

## COST SUMMARY WORK

Task description: Cost Summary

Signal Reservoir No. 1  
Site: Expansion

Permit Action:  
111c Application

Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 000  
Date: 7/5/2018  
User: JLE

State: Colorado  
County: Adams

Abbreviation: None  
Filename: M013-000

Agency or organization name: DRMS

### TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Rip the reservoir area	RIPPER	1	35.90	\$10,651.00
002	Excavate and move liner material	LOADER	2	174.55	\$126,967.00
003	Spread liner material	DOZER	2	47.85	\$26,219.00
004	Compact the liner	COMPACT	2	24.36	\$10,209.00
005	Add water to the liner	MISCTRUK	1	24.40	\$3,393.00
006	Mobilization of equipment	MOBILIZE	1	2.36	\$6,608.00
<b><u>SUBTOTALS:</u></b>				<b>309.42</b>	<b>\$184,047</b>

### INDIRECT COSTS

#### OVERHEAD AND PROFIT:

Liability insurance:	2.02	Total =	\$3,717.75
Performance bond:	1.05	Total =	\$1,932.49
Job superintendent:	154.71	Total =	\$11,301.57
Profit:	10.00	Total =	\$18,404.70

TOTAL O & P = \$35,356.51

CONTRACT AMOUNT (direct + O & P) = \$219,403.51

#### LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs):	<u>0.00</u>	Total =	<u>0.00</u>
Engineering work and/or contract/bid preparation:	<u>7.22</u>	Total =	<u>\$15,840.93</u>
Reclamation management and/or administration:	<u>5.00</u>		<u>\$10,970.18</u>

CONTINGENCY: 0.00 Total = \$0.00

TOTAL INDIRECT COST = \$62,167.62

TOTAL BOND AMOUNT (direct + indirect) = \$246,214.62

**Total Required Surety = \$246,215.00**

## BULLDOZER RIPPING WORK

Task description: Rip the reservoir area

Signal Reservoir No. 1  
Site: Expansion

Permit Action:  
111c Application

Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 001  
Date: 7/3/2018  
User: JLE

State: Colorado  
County: Adams

Abbreviation: None  
Filename: M013-001

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat D10T - 10SU  
Ripper Attachment: 3-Shank Ripper

Horsepower: 574  
Shift Basis: 1 per day  
Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$122.17	NA
Operating Cost/Hour:	\$111.29	100
Ripper Ownership Cost/Hour:	\$14.40	NA
Ripper Operating Cost/Hour:	\$8.25	100
Operator Cost/Hour:	\$40.52	NA
Total Unit Cost/Hour:	\$296.63	
Total Fleet Cost/Hour:	<b>\$296.63</b>	

### MATERIAL QUANTITIES

Selected estimating method: Area

#### Alternate Methods:

Seismic: NA  
Area: 30.00 acres  
Bank Volume: NA BCY  
Rip Depth (ft): 3.00 Volume: 145,200 BCY or CCY

Source of estimated quantity: DRMS Estimate

### HOURLY PRODUCTION

#### Seismic:

Seismic Velocity: NA feet/second

#### Area:

Average Ripping Depth: 2.87 mph  
Average Ripping Width: 8.67 degrees  
Average Ripping Length: 500.00 feet  
Average Dozer Speed: 88.00 feet  
Average Maneuver Time: 0.25 feet  
Production per unit area: 1.007 acres/hour

#### Job Condition Correction Factors

Unadjusted Hourly Unit Production: 1.007 Acres/hr  
Site Altitude: 5,130 feet  
Altitude Adj: 1.00 (CAT HB)  
Job Efficiency: 0.83 (1 shift/day)  
Net Correction: 0.83 multiplier

Adjusted Hourly Unit Production: 0.84 Acres/hr  
Adjusted Hourly Fleet Production: 0.84 Acres/hr

### JOB TIME AND COST

Fleet size: 1 Grader(s) Total job time: 35.91 Hours

Unit cost:           \$355.036           Per acre

Total job cost:                   **\$10,651**

## WHEEL LOADER – LOAD AND CARRY WORK

Task description: Excavate and move liner material

Signal Reservoir No. 1 Permit Action: \_\_\_\_\_  
Site: Expansion 111c Application Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 002 State: Colorado Abbreviation: None  
Date: 7/3/2018 County: Adams Filename: M013-002  
User: JLE

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: CAT 992K Horsepower: 801  
Attachment 1: ROPS Cab Shift Basis: 1 per day  
Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$176.02	NA
Operating Cost/Hour:	\$146.20	100
Operator Cost/Hour:	\$41.46	NA
Total Unit Cost/Hour:	\$363.68	
Total Fleet Cost/Hour:	\$727.36	

### MATERIAL QUANTITIES

Initial volume: 145,200 CCY Swell factor: 1.110  
Loose volume: 161,172 LCY

Source of estimated volume: 30 acres at 3 feet deep  
Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Loader Cycle Time: \_\_\_\_\_ Unadjusted Basic Cycle Time (load, dump, maneuver): 0.625 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:	Common ownership of trucks and loaders - 0.04	-0.040	(Cat HB)
Operation:	Constant operation -0.04	-0.040	(Cat HB)
Dump Target:	Nominal target 0.00	0.000	(Cat HB)
Net Cycle Time Adjustment:		-0.080	minutes
Adjusted Basic Cycle Time:		0.545	minutes

#### Rolling Resistance – Road Conditions

Haul: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0  
Return: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0

#### Haul and Return Time

	Length (feet)	Grade Res. (%)	Rolling Res. (%)	Total Res. (%)	Travel Time (minutes)	Source
Haul Route:	500	0.00	3.00	3.00	0.4605	(Cat HB)
Return Route:	500	0.00	3.00	3.00	0.4616	(Cat HB)

Total Travel Time: 0.9221 minutes  
Total Cycle Time: 1.4671 minutes

#### Load Bucket Capacity

Rated Capacity: 16.00 LCY (heaped)  
Bucket Fill Factor: 0.850 Hard, tough clay (80% - 90%) 0.850  
Adjusted Capacity: 13.60 LCY

#### Job Condition Correction Factors

Site Altitude: 5130 feet

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

Unadjusted Hourly Unit Production: 556.21 LCY/Hour  
Adjusted Hourly Unit Production: 461.66 LCY/Hour  
Adjusted Hourly Fleet Production: 923.31 LCY/Hour

#### JOB TIME AND COST

Fleet size: 2 Loader(s) Total job time: 174.56 Hours  
Unit cost: \$0.788 /LCY Total job cost: \$126,967

## BULLDOZER WORK

Task description: Spread liner material

Site: Signal Reservoir No. 1 Permit Action: 111c Application Permit/Job#: M2017013  
Expansion

### PROJECT IDENTIFICATION

Task #: 003 State: Colorado Abbreviation: None  
Date: 7/3/2018 County: Adams Filename: M013-003  
User: JLE

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: Cat D10T - 10SU  
Horsepower: 574  
Blade Type: Semi-Universal  
Attachment: NA  
Shift Basis: 1 per day  
Data Source: (CRG)

#### Cost Breakdown:

		<u>Utilization %</u>
Ownership Cost/Hour:	<u>\$122.17</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$111.29</u>	<u>100</u>
Ripper own.		
Cost/Hour:	<u>\$0.00</u>	<u>NA</u>
Ripper op. Cost/Hour:	<u>\$0.00</u>	<u>0</u>
Operator Cost/Hour:	<u>\$40.52</u>	<u>NA</u>
Total unit Cost/Hour:	<u>\$273.98</u>	
Total Fleet Cost/Hour:	<u>\$547.96</u>	

### MATERIAL QUANTITIES

Initial Volume: 145,200  
Swell factor: 1.000  
Loose volume: 145,200 LCY

Source of estimated volume: 30 acres at 3 feet deep  
Source of estimated swell factor: Cat Handbook

### HOURLY PRODUCTION

Average push distance: 50 feet  
Unadjusted hourly production: 2,748.7 LCY/hr

Materials consistency description: Loose stockpile 1.2

Average push gradient: 0 %  
Average site altitude: 5,130 feet

Material weight: 2,800 lbs/LCY

Weight description: Clay - Wet

Job Condition Correction Factor

		<u>Source</u>
Operator Skill:	0.750	(AVG.)
Material consistency:	1.200	(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:	0.821	(CAT HB)
Blade type:	1.000	(PAT)

Net correction: 0.5520

Adjusted unit  
production: 1,517.28 LCY/hr

Adjusted fleet  
production: **3034.56 LCY/hr**

**JOB TIME AND COST**

Fleet size: 2 Dozer(s)

Unit cost: \$0.181/LCY

Total job time: **47.85 Hours**

Total job cost: **\$26,219**

## COMPACTION WORK

Task description: Compact the Liner

Site: Signal Reservoir No. 1  
Expansion

Permit Action: 111c Application

Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 004  
Date: 7/3/2018  
User: JLE

State: Colorado  
County: Adams

Abbreviation: None  
Filename: M013-004

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Basic Machine: CAT 825H  
Compactor Type: Soil - tamping foot

Horsepower: 354  
Shift Basis: 1 per day  
Data Source: (CRG)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	\$103.01	NA
Operating Cost/Hour:	\$74.57	100
Operator Cost/Hour:	\$31.87	NA
Total Unit Cost/Hour:	\$209.45	
Total Fleet Cost/Hour:	<b>\$418.90</b>	

### MATERIAL QUANTITIES

Loose volume: 145,200 LCY      Shrinkage factor: 0.900  
Compacted volume: **130,680** CCY

Source of estimated volume: Division of Reclamation, Mining & Safety  
Source of estimated shrinkage factor: Cat Handbook

### HOURLY PRODUCTION

Unadjusted hourly production =  $(W \times S \times L \times C) / P$

Compacted width per pass (W):	<u>7.34</u>	feet
Average Compactor Speed (S):	<u>3.00</u>	mph
Compacted thickness of each lift (L):	<u>9.00</u>	inches
Conversion Constant (C):	<u>16.3</u>	(5,280ft./12in./27cu.ft.)
Required number of machine passes (P):	<u>1</u>	passes
Unadjusted Hourly Unit Production:	<u>3,230.33</u>	CCY/hour

#### Job Condition Correction Factors

Site Altitude: 5,130 feet

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

Adjusted Hourly Unit Production: 2,681.18 CCY/Hour  
Adjusted Hourly Fleet Production: **5,362.35** CCY/Hour

### JOB TIME AND COST

Fleet size: 2 Compactor(s)      Total job time: **24.37** Hours



Unit cost: \$0.078 per CCY

Total job cost: **\$10,209**

## MISCELLANEOUS TRUCK WORK

Task description: Add water to the liner

Signal Reservoir No. 1  
Site: Expansion

Permit Action:  
111c Application

Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 005  
Date: 7/3/2018  
User: JLE

State: Colorado  
County: Adams

Abbreviation: None  
Filename: M013-005

Agency or organization name: DRMS

### HOURLY EQUIPMENT COST

Make and Model: Water Tanker, 7,000 Gal.  
Attachment 1: \_\_\_\_\_  
Attachment 2: \_\_\_\_\_  
Labor Unit 1: Tanker Driver - 1 rear axle  
Labor Unit 2: \_\_\_\_\_

Horsepower: 330  
Shift Basis: 1 per day  
Weight: 29.65  
(US Tons)

#### Cost Breakdown:

		Utilization %
Ownership Cost/Hour:	<u>\$38.58</u>	<u>NA</u>
Operating Cost/Hour:	<u>\$61.11</u>	<u>100</u>
Operator Cost/Hour:	<u>\$39.38</u>	<u>NA</u>
Total Unit Cost/Hour:	<u>\$139.07</u>	
Total Fleet Cost/Hour:	<u>\$139.07</u>	

### JOB TIME AND COST

Fleet size: 1 Truck(s)

Total job time: 24.40 Hours

Unit cost: \$139.07 /Hour

Total job cost: \$3,393

## EQUIPMENT MOBILIZATION/DEMOBILIZATION

Task description: Mobilization of Equipment

Signal Reservoir No. 1  
Site: Expansion

Permit Action:  
111c Application

Permit/Job#: M2017013

### PROJECT IDENTIFICATION

Task #: 006  
Date: 7/3/2018  
User: JLE

State: Colorado  
County: Adams

Abbreviation: None  
Filename: M013-006

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:	\$16.63	\$18.37	\$22.33
Operating Cost/Hour:	\$44.38	\$46.13	\$50.07
Operator Cost/Hour:	\$27.66	\$27.66	\$27.66
Helper Cost/Hour:	\$0.00	\$25.39	\$25.39
Total Unit Cost/Hour:	\$88.67	\$117.55	\$125.45

### 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 D10T - 10SU	93.31	\$136.57	\$125.45	2	\$524.04	\$250.90	\$500.00
CAT 992K	107.88	\$176.02	\$125.45	2	\$602.94	\$250.90	\$500.00
CAT 825H	36.08	\$103.01	\$117.55	2	\$441.12	\$235.10	\$500.00

Subtotals: **\$1,568.10** **\$736.90** **\$1,500.00**

### ROADABLE EQUIPMENT:

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Water Tanker, 7,000 Gal.	\$139.07	1	\$139.07	\$139.07
Fuel Tanker, 6x4, 210 HP	\$74.87	2	\$149.74	\$149.74

Subtotals: **\$288.81** **\$288.81**

**EQUIPMENT HAUL DISTANCE and Time**

Nearest Major City or Town within project area region: BRIGHTON  
Total one-way travel distance: 5.00 miles  
Average Travel Speed: 55.00 mph

Total Non-Roadable Mob/Demob Cost \* \$6,555.29  
\*\* two round trips with haul rig:  
Total Roadable Mob/Demob Cost \*\* \$52.51  
\*\* one round trip, no haul rig:

**Transportation Cycle Time:**

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	0.09	0.09
Return Time (Hours):	0.09	0.09
Loading Time (Hours):	0.50	NA
Unloading Time (Hours):	0.50	NA
Subtotals:	1.18	0.18

**JOB TIME AND COST**

Total job time: 2.36 Hours  
Total job cost: \$6,608