


**COLORADO**Division of Reclamation,  
Mining and Safety

Department of Natural Resources

**MINERALS PROGRAM INSPECTION REPORT****PHONE: (303) 866-3567**

The Division of Reclamation, Mining and Safety has conducted an inspection of the mining operation noted below. This report documents observations concerning compliance with the terms of the permit and applicable rules and regulations of the Mined Land Reclamation Board.

<b>MINE NAME:</b> Timnath Connell Pit	<b>MINE/PROSPECTING ID#:</b> M-1999-050	<b>MINERAL:</b> Sand and gravel	<b>COUNTY:</b> Larimer
<b>INSPECTION TYPE:</b> Monitoring	<b>INSPECTOR(S):</b> Jared L. Ebert	<b>INSP. DATE:</b> May 15, 2017	<b>INSP. TIME:</b> 12:35
<b>OPERATOR:</b> Connell Resources, Inc.	<b>OPERATOR REPRESENTATIVE:</b> Kevin Anderson, Connell Resources, Inc.	<b>TYPE OF OPERATION:</b> 112c - Construction Regular Operation	

<b>REASON FOR INSPECTION:</b> Normal I&E Program	<b>BOND CALCULATION TYPE:</b> Complete Bond	<b>BOND AMOUNT:</b> \$510,198.00
<b>DATE OF COMPLAINT:</b> NA	<b>POST INSP. CONTACTS:</b> None	<b>JOINT INSP. AGENCY:</b> None
<b>WEATHER:</b> Clear	<b>INSPECTOR'S SIGNATURE:</b> 	<b>SIGNATURE DATE:</b> May 18, 2017

**The following inspection topics were identified as having Problems or Possible Violations. OPERATORS SHOULD READ THE FOLLOWING PAGES CAREFULLY IN ORDER TO ASSURE COMPLIANCE WITH THE TERMS OF THE PERMIT AND APPLICABLE RULES AND REGULATIONS. If a Possible Violation is indicated, you will be notified under separate cover as to when the Mined Land Reclamation Board will consider possible enforcement action.**

**INSPECTION TOPIC:** Backfilling & Grading

**PROBLEM:** The Operator is backfilling the pit with structural fill generated outside of the approved permit area without first obtaining approval from the Division for this activity. This issue is cited as a problem at this time for failure to notify the Division of this activity and/or including this backfilling activity in the approved reclamation plan in accordance with Rule 3.1.5(9).

**CORRECTIVE ACTIONS:** The Operator shall submit a Technical Revision with the required \$216 fee, the revision shall include all of the information required by Rule 3.1.5(9).

**CORRECTIVE ACTION DUE DATE:** 6/19/17

**INSPECTION TOPIC:** Hydrologic Balance

**PROBLEM:** The Operator has not submitted the results of the groundwater monitoring that is required to be conducted at the site in accordance with the approved plan. To date the Division has only received the monitoring data from April 12, 1999 to February 26, 2004. The results of the groundwater monitoring was required to be submitted to the Division with the Operator's annual report. This issue is cited as a problem at this time for failure to comply with the conditions of a permit in accordance with C.R.S. 34-32.5-124.

**CORRECTIVE ACTIONS:** Please submit the results of the groundwater monitoring in accordance with the approved plan. These results shall include the data collected from February 26, 2004 to date.

**CORRECTIVE ACTION DUE DATE:** 6/19/17

## **OBSERVATIONS**

This was a monitoring inspection of the Timnath Connell Pit, DRMS Permit No. M-1999-050, operated by Connell Resources, Inc. (CR). I, Jared Ebert of the Colorado Division of Reclamation, Mining and Safety (Division) conducted the inspection. Mr. Kevin Anderson with CR accompanied me during the inspection. The weather was clear and warm at the time of the inspection.

This is a 112c mining operation with a permit area of 157.58 acres. The approved post mine land use is designated as Developed Water Resources. Overall, mining appears to have been completed or at least temporarily halted at the site. CR has mined the site in two phases. The Box Elder ditch bisects the site and CR has excavated an area west of the ditch (Phase 1) and an area east of the ditch (Phase 2). The mining plan indicates that the Operator had originally intended to relocate the ditch and mine in that area. At the time of the inspection, the ditch has not been relocated. Two groundwater recharge ponds are located at the southern end of the site.

An asphalt batch plant is operating at the north end of the Phase 1 mining area. A mine office, multiple building and fuels tanks are located in the facilities area. The primary activity occurring at the site is processing material. Mined material from other Connell mining operations and material such as concrete are brought in and processed at the site. A large number of product stockpiles are located throughout the Phase 1 mining area. Also, Connell uses the southeast corner of the Phase 1 mining area to store various construction related items such as pipes, culverts, tires and metal pieces.

About half of the Phase 2 mining area has been mined and according to the December 2016 annual report the last time mining occurred at the site was in 2010.

### **Backfilling and Grading:**

The Phase II mine area has been partially mined and partially backfilled with material generated outside of the approved permit area according to Mr. Anderson. This activity is not approved in the current mining and reclamation plan. Based on what was observed at the surface of the site, the backfilled material appears to be dirt and soil. This issue is cited as a problem at the beginning of the report.

The Phase I mine area consists of a pit excavation, a large berm/pit slope has been constructed on the west side and south side of the mined area. The west berm separates the site from I-25 and the south berm separates the pit from the two recharge groundwater ponds. The side slopes of the berm are graded to a 3H:1V ratio or less and are stabilized with dense vegetation cover.

The Phase II mine area consists of a pit excavation on the north end of the parcel and a dewatering trench that runs from the northwest to the southwest on the west side of the parcel. Groundwater was observed within the de-watering trench. About half of the Phase II parcel has been backfilled to a level that appears to be above the static ground water level. The slopes leading of the dewatering trench have been graded to a 3H:1V ratio or less. A small highwall remains on the north side of the pit. The highwall is vertical and is about 15 to 20 feet in height on is about 520 feet in length

The slopes of the groundwater recharge ponds have been graded to a 3H:1V ratio or less and are vegetated and stable.

Financial Warranty:

The last cost estimate conducted for this site was done in 1999 when the site was permitted. The current financial warranty held for the site is \$510,198.00. The Division has estimated a new liability amount of \$532,504.72. This is a \$22,306.72 increase in liability. The Division's reclamation cost estimate is attached for your review. The Division requests that CR provide any comments or questions regarding this updated cost estimate by **May 26, 2017**. The Division may issue a surety increase revision after **May 26, 2017**. If the Division issues a surety increase revision a notice will be sent to CR under a separate cover. CR will have 60 days from the date of this notice to submit the additionally required financial warranty.

Hydrologic Balance:

On January 14, 2000, CR submitted a Technical Revision (TR01) to the permit and committed to conducting groundwater monitoring at the site. The plan was complex and had various trigger points based on the phasing of the mining operation. To briefly summarize the plan, CR committed to monitoring five piezometer on the Timnath property and four on the Swift property to the south (a map of the monitoring locations is attached). The results of the monitoring was to be submitted to the Division with CR's annual report for the Timnath Connell Pit. To date, the Division has only received monitoring data from April 12, 1999 to February 26, 2004. This data was received on March 12, 2004. Since that time the Operator has not submitted the groundwater monitoring data as required in the annual report. This issue is cited as a problem at the beginning of this report.

The Operator has installed a French Drain on the north end of the property and a groundwater collection ditch on the west side of the property. This water flows to the groundwater recharge ponds located at the south end of the site.

Surface water has collected in the base of the Phase I excavation on the south central portion of the Phase I mining area.

Off-site Damage:

Northwest of the facilities area is a portion of land north of the permit boundary that has been cleared of vegetation and is being used to store camper trailers and what appears to be paving equipment. This disturbance does not appear to be part of the mining operation.

Reclamation Success:

The vegetation established around the groundwater recharge ponds and the west and south pit slopes of the Phase I mine area is dense and well established. This area appears stable and the Operator is aggressively managing the weeds at the site.

Topsoil:

A large topsoil stockpile is located on the east side of the Phase II excavation area. At the time of the inspection, CR was reshaping the side slopes of the topsoil pile to grade them to a gentle slope. Otherwise the pile was stable and vegetated.

## **PHOTOGRAPHS**



**Figure 1. West recharge pond.**



**Figure 2. East recharge pond.**





**Figure 3. West groundwater drain.**



**Figure 4. Phase II Mine area from east end looking northwest.**



**Figure 5. Groundwater dewatering trench in Phase II mine area.**



**Figure 6. Highwall in the Phase II mine area.**





Figure 7. Phase I mine area, view from the Box Elder Ditch looking northwest.



Figure 8. Phase I mine area, view from the Box Elder Ditch looking southwest.



Figure 9. From the northwest corner of the Phase II area looking southeast.



### GENERAL INSPECTION TOPICS

The following list identifies the environmental and permit parameters inspected and gives a categorical evaluation of each

(AR) RECORDS----- <u>N</u>	(FN) FINANCIAL WARRANTY----- <u>Y</u>	(RD) ROADS----- <u>Y</u>
(HB) HYDROLOGIC BALANCE----- <u>PB</u>	(BG) BACKFILL & GRADING----- <u>PB</u>	(EX) EXPLOSIVES----- <u>NA</u>
(PW) PROCESSING WASTE/TAILING---- <u>NA</u>	(SF) PROCESSING FACILITIES----- <u>Y</u>	(TS) TOPSOIL----- <u>Y</u>
(MP) GENL MINE PLAN COMPLIANCE- <u>Y</u>	(FW) FISH & WILDLIFE----- <u>Y</u>	(RV) REVEGETATION---- <u>Y</u>
(SM) SIGNS AND MARKERS----- <u>Y</u>	(SP) STORM WATER MGT PLAN---- <u>NA</u>	(CI) COMPLETE INSP---- <u>Y</u>
(ES) OVERBURDEN/DEV. WASTE----- <u>NA</u>	(SC) EROSION/SEDIMENTATION--- <u>Y</u>	(RS) RECL PLAN/COMP-- <u>Y</u>
(AT) ACID OR TOXIC MATERIALS----- <u>NA</u>	(OD) OFF-SITE DAMAGE----- <u>Y</u>	(ST) STIPULATIONS----- <u>N</u>

Y = Inspected and found in compliance / N = Not inspected / NA = Not applicable to this operation / PB = Problem cited / PV = Possible violation cited

#### Inspection Contact Address

Kevin Anderson  
Connell Resources, Inc.  
7785 Highland Meadows Pkwy., Ste. 100  
Fort Collins, CO 80528

Enclosure: 1.) Groundwater Monitoring Well Location Map.  
2.) May 18, 2017 CIRCES Cost Estimate.

CC: None



## COST SUMMARY WORK

Task description: \_\_\_\_\_

Site: Timnath Connell Pit

Permit Action: May 2017

Permit/Job#: M1999050

### PROJECT IDENTIFICATION

Task #: 000

State: Colorado

Abbreviation: None

Date: 5/18/2017

County: Larimer

Filename: M050-000

User: JLE

Agency or organization name: DRMS

### TASK LIST (DIRECT COSTS)

Task	Description	Form Used	Fleet Size	Task Hours	Cost
001	Structure Demolition	DEMOLISH	1	119.00	\$75,422.56
002	Rip Shale for Clay Liner	RIPPER	2	192.28	\$114,887.00
003	Place clay for liner	SCRAPER1	1	65.75	\$99,286.00
004	Rip Facilities Road	RIPPER	2	1.40	\$831.00
005	Spread topsoil over pit area west of ditch	SCRAPER1	1	12.99	\$15,169.00
006	Backfill dewatering trench in pit east of ditch	TRUCK1	1	44.27	\$42,273.00
007	Spread topsoil over pit area east of ditch	SCRAPER1	1	7.58	\$8,845.00
008	Revegetation of Affected Area	REVEGE	1	23.52	\$31,028.00
009	Mobilization of Equipment	MOBILIZE	1	4.97	\$19,056.00
<b><u>SUBTOTALS:</u></b>				<b>471.76</b>	<b>\$406,798</b>

### INDIRECT COSTS

#### OVERHEAD AND PROFIT:

Liability insurance: 2.02  
Performance bond: 1.05  
Job superintendent: 235.88  
Profit: 10.00

Total = \$8,217.32

Total = \$4,271.38

Total = \$17,231.03

Total = \$40,679.80

TOTAL O & P = \$70,399.53

CONTRACT AMOUNT (direct + O & P) = \$477,197.53

#### LEGAL - ENGINEERING - PROJECT MANAGEMENT:

Financial warranty processing (legal/related costs): 0.00

Total = 0.00

Engineering work and/or contract/bid preparation: 6.59

Total = \$31,447.32

Reclamation management and/or administration: 5.00

\$23,859.88

CONTINGENCY: 0.00

Total = \$0.00

TOTAL INDIRECT COST = \$125,706.72

**TOTAL BOND AMOUNT (direct + indirect) = \$532,504.72**



**DEMOLITION WORK**Task description: **Structure Demolition**Site: **Timnath Connell Pit**Permit Action: **May 2017**Permit/Job#: **M1999050****PROJECT IDENTIFICATION**Task #: **001**  
Date: **5/18/2017**  
User: **JLE**State: **Colorado**  
County: **Larimer**Abbreviation: **None**  
Filename: **M050-001**Agency or organization name: **DRMS****UNIT COSTS****Location adjustment: 94.70 %**

Structure or Item Description	Dimensions	Demolition Menu Selection	Quantity	Unit	Unit Cost	Total Cost
Office	20x 65x12	Bldg. (SN) demo./on-site disposal in existing pit or cut - Max. 10,000 ft. haul	15,600.00	CF	\$0.19	\$2,886.00
Asphalt Batch Plant Silos	5 Silos	Haul tank to certified salvage dump - 6,000 to 8,000 gal. tank	5.00	EA	\$880.00	\$4,400.00
Fuel Tank Removal	5 Tanks	Haul tank to certified salvage dump - 6,000 to 8,000 gal. tank	5.00	EA	\$880.00	\$4,400.00
Conveyor Removal	543 Feet	Conveyor, demolition, on-site disposal, excavated pit, 10,000 ft. haul	4,887.00	CF	\$0.22	\$1,075.14
North Fuel Storage Containment Demo	64x44	Demo. and on-site disposal in existing pit, 12 in. thick - Max. 10,000 ft. haul	2,816.00	SF	\$1.25	\$3,525.63
South Fuel Storage Containment Demo	16 x 38	Demo. and on-site disposal in existing pit, 12 in. thick - Max. 10,000 ft. haul	608.00	SF	\$1.25	\$761.22
Building 1, Next to Asphalt Plant	17x32x12	Bldg. (SN) demo./on-site disposal in existing pit or cut - Max. 10,000 ft. haul	6,528.00	CF	\$0.19	\$1,207.68
Building 2, Next to Asphalt Plant	17x35x12	Bldg. (SN) demo./on-site disposal in existing pit or cut - Max. 10,000 ft. haul	7,140.00	CF	\$0.19	\$1,320.90
Building 3, Next to Asphalt Plant	15x31x12	Bldg. (SN) demo./on-site disposal in existing	5,580.00	CF	\$0.19	\$1,032.30

		pit or cut - Max. 10,000 ft. haul				
Large tank removal, SE of Asphalt Plant	1 Tank	Haul tank to certified salvage dump - 6,000 to 8,000 gal. tank	1.00	EA	\$880.00	\$880.00
Load Tanks	11 Tanks	Comprehensive storage tank removal, non- leaking - 6,000 to 8,000 gal. tank	11.00	EA	\$5,286.80	\$58,154.80

			<b>Total Cost</b>
			<b>(adjusted for</b>
<b>Job Hours:</b>	<b>119.00</b>	<b>Subtotal</b>	<b>location):</b>
		<b>(unadjusted):</b>	
		<b>\$79,643.67</b>	<b>\$75,422.56</b>

**BULLDOZER RIPPING WORK**Task description: **Rip Shale for Clay Liner**Site: **Timmnath Connell Pit**Permit Action: **May 2017**Permit/Job#: **M1999050****PROJECT IDENTIFICATION**Task #: **002**State: **Colorado**Abbreviation: **None**Date: **5/18/2017**County: **Larimer**Filename: **M050-002**User: **JLE**Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**Basic Machine: **Cat D10T - 10SU**Horsepower: **574**Ripper Attachment: **1-Shank Ripper**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:	\$15.98	NA
Ripper Operating Cost/Hour:	\$8.78	100
Operator Cost/Hour:	\$40.52	NA
Total Unit Cost/Hour:	\$298.74	
Total Fleet Cost/Hour:	<b>\$597.48</b>	

**MATERIAL QUANTITIES**Selected estimating method: **Seismic****Alternate Methods:**

Seismic: **75,362** BCY Bank Volume: **75,362** BCY Ideal  
 Area: **NA** acres Rip Depth (ft): **NA** Volume: **NA** BCY or CCY

Source of estimated quantity: **Estimate of West Pit and East Pit needs****HOURLY PRODUCTION****Seismic:**Seismic Velocity: **8,700** feet/second**Area:**

Average Ripping Depth: **NA** mph  
 Average Ripping Width: **NA** degrees  
 Average Ripping Length: **NA** feet  
 Average Dozer Speed: **NA** feet  
 Average Maneuver Time: **NA** feet  
 Production per unit area: **NA** acres/hour

**Job Condition Correction Factors**Unadjusted Hourly Unit Production: **236.10** Cu. yds./hrSite Altitude: **4,830** feetAltitude Adj: **1.00** (CAT HB)Job Efficiency: **0.83** (1 shift/day)Net Correction: **0.83** multiplierAdjusted Hourly Unit Production: **195.96** Cu. yds./hrAdjusted Hourly Fleet Production: **391.93** Cu. yds./hr**JOB TIME AND COST**Fleet size: **2** Grader(s) Total job time: **192.29** Hours



Unit cost:       \$1.524       Per cu. yd.

Total job cost:       **\$114,887**

**SCRAPER TEAM WORK**Task description: **Place clay for liner**Site: **Timnath Connell Pit**Permit Action: **May 2017**Permit/Job#: **M1999050****PROJECT IDENTIFICATION**Task #: **003**State: **Colorado**Abbreviation: **None**Date: **5/18/2017**County: **Larimer**Filename: **M050-003**User: **JLE**Agency or organization name: **DRMS****HOURLY EQUIPMENT**COSTShift basis: **1 per day**

Equipment Description	
-Scraper:	Cat 637G w/push-pull
-Dozer:	Cat D10T - 10SU
Support Equipment -Load Area:	NA
-Dump Area:	CAT 836H
Road Maintenance -Motor Grader:	CAT 14M
-Water Truck:	Water Tanker, 5,000 Gal.

**Cost Breakdown:****Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	100	50	100
Ownership cost/hour:	\$152.84	\$122.17	NA	\$164.18	\$54.68	\$24.01
Operating cost/hour:	\$158.39	\$111.29	NA	\$120.79	\$23.50	\$34.13
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	\$0.00
Operator cost/hour:	\$41.46	\$40.52	NA	\$31.87	\$38.16	\$39.38
Unit Subtotals:	\$352.69	\$273.98	NA	\$316.84	\$116.33	\$97.52
Number of Units:	2	1	0	1	1	1
Group Subtotals:	Work: \$979.36		Support:	\$316.84	Maint:	\$213.85

Total work team cost/hour: **\$1,510.05****MATERIAL QUANTITIES**Initial volume: **75,362**

CCY

Swell factor: **1.000**Loose volume: **75,362**

LCY

Source of estimated volume: **Division of Reclamation, Mining & Safety**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: **81,600 pounds**  
 Payload Capacity: **29.14 LCY**

Struck Volume: **24.00** LCY  
 Heaped Volume: **34.00** LCY  
 Average Volume: **29.00** LCY  
 Adjusted Capacity: **29.00** LCY

Cycle Time:

Scraper Loading Time: 1.00 Minutes  
 Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction:

Site Altitude: 4830 feet

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

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	0.00	3.00	3.00	2800	0.54

Haul Time: 0.54 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	700.00	0.00	3.00	3.00	2949	0.38

Return Time: 0.38 minutes

Total Scraper team cycle time: 2.52 minutes  
 Adjusted for job conditions: 1,146.19 LCY/Hour  
 Selected Number of Scrapers: 2 Scraper(s)  
 Adjusted single scraper team (unit) hourly production: 1,146.19 LCY/Hour  
 Adjusted multiple scraper team (fleet) hourly production: 1,146.19 LCY/Hour

Unadjusted unit production/hour: 1,380.95 LCY/Hour  
 Optimal Number of Scrapers per push  
 dozer: \_\_\_\_\_

**JOB TIME AND COST**

Fleet size: 1 Team(s) Total job time: 65.75 Hours  
 Unit cost: \$1.317 /LCY Total job cost: \$99,286



**BULLDOZER RIPPING WORK**Task description: **Rip Facilities Road**Site: **Timmath Connell Pit**Permit Action: **May 2017**Permit/Job#: **M1999050****PROJECT IDENTIFICATION**Task #: **004**State: **Colorado**Abbreviation: **None**Date: **5/18/2017**County: **Larimer**Filename: **M050-004**User: **JLE**Agency or organization name: **DRMS****HOURLY EQUIPMENT COST**Basic Machine: **Cat D10T - 10SU**Horsepower: **574**Ripper Attachment: **3-Shank Ripper**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>\$593.26</b>	

**MATERIAL QUANTITIES**Selected estimating method: **Area****Alternate Methods:**Seismic: **NA**Bank Volume: **NA**BCY **NA**Area: **2.34** acresRip Depth (ft): **2.00**Volume: **7,550**

BCY or CCY

Source of estimated quantity: **2,912 feet of road at 35 feet wide****HOURLY PRODUCTION****Seismic:**Seismic Velocity: **NA** feet/second**Area:**

Average Ripping Depth:	2.88	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/hrSite Altitude: **4,830** feetAltitude Adj: **1.00** (CAT HB)Job Efficiency: **0.83** (1 shift/day)Net Correction: **0.83** multiplierAdjusted Hourly Unit Production: **0.84** Acres/hrAdjusted Hourly Fleet Production: **1.67** Acres/hr**JOB TIME AND COST**Fleet size: **2** Grader(s)Total job time: **1.40** Hours

Unit cost:           \$355.036           Per acre

Total job cost:                     **\$831**

**SCRAPER TEAM WORK**Task description: Spread topsoil over pit area west of ditchSite: Timmath Connell PitPermit Action: May 2017Permit/Job#: M1999050**PROJECT IDENTIFICATION**Task #: 005State: ColoradoAbbreviation: NoneDate: 5/18/2017County: LarimerFilename: M050-005User: JLEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 637G w/push-pull
-Dozer:	Cat D10T - 10SU
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-Water Truck:	Water Tanker, 5,000 Gal.

**Cost Breakdown:****Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	50	25
Ownership cost/hour:	\$152.84	\$122.17	NA	NA	\$54.68	\$24.01
Operating cost/hour:	\$158.39	\$111.29	NA	NA	\$23.50	\$8.53
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	NA	\$0.00	\$0.00
Operator cost/hour:	\$41.46	\$40.52	NA	NA	\$38.16	\$39.38
Unit Subtotals:	\$352.69	\$273.98	NA	NA	\$116.33	\$71.93
Number of Units:	2	1	0	0	1	1
Group Subtotals:	Work:	\$979.36	Support:	\$0.00	Maint:	\$188.26

Total work team cost/hour: **\$1,167.62****MATERIAL QUANTITIES**Initial volume: 8,892

CCY

Swell factor: 1.000Loose volume: **8,892**

LCY

Source of estimated volume: Division of Reclamation, Mining & SafetySource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Scraper Bowl (volume) Basis:Material weight: 1,600 lbs/LCYStruck Volume: 24.00

LCY

Material description:	Top Soil	Heaped Volume:	34.00	LCY
Rated Payload:	81,600 pounds	Average Volume:	29.00	LCY
Payload Capacity:	51.00 LCY	Adjusted Capacity:	<b>29.00</b>	LCY

Cycle Time:

Scraper Loading Time: 1.00 Minutes  
 Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction:

Site Altitude: 4830 feet

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

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	3250.00	0.00	3.00	3.00	2800	1.37

Haul Time: 1.37 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	3250.00	0.00	3.00	3.00	2949	1.25

Return Time: 1.25 minutes

Total Scraper team cycle time: 4.22 minutes  
 Adjusted for job conditions: 684.45 LCY/Hour  
 Selected Number of Scrapers: 2 Scraper(s)  
 Adjusted single scraper team (unit) hourly production: 684.45 LCY/Hour  
 Adjusted multiple scraper team (fleet) hourly production: 684.45 LCY/Hour

Unadjusted unit production/hour: 824.64 LCY/Hour  
 Optimal Number of Scrapers per push  
 dozer: \_\_\_\_\_

**JOB TIME AND COST**

Fleet size: 1 Team(s) Total job time: 12.99 Hours  
 Unit cost: \$1.706 /LCY Total job cost: \$15,169



**TRUCK/LOADER TEAM WORK**Task description: **Backfill dewatering trench in pit east of ditch**Site: **Tinnath Connell Pit**Permit Action: May 2017Permit/Job#: M1999050**PROJECT IDENTIFICATION**Task #: 006State: ColoradoAbbreviation: NoneDate: 5/18/2017County: LarimerFilename: M050-006User: JLEAgency or organization name: DRMS**HOURLY EQUIPMENT COST**Shift basis: 1 per day

Equipment Description	
Truck Loader Team -Truck:	Cat 770D
-Loader:	Cat 365C L 13'-7" Stick
Support Equipment -Load Area:	NA
-Dump Area:	Cat D10T - 10SU
Road Maintenance -Motor Grader:	CAT 14M
-Water Truck:	NA

**Cost Breakdown:**

	Truck/Loader Team		Support Equipment		Maintenance Equipment	
	Truck	Excavator	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	100	25	NA
Ownership cost/hour:	\$78.80	\$109.56	NA	\$122.17	\$54.68	NA
Operating cost/hour:	\$59.14	\$102.56	NA	\$111.29	\$11.75	NA
%Utilization-riper:	NA	0	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	NA
Ripper op. cost/hour:	NA	\$0.00	NA	\$0.00	\$0.00	NA
Operator cost/hour:	\$25.65	\$36.93	NA	\$40.52	\$38.16	NA
Unit Subtotals:	\$163.59	\$249.05	NA	\$273.98	\$104.59	NA
Number of Units:	2	1	0	1	1	0
Group Subtotals:	Work: \$576.23		Support: \$273.98		Maint: \$104.59	

Total work team cost/hour: **\$954.80****MATERIAL QUANTITIES**Initial volume: 28,233

CCY

Swell factor: 1.230Loose volume: **34,727**

LCY

Source of estimated volume: Division of Reclamation, Mining & SafetySource of estimated swell factor: Cat HandbookMaterial Purchase Cost: \$0.00Total Cost: \$0.00**HOURLY PRODUCTION****Truck Capacity:**Truck Payload (weight) Basis:Material weight: 2,100

Pounds/LCY

Description: Earth - Loam

Rated Payload:	<u>82,000</u>	Pounds
Payload Capacity:	<u>39.05</u>	LCY

**Truck Bed (volume) Basis:**

Struck Volume:	<u>21.60</u>	LCY
Heaped Volume:	<u>31.70</u>	LCY
Average Volume:	<u>26.65</u>	LCY
Adjusted Volume:	<u>31.70</u>	LCY

Final Truck Volume Based on Number of Loader Passes: 28.98 LCY

**Loading Tool Capacity**

		Bucket Size Class: <u>Large</u>
Rated Capacity:	<u>6.900</u>	LCY (heaped)
Bucket Fill Factor:	<u>1.050</u>	Other - moist loam (100-110%) 1.050
Adjusted Capacity:	<u>7.245</u>	LCY

**Job Condition Corrections:**Site Altitude (ft.): 4830 feet

	Truck	Loader	Source
Altitude Adj:	1.000	1.000	(CAT HB)
Job Efficiency:	0.830	0.830	(CAT HB)
Net Correction:	<b>0.830</b>	<b>0.830</b>	

**Loading Tool Cycle Time:**

Number of Loading Tool Passes Required to Fill Truck: 4 passes

**Excavators and Front Shovels:**

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

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): NA minutes

Cycle Time Factors		Factor (min.)	Source
Material:	NA	NA	(Cat HB)
Stockpile:	NA	NA	(Cat HB)
Truck Ownership:	NA	NA	(Cat HB)
Operation:	NA	NA	(Cat HB)
Dump Target:	NA	NA	(Cat HB)

Net Cycle Time Adjustment:	<u>NA</u>	minutes
Adjusted Loader Cycle Time:	<u>0.380</u>	minutes
Net Load Time per Truck:	<u>1.240</u>	minutes

**Truck Cycle Time:**

Truck Exchange Time:	<u>0.60</u>	Minutes	Adjusted for site altitude:	<u>0.600</u>	Minutes
Truck Load Time:	<u>1.240</u>	Minutes	Adjusted for site altitude:	<u>1.240</u>	Minutes
Truck Maneuver and Dump Time:	<u>1.00</u>	Minutes	Adjusted for site altitude:	<u>1.000</u>	Minutes

Truck Travel (Haul & Return) Time:  
maintained 3.0

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

Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	500.00	0.00	3.00	3.00	2754	0.632

Haul Time: 0.632 minutes

Return Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)

Return Time: 0.000 minutes

Total Truck Cycle Time: 3.472 minutes

Loading Tool unit

Production

945.00

LCY/Hour

Adjusted for job efficiency:

784.35

LCY/Hour

Truck Unit Production

500.81

LCY/Hour

Adjusted for job efficiency:

415.67

LCY/Hour

Optimal No. of Trucks:

2

Truck(s)

Selected Number of Trucks:

2

Truck(s)

Adjusted hourly truck team production:

831.34

LCY/Hour

Adjusted single truck/loader team production:

784.35

LCY/Hour

Adjusted multiple truck/loader team production:

784.35

LCY/Hour

### **JOB TIME AND COST**

Fleet size:

1

Team(s)

Total job time:

44.27

Hours

Unit cost:

\$1.217

/LCY

Total job cost:

\$42,273

**SCRAPER TEAM WORK**Task description: Spread topsoil over pit area east of ditchSite: Timnath Connell PitPermit Action: May 2017Permit/Job#: M1999050**PROJECT IDENTIFICATION**Task #: 007State: ColoradoAbbreviation: NoneDate: 5/18/2017County: LarimerFilename: M050-007User: JLEAgency or organization name: DRMS**HOURLY EQUIPMENT**COSTShift basis: 1 per day

Equipment Description	
-Scraper:	Cat 637G w/push-pull
-Dozer:	Cat D10T - 10SU
Support Equipment -Load Area:	NA
-Dump Area:	NA
Road Maintenance -Motor Grader:	CAT 14M
-Water Truck:	Water Tanker, 5,000 Gal.

**Cost Breakdown:****Scraper Work Team****Support Equipment****Maintenance Equipment**

	Scraper	Dozer	Load Area	Dump Area	Motor Grader	Water Truck
%Utilization-machine:	100	100	NA	NA	50	25
Ownership cost/hour:	\$152.84	\$122.17	NA	NA	\$54.68	\$24.01
Operating cost/hour:	\$158.39	\$111.29	NA	NA	\$23.50	\$8.53
%Utilization-ripper:	NA	NA	NA	NA	NA	NA
Ripper own. cost/hour:	NA	\$0.00	NA	NA	\$0.00	\$0.00
Ripper op. cost/hour:	NA	\$0.00	NA	NA	\$0.00	\$0.00
Operator cost/hour:	\$41.46	\$40.52	NA	NA	\$38.16	\$39.38
Unit Subtotals:	\$352.69	\$273.98	NA	NA	\$116.33	\$71.93
Number of Units:	2	1	0	0	1	1
Group Subtotals:	Work:	\$979.36	Support:	\$0.00	Maint:	\$188.26

Total work team cost/hour: \$1,167.62**MATERIAL QUANTITIES**Initial volume: 10,083

CCY

Swell factor: 1.000Loose volume: 10,083

LCY

Source of estimated volume: Division of Reclamation, Mining & SafetySource of estimated swell factor: Cat Handbook**HOURLY PRODUCTION**Scraper Bowl (volume) Basis:Material weight: 1,600 lbs/LCYStruck Volume: 24.00

LCY



Material description:	Top Soil	Heaped Volume:	34.00	LCY
Rated Payload:	81,600 pounds	Average Volume:	29.00	LCY
Payload Capacity:	51.00 LCY	Adjusted Capacity:	<b>29.00</b>	LCY

Cycle Time:

Scraper Loading Time: 1.00 Minutes  
 Maneuver and Spread Time: 0.60 Minutes

Job Condition Correction:

Site Altitude: 4830 feet

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

Travel Time:Road Condition: Firm, smooth, rolling, dirt/lt. surfaced, watered, maintained 3.0Haul Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	300.00	0.00	3.00	3.00	2800	0.32

Haul Time: 0.32 minutesReturn Route:

Seg #	Haul Distance (Ft)	Grade (%)	Roll. Res (%)	Total Res (%)	Velocity (fpm)	Travel Time (min)
1	300.00	0.00	3.00	3.00	2949	0.25

Return Time: 0.25 minutes

Total Scraper team cycle time: 2.17 minutes  
 Adjusted for job conditions: 1,331.06 LCY/Hour  
 Selected Number of Scrapers: 2 Scraper(s)  
 Adjusted single scraper team (unit) hourly production: 1,331.06 LCY/Hour  
 Adjusted multiple scraper team (fleet) hourly production: 1,331.06 LCY/Hour

Unadjusted unit production/hour: 1,603.69 LCY/Hour  
 Optimal Number of Scrapers per push  
 dozer: \_\_\_\_\_

**JOB TIME AND COST**

Fleet size: 1 Team(s) Total job time: 7.58 Hours  
 Unit cost: \$0.877 /LCY Total job cost: \$8,845

**REVEGETATION WORK**Task description: **Revegetation of Affected Area**Site: **Timnath Connell Pit**Permit Action: May 2017Permit/Job#: M1999050**PROJECT IDENTIFICATION**Task #: 008State: ColoradoAbbreviation: NoneDate: 5/18/2017County: LarimerFilename: M050-008User: JLEAgency or organization name: DRMS**FERTILIZING****Materials**

Description	Units / Acre	Unit	Cost / Unit	Cost /Acre
0-20-20, 4-8-12, 10-10-10	40.00	pound	\$0.21	\$8.40
			<b>Total Fertilizer Materials Cost/Acre</b>	<b>\$8.40</b>

**Application**

Description	Cost /Acre
Tractor towed spreader (MEANS 32 01 90.13 0120)	\$144.62
<b>Total Fertilizer Application Cost/Acre</b>	<b>\$144.62</b>

**TILLING**

Description	Cost /Acre
Disc harrowing, 6" deep (MEANS 32 91 13.23 6100)	\$106.29
<b>Total Tilling Cost/Acre</b>	<b>\$106.29</b>

**SEEDING**

Seed Mix	Rate – PLS LBS / Acre	Seeds per SQ. FT	Cost /Acre
Switchgrass - Blackwell	1.25	11.16	\$11.98
Sideoats Grama - Vaughn	2.25	7.39	\$22.50
Thickspike Wheatgrass - Critana	5.50	19.44	\$31.57
<b>Totals Seed Mix</b>	<b>9.00</b>	<b>37.99</b>	<b>\$66.05</b>

**Application**

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

<b>Total Seed Application Cost/Acre</b>	<b>\$232.00</b>
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**MULCHING and MISCELLANEOUS****Materials**

<b>Description</b>	<b>Units / Acre</b>	<b>Unit</b>	<b>Cost / Unit</b>	<b>Cost /Acre</b>
Hay, delivered {MEANS 31 25 14.16 1200}	2.00	TON	\$261.00	\$522.00
<b>Total Mulch Materials Cost/Acre</b>				<b>\$522.00</b>

**Application**

<b>Description</b>	<b>Cost /Acre</b>
Crimping, with tractor {DMG survey data}	\$66.02
Power mulcher (MEANS 32 91 13.16 0350)	\$99.32
<b>Total Mulch Application Cost/Acre</b>	<b>\$165.34</b>

**NURSERY STOCK PLANTING**

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

**JOB TIME AND COST**

No. of Acres:	23.52	Cost /Acre:	\$1,244.70
Estimated Failure Rate:	25%	Cost /Acre*:	\$298.05
*Selected Replanting Work Items:	SEEDING		

Initial Job Cost:	<b>\$29,275.34</b>
Reseeding Job Cost:	<b>\$1,752.53</b>
Total Job Cost:	<b>\$31,028</b>
Job Hours:	<b>23.52</b>

**EQUIPMENT MOBILIZATION/DEMOBILIZATION**Task description: **Mobilization of Equipment**Site: **Timnath Connell Pit**Permit Action: **May 2017**Permit/Job#: **M1999050****PROJECT IDENTIFICATION**Task #: **009**State: **Colorado**Abbreviation: **None**Date: **5/18/2017**County: **Larimer**Filename: **M050-009**User: **JLE**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:**

<b>Available Rig Capacities</b>	<b>0-25 Tons</b>	<b>26-50 Tons</b>	<b>51+ Tons</b>
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 637G w/push-pull	59.59	\$152.84	\$125.45	2	\$556.58	\$250.90	\$500.00
CAT 836H	54.88	\$164.18	\$125.45	1	\$289.63	\$125.45	\$250.00
CAT 14M	23.57	\$54.68	\$88.67	2	\$286.70	\$177.34	\$500.00
Cat 365C L 13'-7" Stick	77.56	\$109.56	\$125.45	1	\$235.01	\$125.45	\$250.00
Cat 770D	37.54	\$78.80	\$117.55	2	\$392.70	\$235.10	\$500.00
Drill/Broadcast Seeder with Tractor	25.00	\$12.22	\$88.67	2	\$201.78	\$177.34	\$500.00
Power Mulcher (Bowie LD-90)	6.00	\$7.03	\$88.67	1	\$95.70	\$88.67	\$250.00

Subtotals: **\$2,582.14** **\$1,431.15** **\$3,250.00****ROADABLE EQUIPMENT:**

Machine Description	Total Cost/hr/ unit	Fleet Size	Haul Trip Cost/hr/ fleet	Return Trip Cost/hr/ fleet
Water Tanker, 5,000 Gal.	\$97.52	1	\$97.52	\$97.52
Fuel Tanker, 6x4, 210 HP	\$74.87	2	\$149.74	\$149.74

Subtotals:	<b>\$247.26</b>	<b>\$247.26</b>
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**EQUIPMENT HAUL DISTANCE and Time**

Nearest Major City or Town within project area region:	<u>WINDSOR</u>	
Total one-way travel distance:	<u>7.40</u>	miles
Average Travel Speed:	<u>45.00</u>	mph

Total Non-Roadable Mob/Demob Cost *	<u>\$18,974.77</u>
'* two round trips with haul rig:	
Total Roadable Mob/Demob Cost **	<u>\$81.32</u>
** one round trip, no haul rig:	

**Transportation Cycle Time:**

	Non-Roadable Equipment	Roadable Equipment
Haul Time (Hours):	<u>0.16</u>	<u>0.16</u>
Return Time (Hours):	<u>0.16</u>	<u>0.16</u>
Loading Time (Hours):	<u>1.08</u>	<u>NA</u>
Unloading Time (Hours):	<u>1.08</u>	<u>NA</u>
Subtotals:	<u>2.49</u>	<u>0.33</u>

**JOB TIME AND COST**

Total job time: 4.98 Hours

Total job cost: \$19,056