/hour:	$24.82	$35.97	NA	NA	NA	$0.00
Unit Subtotals:	$106.31	$128.16	NA	NA	NA	$48.30
Number of Units:	2	1	0	0	0	1
Group Subtotals:	Work:	$340.78	Support:	$0.00	Maint:	$48.30

Total work team cost/hour: **$389.08**

MATERIAL QUANTITIES

Initial volume: 112,104 CCY Swell factor: 1.000
Loose volume: **112,104** LCY

Source of estimated volume: 10,810 lf, 4’ deep, 66’ slope length, and 4’x4’ keyway
Source of estimated swell factor: Cat Handbook
Material Purchase Cost: $0.00
Total Cost: $0.00

HOURLY PRODUCTION

Truck Capacity:

Truck Payload (weight) Basis:

Material weight: 1,600 Pounds/LCY
Description: Top Soil
Rated Payload: 50,300 Pounds

Payload Capacity: 31.44 LCY

Truck Bed (volume) Basis:

Struck Volume:	12.00	LCY
Heaped Volume:	18.00	LCY
Average Volume:	15.00	LCY
Adjusted Volume:	18.00	LCY

Final Truck Volume Based on Number of Loader Passes: **15.75** LCY

Loading Tool Capacity

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.050	Other - moist loam (100-110%) 1.050
Adjusted Capacity:	**5.250**	LCY

Job Condition Corrections: Site Altitude (ft.): 4680 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	**0.830**	**0.830**	

Loading Tool Cycle Time: Number of Loading Tool Passes Required to Fill Truck: 3 passes

Excavators and Front Shovels:

Machine Cycle Time vs. Job Condition Rating: NA
Selected Value within this Basic Rating: NA

Track Loaders – Material Description:

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Stockpile:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Dump Target:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
	Net Cycle Time Adjustment:	0.000	minutes
	Adjusted Loader Cycle Time:	**0.500**	minutes
	Net Load Time per Truck:	**1.100**	minutes

Truck Cycle Time:

Truck Exchange Time:	0.50	Minutes	Adjusted for site altitude:	0.500	Minutes
Truck Load Time:	1.100	Minutes	Adjusted for site altitude:	1.100	Minutes
Truck Maneuver and Dump Time:	0.90	Minutes	Adjusted for site altitude:	0.900	Minutes

Truck Travel (Haul & Return) 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	1600.00	0.00	3.00	3.00	2824	0.728

Haul Time: **0.728** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1600.00	0.00	3.00	3.00	2874	0.592

Return Time: **0.592** minutes
Total Truck Cycle Time: **3.820** minutes

Loading Tool unit Production 590.63 LCY/Hour Adjusted for job efficiency: 490.22 LCY/Hour
Truck Unit Production 247.38 LCY/Hour Adjusted for job efficiency: 205.33 LCY/Hour

Optimal No. of Trucks: 2 Truck(s) Selected Number of Trucks: 2 Truck(s)

Adjusted hourly truck team production: 410.65 LCY/Hour
Adjusted single truck/loader team production: 410.65 LCY/Hour
Adjusted multiple truck/loader team production: **410.65** LCY/Hour

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **272.99** Hours

Unit cost: $0.947 /LCY Total job cost: **$106,214**

BULLDOZER WORK

Task description: **Mix material for liner**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 02C State: Colorado Abbreviation: None
Date: 2/28/2023 County: Weld Filename: M013-02c
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$124.85	NA
Operating Cost/Hour:	$97.63	100
Ripper own. Cost/Hour:	$16.38	NA
Ripper op. Cost/Hour:	$8.60	100
Operator Cost/Hour:	$40.04	NA

Total unit Cost/Hour: $287.50
Total Fleet Cost/Hour: **$574.99**

MATERIAL QUANTITIES

Initial Volume: 56,052
Swell factor: 1.215
Loose volume: **68,103** LCY

Source of estimated volume: Assumed half the volume of liner material.
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: Partly consolidated stockpile 1.1

Average push gradient: 0 %
Average site altitude: 4,680 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	1.100	(CAT HB)
Dozing method:	1.000	(GEN.)
Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8862

Adjusted unit production: 1,240.68 LCY/hr

Adjusted fleet production: **2481.36** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.232/LCY

Total job time: **27.45** Hours
Total job cost: **$15,781**

COMPACTION WORK

Task description: **Compact liner**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 02D State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-02d
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine: CAT 815F Horsepower: 240
Compactor Type: Soil - tamping foot Shift Basis: 1 per day
Data Source: (CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$110.46	NA
Operating Cost/Hour:	$96.20	100
Operator Cost/Hour:	$31.50	NA
Total Unit Cost/Hour:	$238.16	
Total Fleet Cost/Hour:	**$476.33**	

MATERIAL QUANTITIES

Loose volume: 112,104 LCY Shrinkage factor: 0.910
Compacted volume: **102,015** CCY

Source of estimated volume: Same as hauled quantity.
Source of estimated shrinkage factor: Cat Handbook

HOURLY PRODUCTION

Unadjusted hourly production = (W x S x L x C) / P

Compacted width per pass (W):	6.50	feet
Average Compactor Speed (S):	8.00	mph
Compacted thickness of each lift (L):	10.00	inches
Conversion Constant (C):	16.3	(5,280ft./12in./27cu.ft.)
Required number of machine passes (P):	4	passes
Unadjusted Hourly Unit Production:	2,119.00	CCY/hour

Job Condition Correction Factors Site Altitude: 4,680 feet

		Source
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.8300	multiplier

Adjusted Hourly Unit Production: 1,758.77 CCY/Hour
Adjusted Hourly Fleet Production: **3,517.54** CCY/Hour

JOB TIME AND COST

Fleet size: 2 Compactor(s) Total job time: **29.00** Hours

Unit cost: $0.135 per CCY Total job cost: **$13,814**

TRUCK/LOADER TEAM WORK

Task description: **Haul subsoil from NE stockpile to pit area**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 03A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-03a
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Generic 12-18 cy, 6x4
-Loader:	CAT 966H high lift
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	NA
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	NA	100
Ownership cost/hour:	$24.21	$49.15	NA	NA	NA	$14.98
Operating cost/hour:	$57.28	$43.04	NA	NA	NA	$33.32
%Utilization-riper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Ripper op. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Operator cost/hour:	$24.82	$35.97	NA	NA	NA	$0.00
Unit Subtotals:	$106.31	$128.16	NA	NA	NA	$48.30
Number of Units:	2	1	0	0	0	1
Group Subtotals:	Work:	$340.78	Support:	$0.00	Maint:	$48.30

Total work team cost/hour: **$389.08**

MATERIAL QUANTITIES

Initial volume: 576,533 CCY Swell factor: 1.000
Loose volume: **576,533** LCY

Source of estimated volume: 10,810 lf, x-section is 1,440 sq ft
Source of estimated swell factor: Cat Handbook
Material Purchase Cost: $0.00
Total Cost: $0.00

HOURLY PRODUCTION

Truck Capacity:

Truck Payload (weight) Basis:

Material weight: 1,600 Pounds/LCY
Description: Top Soil
Rated Payload: 50,300 Pounds

Payload Capacity: 31.44 LCY

Truck Bed (volume) Basis:

Struck Volume:	12.00	LCY
Heaped Volume:	18.00	LCY
Average Volume:	15.00	LCY
Adjusted Volume:	18.00	LCY

Final Truck Volume Based on Number of Loader Passes: **15.75** LCY

Loading Tool Capacity

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.050	Other - moist loam (100-110%) 1.050
Adjusted Capacity:	**5.250**	LCY

Job Condition Corrections: Site Altitude (ft.): 4680 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	**0.830**	**0.830**	

Loading Tool Cycle Time: Number of Loading Tool Passes Required to Fill Truck: 3 passes

Excavators and Front Shovels:

Machine Cycle Time vs. Job Condition Rating: NA
Selected Value within this Basic Rating: NA

Track Loaders – Material Description:

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Stockpile:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Dump Target:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
	Net Cycle Time Adjustment:	0.000	minutes
	Adjusted Loader Cycle Time:	**0.500**	minutes
	Net Load Time per Truck:	**1.100**	minutes

Truck Cycle Time:

Truck Exchange Time:	0.50	Minutes	Adjusted for site altitude:	0.500	Minutes
Truck Load Time:	1.100	Minutes	Adjusted for site altitude:	1.100	Minutes
Truck Maneuver and Dump Time:	0.90	Minutes	Adjusted for site altitude:	0.900	Minutes

Truck Travel (Haul & Return) 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	1600.00	0.00	3.00	3.00	2824	0.728

Haul Time: **0.728** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1600.00	0.00	3.00	3.00	2874	0.592

Return Time: **0.592** minutes
Total Truck Cycle Time: **3.820** minutes

Loading Tool unit Production 590.63 LCY/Hour Adjusted for job efficiency: 490.22 LCY/Hour
Truck Unit Production 247.38 LCY/Hour Adjusted for job efficiency: 205.33 LCY/Hour

Optimal No. of Trucks: 2 Truck(s) Selected Number of Trucks: 2 Truck(s)

Adjusted hourly truck team production: 410.65 LCY/Hour
Adjusted single truck/loader team production: 410.65 LCY/Hour
Adjusted multiple truck/loader team production: **410.65** LCY/Hour

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **1,403.94** Hours

Unit cost: $0.947 /LCY Total job cost: **$546,244**

COMPACTION WORK

Task description: **Compact fill above liner**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #:	03B	State:	Colorado	Abbreviation:	None
Date:	2/15/2023	County:	Weld	Filename:	M013-03b
User:	RDZ				

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Basic Machine:	CAT 815F	Horsepower:	240
Compactor Type:	Soil - tamping foot	Shift Basis:	1 per day
		Data Source:	(CRG)

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$110.46	NA
Operating Cost/Hour:	$96.20	100
Operator Cost/Hour:	$31.50	NA
Total Unit Cost/Hour:	$238.16	
Total Fleet Cost/Hour:	**$476.33**	

MATERIAL QUANTITIES

Loose volume:	576,533	LCY	Shrinkage factor:	0.910
Compacted volume:	**524,645**	CCY		

Source of estimated volume: Same as hauled quantity.
Source of estimated shrinkage factor: Cat Handbook

HOURLY PRODUCTION

Unadjusted hourly production = (W x S x L x C) / P

Compacted width per pass (W):	6.50	feet
Average Compactor Speed (S):	8.00	mph
Compacted thickness of each lift (L):	10.00	inches
Conversion Constant (C):	16.3	(5,280ft./12in./27cu.ft.)
Required number of machine passes (P):	1	passes
Unadjusted Hourly Unit Production:	8,476.00	CCY/hour

Job Condition Correction Factors — Site Altitude: 4,680 feet

		Source
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.8300	multiplier

Adjusted Hourly Unit Production:	7,035.08	CCY/Hour
Adjusted Hourly Fleet Production:	**14,070.16**	CCY/Hour

JOB TIME AND COST

Fleet size:	2	Compactor(s)	Total job time:	**37.29**	Hours
Unit cost:	$0.034	per CCY	Total job cost:	**$17,761**	

TRUCK/LOADER TEAM WORK

Task description: **Haul topsoil to pit area**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 03C State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-03c
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Generic 12-18 cy, 6x4
-Loader:	CAT 966H high lift
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	NA
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	NA	100
Ownership cost/hour:	$24.21	$49.15	NA	NA	NA	$14.98
Operating cost/hour:	$57.28	$43.04	NA	NA	NA	$33.32
%Utilization-riper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Ripper op. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Operator cost/hour:	$24.82	$35.97	NA	NA	NA	$0.00
Unit Subtotals:	$106.31	$128.16	NA	NA	NA	$48.30
Number of Units:	2	1	0	0	0	1
Group Subtotals:	Work:	$340.78	Support:	$0.00	Maint:	$48.30

Total work team cost/hour: **$389.08**

MATERIAL QUANTITIES

Initial volume: 6,857 CCY Swell factor: 1.000
Loose volume: **6,857** LCY

Source of estimated volume: Area of 8.5 acres and depth of 6”.
Source of estimated swell factor: Cat Handbook
Material Purchase Cost: $0.00
Total Cost: $0.00

HOURLY PRODUCTION

Truck Capacity:

Truck Payload (weight) Basis:

Material weight: 1,600 Pounds/LCY
Description: Top Soil
Rated Payload: 50,300 Pounds

Payload Capacity: 31.44 LCY

Truck Bed (volume) Basis:

Struck Volume:	12.00	LCY
Heaped Volume:	18.00	LCY
Average Volume:	15.00	LCY
Adjusted Volume:	18.00	LCY

Final Truck Volume Based on Number of Loader Passes: **15.75** LCY

Loading Tool Capacity

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.050	Other - moist loam (100-110%) 1.050
Adjusted Capacity:	**5.250**	LCY

Job Condition Corrections: Site Altitude (ft.): 4680 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	**0.830**	**0.830**	

Loading Tool Cycle Time: Number of Loading Tool Passes Required to Fill Truck: 3 passes

Excavators and Front Shovels:

Machine Cycle Time vs. Job Condition Rating: NA
Selected Value within this Basic Rating: NA

Track Loaders – Material Description:

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Stockpile:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Dump Target:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
	Net Cycle Time Adjustment:	0.000	minutes
	Adjusted Loader Cycle Time:	**0.500**	minutes
	Net Load Time per Truck:	**1.100**	minutes

Truck Cycle Time:

Truck Exchange Time:	0.50	Minutes	Adjusted for site altitude:	0.500	Minutes
Truck Load Time:	1.100	Minutes	Adjusted for site altitude:	1.100	Minutes
Truck Maneuver and Dump Time:	0.90	Minutes	Adjusted for site altitude:	0.900	Minutes

Truck Travel (Haul & Return) 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	1600.00	0.00	3.00	3.00	2824	0.728

Haul Time: **0.728** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	1600.00	0.00	3.00	3.00	2874	0.592

Return Time: **0.592** minutes
Total Truck Cycle Time: **3.820** minutes

Loading Tool unit Production 590.63 LCY/Hour Adjusted for job efficiency: 490.22 LCY/Hour

Truck Unit Production 247.38 LCY/Hour Adjusted for job efficiency: 205.33 LCY/Hour

Optimal No. of Trucks: 2 Truck(s) Selected Number of Trucks: 2 Truck(s)

Adjusted hourly truck team production: 410.65 LCY/Hour
Adjusted single truck/loader team production: 410.65 LCY/Hour
Adjusted multiple truck/loader team production: **410.65** LCY/Hour

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **16.70** Hours

Unit cost: $0.947 /LCY Total job cost: **$6,497**

BULLDOZER WORK

Task description: **Spread topsoil on pond bank**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 03D State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-03d
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$124.85	NA
Operating Cost/Hour:	$97.63	100
Ripper own. Cost/Hour:	$16.38	NA
Ripper op. Cost/Hour:	$8.60	100
Operator Cost/Hour:	$40.04	NA

Total unit Cost/Hour: $287.50
Total Fleet Cost/Hour: **$574.99**

MATERIAL QUANTITIES

Initial Volume: 6,857
Swell factor: 1.215
Loose volume: **8,331** LCY

Source of estimated volume: Area of 8.5 acres. Depth of 6".
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: Partly consolidated stockpile 1.1

Average push gradient: 5 %
Average site altitude: 4,680 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	1.100	(CAT HB)
Dozing method:	1.000	(GEN.)

Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	0.903	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8002

Adjusted unit production: 1,120.28 LCY/hr
Adjusted fleet production: **2240.56** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.257/LCY

Total job time: **3.72** Hours
Total job cost: **$2,138**

REVEGETATION WORK

Task description: **Seed banks of pond**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 03E State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-03e
User: RDZ

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
10-34-0, 18-46-0, 5-10-5	200.00	pound	$0.38	$76.00
			Total Fertilizer Materials Cost/Acre	**$76.00**

Application

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	$39.64
Total Fertilizer Application Cost/Acre	**$39.64**

TILLING

Description	Cost /Acre
Chisel plowing {DMG}	$98.43
Weed control spraying (MEANS 31 31 16.13 3100)	$290.40
Total Tilling Cost/Acre	**$388.83**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Alkali Sacaton	0.10	3.90	$2.85
Blue Grama - Lovington	0.20	3.26	$3.20
Indian Ricegrass - Paloma	1.90	6.15	$21.14
Switchgrass - Pathfinder	0.90	8.04	$11.48
Sand Dropseed	0.10	11.94	$0.98
Kentucky Bluegrass - Ginger	0.10	4.94	$0.32
Little Bluestem - Pastura	0.30	1.79	$4.04
Sideoats Grama - Vaughn	1.80	5.91	$15.08
Strawberry Clover (coated)	0.10	0.68	$0.63

Smooth Brome - Manchar	0.30	1.00	$1.00
Sheep Fescue - Covar	0.40	6.24	$2.44
Tall Wheatgrass - Jose	1.10	1.99	$3.71
Totals Seed Mix	7.30	55.84	**$66.85**

Application

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**
Herbicide - Curtail @ 4.0 pt/ac	1.00	ACRE	$7.94	$7.94
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	$421.36	$842.72
Total Mulch Materials Cost/Acre				**$850.66**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$73.00
Weed spray, truck, non-aquatic area, nox. [DMG]	$62.72
Total Mulch Application Cost/Acre	**$135.72**

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: 8.5 Cost /Acre: $1,789.70
Estimated Failure Rate: 25% Cost /Acre*: $1,789.70
*Selected Replanting Work Items: FERTILIZING,TILLING,SEEDING,MULCHING

Initial Job Cost: **$15,212.45**
Reseeding Job Cost: **$3,803.11**
Total Job Cost: **$19,016**
Job Hours: **5.00**

DEMOLITION WORK

Task description: **Demo and remove concrete and conveyor**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 04A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-04a
User: RDZ

Agency or organization name: DRMS

UNIT COSTS **Location adjustment: 89.20 %**

Structure or Item Description	Dimensions	Demolition Menu Selection	Quantity	Unit	Unit Cost	Total Cost
Concrete pads	15x30,15x60,15x25	Demo. and on-site disposal in existing pit, 12 in. thick - Max. 10,000 ft. haul	1,725.00	SF	$2.30	$3,962.33
Concrete supports - truck scales	Convert 10 CY (Exh L)	Demo. and on-site disposal in existing pit, 1.5 ft. x 2 ft. - Max. 10,000 ft. haul	90.00	LF	$6.89	$620.10
Concrete supports - temp buildings	Convert 8 CY (Exh L)	Demo. and on-site disposal in existing pit, 1.5 ft. x 2 ft. - Max. 10,000 ft. haul	72.00	LF	$6.89	$496.08
Concrete blocks for conveyor	45 2'x2'x6' blocks	Demo. and on-site disposal in existing pit, 1.5 ft. x 2 ft. - Max. 10,000 ft. haul	360.00	LF	$6.89	$2,480.40
Conveyor - not elevated	3' x6', 1787' long	Conveyor, demolition, off-site disposal in approved landfill, 30 mile haul	16,000.00	CF	$0.80	$12,800.00
Conveyor - elevated	3' wide, 375' long	Bridge Demolition - Steel	1,125.00	SF	$9.57	$10,766.25
Fuel tanks	6,000 gallons	Comprehensive storage tank removal, non-leaking - 6,000 to 8,000 gal. tank	2.00	EA	$5,416.35	$10,832.70

Job Hours: 175.00 **Subtotal (unadjusted): $41,957.86** **Total Cost (adjusted for location): $37,426.41**

BULLDOZER RIPPING WORK

Task description: **Rip processing area, wash pond area**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 05A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-05a
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$124.85	NA
Operating Cost/Hour:	$97.63	100
Ripper Ownership Cost/Hour:	$16.38	NA
Ripper Operating Cost/Hour:	$8.60	100
Operator Cost/Hour:	$40.04	NA
Total Unit Cost/Hour:	$287.50	

Total Fleet Cost/Hour: **$574.99**

MATERIAL QUANTITIES

Selected estimating method: Area

Alternate Methods:

Seismic: NA Bank Volume: NA BCY NA
Area: 21.36 acres Rip Depth (ft): 1.00 Volume: 34,461 BCY or CCY

Source of estimated quantity: Exhibit C-2

HOURLY PRODUCTION

Seismic:

Seismic Velocity: NA feet/second

Area:

Average Ripping Depth:	3.71	feet/pass
Average Ripping Width:	5.56	feet/pass
Average Ripping Length:	150.00	feet/pass
Average Dozer Speed:	88.00	feet/minute
Average Maneuver Time:	0.25	minutes/pass
Production per unit area:	0.588	acres/hour

Job Condition Correction Factors

Unadjusted Hourly Unit Production:	0.588	Acres/hr
Site Altitude:	4,680	feet
Altitude Adj:	1.00	(CAT HB)
Job Efficiency:	0.83	(1 shift/day)
Net Correction:	0.83	multiplier

Adjusted Hourly Unit Production: 0.49 Acres/hr
Adjusted Hourly Fleet Production: **0.98** Acres/hr

JOB TIME AND COST

Fleet size: 2 Grader(s) Total job time: **21.89** Hours

Unit cost: $589.354 Per acre Total job cost: **$12,588**

TRUCK/LOADER TEAM WORK

Task description: **Haul topsoil to process and wash pond areas**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 05C State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-05c
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

Shift basis: 1 per day

	Equipment Description
Truck Loader Team -Truck:	Generic 12-18 cy, 6x4
-Loader:	CAT 966H high lift
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance –Motor Grader:	NA
-Water Truck:	Water Tanker, 3,500 Gal.

Cost Breakdown:

	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Loader	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	NA	100
Ownership cost/hour:	$24.21	$49.15	NA	NA	NA	$14.98
Operating cost/hour:	$57.28	$43.04	NA	NA	NA	$33.32
%Utilization-riper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Ripper op. cost/hour:	NA	$0.00	NA	NA	NA	$0.00
Operator cost/hour:	$24.82	$35.97	NA	NA	NA	$0.00
Unit Subtotals:	$106.31	$128.16	NA	NA	NA	$48.30
Number of Units:	2	1	0	0	0	1
Group Subtotals:	Work:	$340.78	Support:	$0.00	Maint:	$48.30

Total work team cost/hour: **$389.08**

MATERIAL QUANTITIES

Initial volume: 17,230 CCY Swell factor: 1.000
Loose volume: **17,230** LCY

Source of estimated volume: Area of 21.36 acres and depth of 6”.
Source of estimated swell factor: Cat Handbook
Material Purchase Cost: $0.00
Total Cost: $0.00

HOURLY PRODUCTION

Truck Capacity:

Truck Payload (weight) Basis:

Material weight: 1,600 Pounds/LCY
Description: Top Soil
Rated Payload: 50,300 Pounds

Payload Capacity: 31.44 LCY

Truck Bed (volume) Basis:

Struck Volume:	12.00	LCY
Heaped Volume:	18.00	LCY
Average Volume:	15.00	LCY
Adjusted Volume:	18.00	LCY

Final Truck Volume Based on Number of Loader Passes: **15.75** LCY

Loading Tool Capacity

Bucket Size Class: NA

Rated Capacity:	5.000	LCY (heaped)
Bucket Fill Factor:	1.050	Other - moist loam (100-110%) 1.050
Adjusted Capacity:	**5.250**	LCY

Job Condition Corrections: Site Altitude (ft.): 4680 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	**0.830**	**0.830**	

Loading Tool Cycle Time: Number of Loading Tool Passes Required to Fill Truck: 3 passes

Excavators and Front Shovels:

Machine Cycle Time vs. Job Condition Rating: NA
Selected Value within this Basic Rating: NA

Track Loaders – Material Description:

Cycle Time Elements (min.):

Load: NA Maneuver: NA Dump: 0.100

Wheel and Track Loaders - Unadjusted Basic Loader Cycle Time (load, dump, maneuver): 0.500 minutes

Cycle Time Factors		Factor (min.)	Source
Material:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Stockpile:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Truck Ownership:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Operation:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
Dump Target:	No adjustment - factor not applicable 0.00	0.000	(Cat HB)
	Net Cycle Time Adjustment:	0.000	minutes
	Adjusted Loader Cycle Time:	**0.500**	minutes
	Net Load Time per Truck:	**1.100**	minutes

Truck Cycle Time:

Truck Exchange Time:	0.50	Minutes	Adjusted for site altitude:	0.500	Minutes
Truck Load Time:	1.100	Minutes	Adjusted for site altitude:	1.100	Minutes
Truck Maneuver and Dump Time:	0.90	Minutes	Adjusted for site altitude:	0.900	Minutes

Truck Travel (Haul & Return) 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	3000.00	0.00	3.00	3.00	2824	1.224

Haul Time: **1.224** minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	3000.00	0.00	3.00	3.00	2874	1.079

Return Time: **1.079** minutes
Total Truck Cycle Time: **4.803** minutes

Loading Tool unit Production 590.63 LCY/Hour Adjusted for job efficiency: 490.22 LCY/Hour

Truck Unit Production 196.75 LCY/Hour Adjusted for job efficiency: 163.30 LCY/Hour

Optimal No. of Trucks: 3 Truck(s) Selected Number of Trucks: 2 Truck(s)

Adjusted hourly truck team production: 326.61 LCY/Hour
Adjusted single truck/loader team production: 326.61 LCY/Hour
Adjusted multiple truck/loader team production: **326.61** LCY/Hour

JOB TIME AND COST

Fleet size: 1 Team(s) Total job time: **52.75** Hours

Unit cost: $1.191 /LCY Total job cost: **$20,526**

BULLDOZER WORK

Task description: **Spread topsoil on process and wash pond areas**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 05D State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-05d
User: RDZ

Agency or organization name: DRMS

HOURLY EQUIPMENT COST

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

Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	$124.85	NA
Operating Cost/Hour:	$97.63	100
Ripper own. Cost/Hour:	$16.38	NA
Ripper op. Cost/Hour:	$8.60	100
Operator Cost/Hour:	$40.04	NA

Total unit Cost/Hour: $287.50
Total Fleet Cost/Hour: **$574.99**

MATERIAL QUANTITIES

Initial Volume: 17,230
Swell factor: 1.215
Loose volume: **20,934** LCY

Source of estimated volume: Area of 21.36 acres. Depth of 6".
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: Partly consolidated stockpile 1.1

Average push gradient: 0 %
Average site altitude: 4,680 feet

Material weight: 1,600 lbs/LCY

Weight description: Top Soil

Job Condition Correction Factor		Source
Operator Skill:	0.750	(AVG.)
Material consistency:	1.100	(CAT HB)
Dozing method:	1.000	(GEN.)

Visibility:	1.000	(AVG.)
Job efficiency:	0.830	(1 SHIFT/DAY)
Spoil pile:	0.900	(SSD-FC)
Push gradient:	1.000	(CAT HB)
Altitude:	1.000	(CAT HB)
Material Weight:	1.438	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.8862

Adjusted unit production: 1,240.68 LCY/hr
Adjusted fleet production: **2481.36** LCY/hr

JOB TIME AND COST

Fleet size: 2 Dozer(s)
Unit cost: $0.232/LCY

Total job time: **8.44** Hours
Total job cost: **$4,851**

REVEGETATION WORK

Task description: **Seed processing area and wash pond area**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 05E State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-05e
User: RDZ

Agency or organization name: DRMS

FERTILIZING

Materials

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
10-34-0, 18-46-0, 5-10-5	200.00	pound	$0.38	$76.00
			Total Fertilizer Materials Cost/Acre	**$76.00**

Application

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	$39.64
Total Fertilizer Application Cost/Acre	**$39.64**

TILLING

Description	Cost /Acre
Chisel plowing {DMG}	$98.43
Weed control spraying (MEANS 31 31 16.13 3100)	$290.40
Total Tilling Cost/Acre	**$388.83**

SEEDING

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Alkali Sacaton	0.10	3.90	$2.85
Blue Grama - Lovington	0.20	3.26	$3.20
Indian Ricegrass - Paloma	1.90	6.15	$21.14
Switchgrass - Pathfinder	0.90	8.04	$11.48
Sand Dropseed	0.10	11.94	$0.98
Kentucky Bluegrass - Ginger	0.10	4.94	$0.32
Little Bluestem - Pastura	0.30	1.79	$4.04
Sideoats Grama - Vaughn	1.80	5.91	$15.08
Strawberry Clover (coated)	0.10	0.68	$0.63

Smooth Brome - Manchar	0.30	1.00	$1.00
Sheep Fescue - Covar	0.40	6.24	$2.44
Tall Wheatgrass - Jose	1.10	1.99	$3.71
Totals Seed Mix	7.30	55.84	**$66.85**

Application

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**
Herbicide - Curtail @ 4.0 pt/ac	1.00	ACRE	$7.94	$7.94
Straw, delivered {MEANS 31 25 14.16 1200}	2.00	TON	$421.36	$842.72
Total Mulch Materials Cost/Acre				**$850.66**

Application

Description	**Cost /Acre**
Crimping, with tractor {DMG survey data}	$73.00
Weed spray, truck, non-aquatic area, nox. [DMG]	$62.72
Total Mulch Application Cost/Acre	**$135.72**

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: 21.36 Cost /Acre: $1,789.70
Estimated Failure Rate: 25% Cost /Acre*: $1,789.70
*Selected Replanting Work Items: FERTILIZING,TILLING,SEEDING,MULCHING

Initial Job Cost: **$38,227.99**
Reseeding Job Cost: **$9,557.00**
Total Job Cost: **$47,785**
Job Hours: **11.00**

EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: **Mobilization and Demob.**

Site: **Two Rivers Sand, Gravel and Reservoir Project** Permit Action: 2023 Application Permit/Job#: M2022013

PROJECT IDENTIFICATION

Task #: 06A State: Colorado Abbreviation: None
Date: 2/15/2023 County: Weld Filename: M013-06a
User: RDZ

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:	$15.25	$23.06	$37.58
Operating Cost/Hour:	$25.26	$30.83	$51.41
Operator Cost/Hour:	$27.71	$27.71	$27.71
Helper Cost/Hour:	$0.00	$20.22	$20.22
Total Unit Cost/Hour:	$68.22	$101.82	$136.92

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	52.21	$141.23	$136.92	2	$556.30	$273.84	$250.00
CAT 966H high lift	25.80	$49.15	$68.22	1	$117.37	$68.22	$250.00
CAT 815F	22.88	$110.46	$68.22	2	$357.36	$136.44	$500.00
Drill/Broadcast Seeder with Tractor	25.00	$6.25	$68.22	1	$74.47	$68.22	$250.00
Subtotals:					**$1,105.50**	**$546.72**	**$1,250.00**

ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Generic 12-18 cy, 6x4	$106.31	2	$212.62	$212.62
Water Tanker, 3,500 Gal.	$48.30	1	$48.30	$48.30
Subtotals:			**$260.92**	**$260.92**

EQUIPMENT HAUL DISTANCE and Time

Nearest Major City or Town within project area region:	GREELEY	
Total one-way travel distance:	5.00	miles
Average Travel Speed:	40.00	mph

Total Non-Roadable Mob/Demob Cost * '* two round trips with haul rig:	$2,913.06
Total Roadable Mob/Demob Cost ** ** one round trip, no haul rig:	$65.23

Transportation Cycle Time:

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.13	0.13
Return Time (Hours):	0.13	0.13
Loading Time (Hours):	0.00	NA
Unloading Time (Hours):	0.00	NA
Subtotals:	0.25	0.25

JOB TIME AND COST

Total job time:	**0.50**	Hours
Total job cost:	**$2,978**	