

From: [Lilla, Mandy](#)
To: [Ohuri, David, EMNRD](#); [Shelley, Thomas L.](#)
Cc: [Shepherd, Holland, EMNRD](#)
Subject: [EXTERNAL] RE: Little Rock Northern Haul Road Response to MMD Comments
Date: Wednesday, September 29, 2021 3:37:28 PM
Attachments: [210902_Table1.pdf](#)
[210902_LittleRock_N_HaulRoad_RCE.xlsm](#)
[20210913-100.pdf](#)

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Hi David,

Attached is a copy of electronical of the letter and cost estimate. Tyrone accidentally did not attach the table and excel spreadsheet to the original letter. Tyrone will send the complete PDF (the 3 files combined) tomorrow. If you need anything else or have questions, please let us know. Thanks.

Mandy J Lilla

Senior Engineer

Office: (575) 912 – 5388

Cell: (575) 313 – 7142

Email: mlilla@fmi.com

From: Ohori, David, EMNRD <david.ohori@state.nm.us>
Sent: Wednesday, September 29, 2021 1:37 PM
To: Shelley, Thomas L. <tshelley@fmi.com>; Lilla, Mandy <mlilla@fmi.com>
Cc: Shepherd, Holland, EMNRD <holland.shepherd@state.nm.us>
Subject: [External] FW: Little Rock Northern Haul Road Response to MMD Comments

Caution: External Email

Hi Tom,

I still cannot locate a copy of the updated cost estimate that was supposed to be attached to Tyrone's September 13, 2021 letter.

Please send an electronic copy of it to me so that we can review it.

Thanks.

-David

David Ohori
Supervisor, Senior Reclamation Specialist
New Mexico Mining and Minerals Division
1220 So. St. Francis De.

Santa Fe, NM 87050
(505) 216-8945
David.Ohori@state.nm.us

From: Ohori, David, EMNRD
Sent: Monday, September 27, 2021 9:20 PM
To: Mandy Lilla (mlilla@fmi.com) <mlilla@fmi.com>
Cc: Tom Shelley (tshelley@fmi.com) <tshelley@fmi.com>; Holland.Shepherd@state.nm.us
Subject: Little Rock Northern Haul Road Response to MMD Comments

Hi Mandy,

On September 17th MMD received the Response to Comments letter from Tyrone dated September 13, 2021. I don't seem to have an electronic copy of the letter and the updated cost estimate that the letter indicated was attached. Please send (or resend) me an e-copy of the letter and the updated cost estimate.

Thanks.

-David

David Ohori
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Tyrone Operations
P.O. Box 571
Tyrone, NM 88065

September 13, 2021

Certified Mail #9171999991703579962778
Return Receipt Requested

Mr. David Otori
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Program
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Otori:

Re: Little Rock Northern Haul Road, GR007RE Modification 21-1

Freeport-McMoRan Tyrone Inc. (Tyrone) submitted a request on July 7, 2021, for an amendment to the Revision 20-1 application to Little Rock Mine for the construction of the Northern Haul Road. During a phone call on June 24, 2021, the Mining and Minerals Division (MMD) notified Tyrone that they would process the request as a modification to permit GR007RE. Tyrone submitted the application fee in a letter dated August 11, 2021. In a letter dated August 27, 2021, MMD submitted comments on Modification 20-1 (Mod. 20-1) for the Northern Haul Road. This letter is in response to MMD comments.

Below are MMD comments in italics followed by Tyrone's response.

- 1. MMD reviewed the Little Rock Mine Reclamation Cost Estimate dated February 12, 2021, that was submitted as a supplement to the Little Rock Mine Updated CCP and provided comments to Tyrone on it in an email dated May 6, 2021. Tyrone responded to the MMD comments on the cost estimate in an email dated June 8, 2021. MMD concurs with the changes to the Little Rock Mine Updated CCP Cost Estimate that Tyrone committed to in the June 8, 2021 email that are used in the Northern Haul Road Reclamation Cost Estimate. However, MMD is concerned that the fuel cost of \$1.90 per gallon used both the Northern Haul Road Reclamation Cost Estimate and the Little Rock Mine Updated CCP Cost Estimate may need to be updated. Please provide the current fuel cost and revise both cost estimates or justify why the \$1.90 per gallon fuel cost should be used.*

Tyrone has updated the diesel fuel cost to August 2021 costs and attached is the updated cost estimate.

2. *Figures 1 and 2 of the Application are plan-view drawings depicting the Northern Haul Road Area Post Mining, and Northern Haul Road Area Post Reclamation, respectively. The Northern Haul Road Area shown in these drawings correlates to portions of Sheet Number 6 and 7, Deadman Diversion East In-Pit Waste Closure Plan, Plan Views and Sectional Views, Appendix A, Reclamation Design Drawings of the Updated CCP. The Application should have referred to Sheet Numbers 6 and 7 of the Updated CCP as they provide greater detail than Figures 1 and 2, especially regarding the re-establishment of the Deadman Canyon Drainage.*

Tyrone acknowledges the comment from MMD and in future applications, Tyrone will reference existing figures where possible.

3. *Description of Portions of the Revision Requested for Partial Approval, pages 1 and 2 of the Application provides information regarding the construction of the Northern Haul Road and states that the fill placed during the construction of the haul road will be removed at mine closure to build the Deadman Canyon Diversion and to re-establish the Deadman Canyon drainage. Reference is made to Appendix A and C of the Little Rock Mine Updated CCP dated June 11, 2020. Please confirm that the reclamation information provided in the Little Rock Mine Updated CCP pertaining to the reclamation of the Northern Haul Road, including Section 4.3, Haul Roads and Access Roads; Section 8.0 Reclamation Schedule; Table 3-2: Summary of Key Design Criteria for Facilities to be Closed; Table 6-1: Proposed Interim Seed Mix and Rates for the Little Rock Mine Reclamation Sites; and Table 8-1: Reclamation Schedule for the Little Rock Mine; and others, if applicable, are included by reference in the Modification 20-1 Application.*

The reclamation information and references provided above and in the Little Rock Mine Updated CCP submitted February 2021 are applicable to the Northern Haul Road.

4. *On August 13, 2021, MMD sent an email to Tyrone with a drawing, Figure 2-1 EOY 2024 Little Rock Mine Facilities and Permit Boundaries of the Updated CCP, depicting a Design Limit for the Little Rock Mine that is more constrained than the Design Limit proposed in Tyrone's application for the Little Rock Mine expansion and Updated CCP. MMD would like to discuss this drawing and the proposed Little Rock Mine Design Limit at Tyrone's earliest convenience and as part of MMD's review of the Revision 20-1 application for the mine expansion and the Updated CCP.*

The Northern Haul Road is located within the currently approved Design Limits for Little Rock Mine and is a separate matter from the expanded design limits for the Rev. 20-1 application.

Tyrone and MMD met on Thursday, September 10, 2021 to discuss the August 13, 2021 drawing and the proposed Design Limit. Additional discussions are planned and per the MMD and Tyrone meeting held July 27, 2021, Tyrone will submit an amended application to Rev. 20-1 for a change in design limit within 60 days of Mod. 20-1 being approved.

Below are the New Mexico Environment Department Mining Environmental Compliance Section (MECS) comments in italics followed by Tyrone's response.

1. *Based on a review of the unit cost tab in the 210706_LittleRock_N_HaulRoad_RCE.xlsx spreadsheet, it is unclear if the fuel costs are based on current (i.e., 2021 fuel costs). Please clarify if current costs were included in the estimate.*

See Tyrone's response to MMD's comment number 1.

2. *Discharge Permit Amendment 16-02, DP-1236 was issued on July 23, 2021 to Freeport-McMoRan Tyrone Operations for expansion of the footprint of the existing Little Rock Haul Road, construction of the East In-Pit and NRW Waste Rock Stockpiles, and expansion of the footprint of the existing North In-Pit and West In-Pit Waste Rock Stockpiles. The expanded footprint of the Little Rock Haul Road is referred to as the Northern Haul Road in DP-1236 Permit Amendment. As stated in the DP-1236 Amendment, the North Haul Road shall be constructed in a manner described in the Amendment request and the approved Waste Rock Characterization and Handling Plan dated June 6, 2016.*

Tyrone agrees.

Below is a summary of the New Mexico Air Quality Bureau comments in italics, followed by Tyrone's response.

1. *The facility has an air quality permit – PSD8448M5. The Bureau summarizes requirements and common control practices. The Air Quality Bureau has no objection to approve this request.*

Tyrone submitted a recent update to its' air quality permit which includes the activities (including the Northern Haul Road) for the Little Rock Mine. This permit was issued on March 9, 2021 as PSD2448M6. In addition, the facility is not subject to 20.2.15 NMAC since this is not a Pumice, Mica, and Perlite Processing Facility. No additional response to this comment is required.

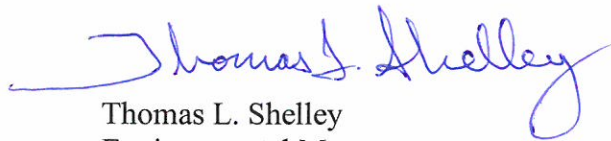
Below is Tyrone's response to the New Mexico Surface Water Quality Bureau comments.

Mr. David Otori
September 13, 2021
Page 4

Tyrone acknowledges the comments from the New Mexico Surface Water Quality Bureau (SWQB), which were received in a letter from the Mining Environmental Compliance Section (MECS) and the SWQB which was dated December 18, 2020. On February 16, 2021, Tyrone provided a response that addressed comments from both bureaus. The response included additional information that had been requested. In a letter on behalf of the MECS and SWQB that was dated June 8, 2021, the agency granted approval of Tyrone's Little Rock geochemical model update and indicated that Tyrone's February 16, 2021 response had satisfactorily addressed NMED's questions.

Please contact Ms. Mandy Lilla at (575) 912-5388 if you have questions.

Sincerely,



Thomas L. Shelley
Environmental Manager
Environmental Services

TLS:mjl
20210913-100

c. Holland Shepherd – MMD

Table 1		
Facility	¹ Northern Haul Road	Deadman Diversion
Reclaimed Acres	9.7	12.8
Earthwork		
Capital Costs	\$ 2,408	\$ 1,685,858
Indirect Costs	\$ 722	\$ 505,757
Total Costs	\$ 3,130	\$ 2,191,615
O&M		
Capital Costs	\$ 1,996	\$ 2,630
Indirect Costs	\$ 349	\$ 460
Total Costs	\$ 2,346	\$ 3,090
¹ Extraction of costs pertaining to Northern Haul Road ('Haul Roads') only.		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Item	Facility	Sub Area or Destination for Cover Material	Description	Area (sf)	Volume (cy)	Push Distance (ft)	Coarse Regrading and Fine Grading (%)	One-Way Scraper Haul (ft)	Scraper Grade (%)	Down Drains (ft)	Downdrain Dissipater (ea)	Channels (ft)	Bench Grading (ft)	Distance (ft)	Average Grade (%)	Distance (ft)	Average Grade (%)	Distance (ft)	Average Grade (%)	Cover Depth (in)	Swell Factor (%)	Material Factor for Coarse Regrading	Material Factor for Fine Grading Cover	Material Weight for Coarse Regrading (lb/cy)	Material Weight for Fine Grading Cover (lb/cy)	Ripping Length (ft)
1400	Haul Roads	HR-0	Haul Roads	421,800	-															0.4	0%	1.0	1.2	3,600	3,600	1,000
1401	Northern Haul Road	HR-1	Flat Area (Haul Road)	421,800	-															0.4	0%	1.0	1.2	3,600	3,600	1,000
1700	Deadman Diversion	Diversion-0	Diversion	555,575	-															0.4	0%	1.0	1.2	3,600	3,600	1,000
1701	East In-Pit Fill Material	Diversion-1	Cut/Fill	344,445	48,339	-								325	15.12%	329	0.00%	110	15.81%	0.4	0%	1.0	1.2	3,600	3,600	1,000
1702	Northern Haul Road Fill Material	Diversion-2	Cut/Fill	367,421	1,032,818	-	-29.0%							390	10.2%	346	-11.5%	-	-	0.4	0%	1.0	1.2	3,600	3,600	1,000
1703	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Diversion-3	Cut/Fill	45,500	16,900	-	-29.0%							329	-20.0%	-	-	-	-	0.4	0%	1.0	1.2	3,600	3,600	1,000
1704	Deadman Diversion Outslope	Diversion-4	Outslopes	-	47,432	20	-29.0%			798	-	2,232	2,232							0.4	0%	1.0	1.2	3,600	3,600	1,000
5000	CLW Waste		1000 Cover Material	-										1,396	-9.2%	-	0.0%	-	0.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000
5001	CLW Waste		1100 Cover Material	-										4,939	-8.9%	3,259	1.9%	1,074	-15.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000
5002	CLW Waste		1200 Cover Material	-										550	15.0%	-	0.0%	-	0.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000
5003	CLW Waste		1300 Cover Material	-										3,498	-7.5%	1,443	2.1%	-	0.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000
5004	CLW Waste		1700 Cover Material	-										4,939	-8.9%	3,259	1.9%	1,074	-15.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000
5005	CLW Waste		2100 Cover Material	-										3,064	-3.9%	1,592	1.2%	430	-6.0%	0.4	8%	1.0	1.2	3,600	3,600	1,000

1	2	3	4	28	29	30	31	32	33	34	35	36	37	38	39	40
Item	Facility	Sub Area or Destination for Cover Material	Description	Breach Dams (cy)	Start of Reclamation Year	Reclamation Complete	Temporary Fence (ft)	Berm (ft)	Chain Link Fence (ft)	Vehicle Gates	Signs Posted Every 500 ft	Grade Control Wall (cy concrete)	Deadman Diversion Channel	Replace Infrastructure	Plug and Abandon Well (ft)	Replace Well (ft)
1400	Haul Roads	HR-0	Haul Roads	-	Jan-32	Dec-32	-	-	-	-	-	-	-	-	-	-
1401	Northern Haul Road	HR-1	Flat Area (Haul Road)	-	Jan-32	Dec-32	-	3,968	-	-	-	-	-	-	-	-
1700	Deadman Diversion	Diversion-0	Diversion	-	Jan-26	Dec-27	-	-	-	-	-	-	-	-	-	-
1701	East In-Pit Fill Material	Diversion-1	Cut/Fill	-	Jan-26	Dec-27	-	-	17,917	-	-	-	1,400	-	-	-
1702	Northern Haul Road Fill Material	Diversion-2	Cut/Fill	-	Jan-26	Dec-27	-	-	-	-	-	-	-	-	-	-
1703	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Diversion-3	Cut/Fill	-	Jan-26	Dec-27	-	-	-	-	-	-	-	-	-	-
1704	Deadman Diversion Outcrop	Diversion-4	Outcrops	-	Jan-26	Dec-27	-	-	-	-	-	-	-	-	-	-
5000	CLW Waste		1000 Cover Material													
5001	CLW Waste		1100 Cover Material													
5002	CLW Waste		1200 Cover Material													
5003	CLW Waste		1300 Cover Material													
5004	CLW Waste		1700 Cover Material													
5005	CLW Waste		2100 Cover Material													

Data from 2020 Little Rock Mine CCP

Item	Activity	Description
A	Grade	Rough grading original material or fine grading cover material
B	Dozer Assist	Dozer is used to assist loader or shovel at cover stockpile or assist scrapers during rough grading
C	Load	Cover material is loaded at borrow areas onto haul trucks
D	Haul	Haul trucks transport cover material from borrow areas to destination stockpiles
E	Rip	Tops of stockpiles are ripped before placing cover to compensate for compaction of soil during rough grading. Stockpiles are also ripped before rough grading with a scraper. Borrow stockpile ripped before revegetation.
F	Grade Benches	Benches are graded at stockpiles and tailings after fine grading
G	Construct Downdrains	Downdrains are constructed after fine grading and consist of articulated concrete blocks (ACB's)
Gb	Construct Downdrain Dissipators	Energy dissipators are specified as part of the downdrains
H	Construct Channels w/ Riprap	Channels are constructed after final grading. Construction includes excavation and wasting, riprap production, riprap and filter placement, and final grading.
Hb	Construct Channels w/o Riprap	Channels are constructed after final grading. Construction includes excavation and wasting and final grading.
I	Construct Top/Outslope Channels	Top and outslope channels are included with H and Hb for this RCE
J	Revegetate	Occurs after final grading and channel construction and includes tractor rental and maintenance, fuel, scarifying, disking, drill seeding, mulching, crimping, seed, and mulch
Jb	Manual Seeding	Seeding for areas inaccessible by heavy equipment
K	Perforate Liner	Reservoir liners are perforated prior to reclamation
L	Replace Infrastructure	Replacing infrastructure is not part of this RCE
M	Post-Closure O&M	Includes vegetation maintenance for 12 years after reclamation and erosion control, road maintenance, and groundwater monitoring for 100 years after reclamation
N	Plug and Abandon Well	Well borehole is backfilled with cement grout
O	Replace Well	Includes borehole drilling, casing, and cementing
P	Road Maintenance	Dust suppression and road maintenance with water truck and motor grader
Q	Construct Haul Road	For shorter hauls etc.
R	Construct Berms	Berming for stormwater runoff control
Sa	Chain Link Fence	Fencing for pit area
Sb	Livestock Fence	Temporary fencing for revegetated areas
T	Build Grade Control Walls	Grade control in each drainage of Tailing Launder Line removal
U	Vehicle Gates	Limited access around open pits
V	Signs Every 500 ft	Warning signs posted every 500 feet around open pits
W	Deadman Diversion Channel	Used to construct Deadman Diversion
X	Compaction	Dozer and water truck used for compaction of fill at Deadman Diversion
Item	Material	Description
a	Existing Ground	Existing ground before rough grading
b	Cover	Cover material from cover stockpiles, before being placed at destination location
c	Rough Graded Material	Existing ground after rough grading
d	Placed Cover	Cover material after being placed at destination location
e	Final Grade	Facility material and cover material after rough grading and fine grading
f	Fill/Stockpile Material	Material used to construct Deadman Diversion. May also include material used backfill pit/ponds or stockpile material used in pullback.

Not all activities are used in this RCE. Other activities are kept for alternatives and testing purposes and to maintain spreadsheet integrity

Unit Rates

Code	Activity	Base Per Unit Cost	Fuel Per Unit Cost	Units	Source	Reference
U1	Fuel	\$ 2.71	\$ -	gal	-	Diesel fuel cost is estimated by correlating historical local quotes with public data, as agreed upon in November 2018 discussions with the agencies. Fuel cost includes direct and indirect costs at \$1.90/gal.
U2a	Revegetation	\$ 854.60	\$ 4.46	ac	Revegetation Unit Cost Sheet	See unit rates calculations - Cost is based on a calculated unit rate that includes tractor rental and maintenance, fuel, scarifying, discing, drill seeding, mulching, crimping, seed, and mulch.
U2b	Seed	\$ 222.85	\$ -	ac	Quote	Rocky Mountain Reclamation, 4/2018, est. cost for seed at 8.9 PLS/ac, \$210/ac. Escalated 2% 2018-2021= \$222.85/ac
U2c	Mulch	\$ 260.00	\$ -	ton	Quote	Rocky Mountain Reclamation, 4/2018, est. cost for hay mulch (nox. weed free, native), \$245/ton). Escalated 2% 2018-2021= \$260.00/ton
U2d	Manual Seeding	\$ 248.64	\$ -	day	Means Line Item 329343.10 0560	Planting, trees, shrubs, and ground cover, medium soil, bare root seedlings, 3" to 5", includes planting only
U3	Bench Grading Stockpile	\$ 1.62	\$ 0.47	ft	Bench Grading Unit Cost Sheet	See unit rates calculations
U4	Bench Grading Tailings Pond	\$ 1.62	\$ 0.47	ft	Bench Grading Unit Cost Sheet	See unit rates calculations
U5	Deadman Diversion Channel Construction	\$ 490.73	\$ -	ft	Quote	See unit rates calculations
U6	Downdrain Construction	\$ 389.66	\$ -	ft	Downdrain Unit Cost Sheet	See unit rates calculations
U7	Downdrain Dissipater	\$ 15,106.89	\$ -	ea	Downdrain Unit Cost Sheet	See unit rates calculations
U8a	Channel Construction w/ Riprap	\$ 7.23	\$ 1.58	ft	Channel Unit Cost Sheet	See unit rates calculations
U8b	Channel Construction w/o Riprap	\$ 0.48	\$ 0.15	ft	Channel Unit Cost Sheet	See unit rates calculations
U9	Erosion Control	#REF!	#REF!	day	Modified Crew B-13A	Erosion control for O&M - includes 1 foreman, 2 laborers, 1 equipment operator, 2 truck drivers, 1 loader (4 cy), 2 dump trucks (8 cy)
U10	Structure Demolition	\$ 0.23	\$ -	cf	Means Line Item 024116.13 0100	Building demolition, large urban projects, mixture of types, excludes foundation demolition, dump fees
U11	Concrete Slab Demolition	\$ 0.62	\$ -	sf	Means Line Item 024116.17 0400	Building footings and foundations demolition, floors, concrete slab on grade, plain concrete, 6" thick, excludes disposal costs and dump fees
U12	Storage Tank Demolition	\$ 1,059.54	\$ -	ea	Means Line Item 130505.75 0530	Selective Demolition - Storage Tanks, steel tank, single wall, above ground, not including foundations, pumps or piping, 5,000 thru 10,000 gallon
U13	Storage Tank Demolition	\$ 2,098.05	\$ -	ea	Means Line Item 130505.75 0540	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping
U14a	Power Line Demolition	\$ 0.63	\$ -	ft	Means Line Item 260505.10 0370	Electrical Demolition - Nonmetallic sheathed cable 3 wire; assume similar enough in cost to overhead powerlines.
U14b	Power Line Demolition	\$ 4,341.20	\$ -	day	Crew B-12N Crew B-17 Crew B-68C	Bare Costs: 2-laborers (B17: \$44.40/hr, \$710.40/day), 1-equipment operator (light) (B17: \$55.50/hr, \$444/day), 1-truck driver (heavy) (B17: \$51.30/hr, \$410.4/day), 1-48 HP backhoe loader (B17: \$216.20/day), 1-8 cy 220 HP dump truck (B17: \$407.60/day), 1-electrician (B68C: \$63.70/hr, \$509.60/day), 1-25-ton hydraulic crane (B12N: \$1152/day), 1-crane operator (B12N: \$61.45/hr, \$491.60/day)
U15	Power Pole Demolition	\$ 220.56	\$ -	ea	Means Line Item 024113.80 0200	Selective Demolition - wood utility poles 35-45 ft high
U16	Pipeline (small HDPE pipe)	\$ 3.01	\$ -	ft	Pipeline Demo Sheet	Selective demolition water, process water HDPE piping; (6 to 8-inch diameter); excludes excavation
U17	Pipeline (large HDPE pipe)	\$ 7.17	\$ -	ft	Pipeline Demo Sheet	Selective demolition water, process water HDPE piping (20 to 36-inch diameter); excludes excavation
U18	Well Plug & Abandon	\$ 18.90	\$ -	ft	Quote	Unit cost of \$18.17/ft is based on a July 2019 direct quote from Layne, A Granite Company (formerly Layne Christensen Company) for a total of 172,631 ft of well and exploration borehole abandonment over 300 days (575 ft/day); the unit cost includes 1 mobilization (\$15,000) and 1 demobilization (\$15,000) spread over 300 days at 575 ft/day. Escalated 2% 2019-2021 = \$18.90
U19	Well Replacement	\$ 70.50	\$ -	ft	Quote	Wilcox Professional Services, 8/2011, est. cost for 5 ½ in bore, \$173,500 for 3000 ft total (\$57.83/ft). Escalated 2% 2011-2021= \$70.50/ft
U20	Seepage Collection Replacement	\$ 133,355.94	\$ -	ea		Est. cost from 2019 Tyrone RCE
U21	Reinforced Concrete Wall Demolition	\$ 190.58	\$ -	hr	Means Crew B-12C	Standard Union Crew: 1 equipment operator (crane), 1 laborer, 1 hydraulic excavator, 2 cy, approximately 40 hrs to demo 200 ft reinforced concrete dam.
U22	Disc harrow attachment, for tractor	\$ 670.65	\$ -	month	Means Line Item 015433.20 1500	Equipment rental costs
U23	Cast-In-Place Concrete	\$ 262.58	\$ -	cy	Means Line Item 033053.40 6200	Structural concrete, in place, gravity retaining wall (3000 psi), includes forms and reinforcement
U24	Cleanup & Disposal of Wastes Requiring Special Handling	\$ 334.41	\$ -	ton	Means Line Item 028120.10 1120/1130	Solid pickup; average of minimum and maximum
U25	Transportation of Wastes Requiring Special Handling	\$ 4.78	\$ -	mile	Means Line Item 028120.10 1260/1270	Transportation to disposal site (Truckload = 80 drums or 25 cy or 18 tons); average of minimum and maximum
U26	Road Maintenance	#REF!	#REF!	month		Road maintenance for O&M - includes one 14M motor grader and one 6,000-gal water truck
U27	Berming	\$ 0.37	\$ -	ft	See Berm Unit Cost Sheet	See unit rates calculations
U28	Livestock Fencing	\$ 0.15	\$ -	ft	Means Line Item 323126.20 0020	Wire fencing & gates, wire fencing general, barbed wire, galvanized, domestic steel, standard, 12-3/4 ga.
U29	Chain Link Fencing	\$ 24.65	\$ -	ft	Means Line Item 323113.20 0800	Fence, chain link industrial, galvanized steel, 6 ga. wire, 2" posts @ 10' OC, 6' high, includes excavation, & concrete, excludes barbed wire
U30	Vehicle Gates, Pit Perimeters	\$ 957.01	\$ -	ea	Means Line Item 323113.20 5070	Fence, chain link industrial, double swing gates, 6' high, 20' opening, includes excavation, posts & hardware in concrete
U31	Signs every 500 ft., pit perimeters	\$ 73.63	\$ -	ea	Means Line Item 101453.20 0600	Signs, guide and directional signs, reflectorized, 12" x 18", excludes posts
U32	Fire Hydrant Demolition	\$ 398.83	\$ -	ea	Means Line Item 024113.23 0900	Utility removal, hydrants, fire, remove only, excludes hauling
U33	Culvert Removal	\$ 12.46	\$ -	ft	Means Line Item 024113.40 0190	Selective demolition, metal drainage piping, CMP, steel, 48"-60", diameter, excludes excavation
U34	Grade Control Wall	\$ 170.79	\$ -	cy	Means Line Item 033053.40 3945	Structural concrete, in place, continuous strip footing (3000 psi), 36" wide x 12" deep, unreinforced, includes forms(4 uses), concrete (Portland cement Type I), placing and finishing, excludes reinforcing
U35	Sludge Removal	\$ 305.54	\$ -	ea	Means Line Item 026510.30 0320	Removal of underground storage tanks, petroleum storage tanks, non-leaking, remove sludge, water and remaining product from tank bottom of tank with vacuum truck, 9,000 - 12,000 gallon tank
U36	Earth Fill Removal (dozer excavate, haul, spread)	\$ 5.20	\$ -	cy	Means Line Item 312316.46 6070	Excavating, bulk, dozer, open site, bank measure, common earth, 700 HP dozer, 300' haul
U37	Concrete Foundation and Metal Arch (excavate and load)	\$ 1.55	\$ -	cy	Means Line Item 312316.46 6010	Excavating, bulk, dozer, open site, bank measure, common earth, 700 HP dozer, 50' haul
U38	Concrete Foundation and Metal Arch (haul and dump)	\$ 2.87	\$ -	cy	Means Line Item 312323.20 5040	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 22 C.Y. truck, cycle 1 mile, 5 MPH, excludes loading equipment
U39	Substation Demo	\$ 12,266.20	\$ -	ea	Substation Unit Cost Sheet	See unit rates calculations
U40	Clay Fill	\$ 12.61	\$ -	cy	Means Line Item 312323.15 6075	Clay fill (material cost only)
U41	Transformer	\$ 1,069.16	\$ -	Ea.	Means Line Item 260505.10 1570	Transformer, dry type, primary, 3 phase, to 600 V, 750 kVA, electrical demolition, remove, including removal of supports, wire & conduit terminations
U42	Steam Cleaner	\$ 313.04	\$ -	week	Means Line Item 015433.40 6300	Rent steam cleaner 100 gph, incl. Hourly Oper. Cost.

RS Means Location Adjustment: New Mexico Las Cruces 85.2%

Not all unit rates are used in this RCE. Other unit rates are kept for alternatives and testing purposes and to maintain spreadsheet integrity
[1] Applied to RSM derived costs only. Equipment/Watch items and items based on local quotes adjusted at base rate
RS Means Online, 2021, New Mexico Las Cruces

EARTHWORK AND O&M EQUIPMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Code	Equipment Description	Equipment Type	Fuel Consumption (gal/hr)	Fuel Cost (\$/hr)	Lube Cost (\$/hr)	Field Parts & Ground Engaging Component Cost (\$/hr)	Tire Cost (\$/hr)	Monthly Rental Rate (\$/month)	Field Labor Time Cost (\$/hr)	Rental Cost (w/o fuel, lube, tires, or field parts) (\$/hr) ¹	Lube, Tires, GEC, & Field Parts Adjusted Rental Cost (w/o fuel) (\$/hr)	Dosing Production (bcy/hr) ¹										Haul Travel Time (min/m) = A/(Eff. Grade %) ¹ + B/(Eff. Grade %) ¹ + C/(Eff. Grade %) ¹ + D/(Eff. Grade %) ¹ + E										Loaded Speed (mph) ³	Empty Speed (mph)	Pass Overlap (ft)	Operator Factor: Coarse Regrading	Operator Factor: Fine Grading, Cover, Other Surfaces, and Channels	Visibility Factor	Elevation Factor	Direct Drive Trans.	Production Method/ Blade Factor: Coarse and Fine Grading																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Comb1	Cat 14M Off-Hwy Water Tanker Truck 6,000-gal	placeholder	0.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

- ¹ Loader Cycle Time = load, dump, and maneuver time
- ² Performance information is unavailable for the Hitachi EX3600-5; therefore, performance information for the Caterpillar 5230B FS has been used
- ³ Performance information is unavailable for the Komatsu 730E; therefore, performance information for the Caterpillar 769D has been used
- ⁴ Maximum loaded speed listed for trucks and scrapers
- ⁵ Equipment costs use 176 max work hours per month (from Bluebook)
- ⁶ Fuel consumption assumed to be the same for the D11T and D11T CD (fuel consumption information unavailable for the D11T CD in EquipmentWatch)
- ⁷ Rental rates and component costs for Hitachi EX3600-5 and Komatsu HD-1500 5 from May 2020

Not all equipment is used in this RCE. Extra equipment is kept for alternatives and testing purposes and to maintain spreadsheet integrity

FUEL		Reference
Earthwork Oil Broker Quote (\$/gal)	\$ 2.71	2

EARTHWORK AND O&M LABOR		Total 2020 Rate (\$/hr)	Reference
NMDOL Type A Operator Group			
Equipment Operator IV	\$	28.65	3
Equipment Operator V	\$	28.77	3
Equipment Operator VI	\$	28.95	3
Laborer I	\$	23.88	3
Laborer II	\$	24.63	3
Truck Driver V	\$	24.65	
Truck Driver VI	\$	24.82	
Truck Driver VII	\$	24.96	
Truck Driver VIII	\$	25.16	
Equipment Operator VII	\$	28.97	
Equipment Operator VIII	\$	30.93	

Equipment costs use 176 max work hours per month (from Bluebook)

- References
1. Equipment unit rates from EquipmentWatch Custom Cost Evaluator January 2021 (<http://www.equipmentwatch.com>). See attachments for rate development. Excavator capacity and maximum reach at ground level from EquipmentWatch.
2. Diesel fuel cost is estimated based on a predictive equation developed by conservative U.S. No. 2 diesel retail prices (U.S. Energy Information Administration) and FMI local fuel quotes, as agreed upon in November 2018 discussions with the agencies. The correlation is based on a dataset for the period from 1995-2018. Fuel cost includes direct and indirect costs at \$1.90/gal.
3. Labor rates based on New Mexico Department of Labor (NMDOL) Type H (Heavy Engineering) 2021 labor rates. Rates include base hourly wage, fringe benefit, and apprenticeship contribution rates. https://www.dws.state.nm.us/Portals/0/PDMLaborRelations/Prevailing_Wage_Poster_H_2021.pdf
4. Production and Haul rates from Caterpillar Performance Handbook; Equipment parameters from Caterpillar Performance Handbook

Code	Equipment Description	Equipment Type	Production Method/ Blade Factor: Channels, Downdrains, Benches	Work Hour (min/hr)	Effective Blade Width (ft)	Ripper Factors					Net Bucket Capacity (cy)	Loader Cycle Time (min)	Bucket Fill Factor	Struck Capacity (cy)	Heaped Capacity (cy)	Sheepsfoot Roller Width (ft)	Max Reach at GL (in)	Swing Time (Loaded) (min)	Swing Time (Empty) (min)	Rolling Resistance (%)	Truck Exchange Time (min)	Dump/Maneuver Time (min)	Rated Load (lb)	Load Time (min)	Maneuver & Spread Time (min)	Push Cycle Time Diff			NMDOL Operator Group	NMDOL Total 2021 Rate (\$/hr)			
						Penetration (in)	Pocket Spacing (in)	Number of Pockets	Turn Time (min/pass)	Dist. b/h Passes (in)																Boost Time (min)	Return Time and Load Time (min)	Maneuver Time (min)					
Comb1	Cat 14M, Off-Hwy Water Tanker Truck,6,000-gal	placeholder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Truck Driver V & Equipment Operator VI	\$ 24.65		
Dz1	Cat D11T, U Blade	Dozer	-	1	50	18.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator V & Truck Driver V	\$ 53.60		
Dz2	Cat D11T, CD	Dozer ²	-	1	50	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator IV	\$ 28.65		
Dz3	Cat D6T, SU Blade	Dozer	-	1	50	14.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator IV	\$ 28.65		
Dz4	Cat D6T, SU Blade	Dozer	-	1	50	10.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator IV	\$ 28.65		
Dz5	Cat D6T XL, SU Blade	Dozer	-	1	50	10.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator IV	\$ 28.65		
Ex1	Cat 319D L	Excavator	-	-	50	-	-	-	-	-	-	-	0.875	-	1.00	3	380	0.09	0.07	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator V	\$ 28.95	
Ld1	Cat 962K	Loader	-	-	50	-	-	-	-	-	-	14.9	0.65	0.875	-	16.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Ld2	Cat 988H	Loader	-	-	50	-	-	-	-	-	-	7.3	0.575	0.875	-	9.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Ld3	Cat 980H	Loader	-	-	50	-	-	-	-	-	-	6.6	0.525	0.875	-	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Ld4	Cat 966H	Loader	-	-	50	-	-	-	-	-	-	4.8	0.525	0.875	-	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Ld5	Cat 953K	Loader	-	-	50	-	-	-	-	-	-	17.5	0.65	0.875	-	20.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Mg1	Cat 16M	Motor Grader	-	1	50	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VIII	\$ 30.93	
Mg2	Cat 14M	Motor Grader	-	-	50	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.95	
Mu1	Finn 5250	Mulcher	-	1	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Truck Driver II	\$ 24.63	
Rp1	Cat D11T CD Multi-shank (w/ MSR-359H)	Dozer w/ Ripper	-	-	50	-	18	59	3	0.25	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator IV	\$ 28.65	
Rp2	MSR-189H	Ripper Attachment	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#N/A		
Sc1	Cat 537G	Scraper	-	-	50	-	-	-	-	-	-	-	-	24	34	-	-	-	2.5%	-	-	-	81,600	0.85	0.65	0.10	1.19	0.15	-	Equipment Operator IV	\$ 28.65		
Sc2	Cat 657G	Scraper	-	-	50	-	-	-	-	-	-	-	-	32	44	-	-	-	2.5%	-	-	-	104,000	0.85	0.65	0.10	1.19	0.15	-	Equipment Operator IV	\$ 28.65		
Sh1	Hitachi EX3600-5	Shovel ³	-	-	50	-	-	-	-	-	-	28.1	0.45	1.025	-	27.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Equipment Operator VII	\$ 28.97	
Tc1	Deere 7430	Tractor	-	-	50	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Truck Driver II	\$ 24.63	
Tk1	Komatsu HD-1500 5	Truck	-	-	50	-	-	-	-	-	-	-	-	71.0	102.0	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VIII	\$ 25.16	
Tk2	Cat 769D	Truck	-	-	50	-	-	-	-	-	-	-	-	22.2	31.7	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VII	\$ 24.96	
Tk3	Cat 725	Truck	-	-	50	-	-	-	-	-	-	-	-	14.3	18.8	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VI	\$ 24.82	
Tk4	Komatsu 730E	Truck ⁴	-	-	50	-	-	-	-	-	-	-	-	101.0	145.0	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VIII	\$ 25.16	
Tk5	Cat 777F	Truck	-	-	50	-	-	-	-	-	-	-	-	54.8	78.8	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VIII	\$ 25.16	
Tk6	Cat 740	Truck	-	-	50	-	-	-	-	-	-	-	-	23.3	30.2	-	-	-	2.5%	0.7	1.1	-	-	-	-	-	-	-	-	-	Truck Driver VII	\$ 24.96	
Tw1	Off-Hwy Water Tanker Truck,6,000-gal	Water/Truck	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Truck Driver V	\$ 24.65	
Tw2	Off-Hwy Water Tanker Truck,10,000-gal	Water/Truck	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Truck Driver VIII	\$ 25.16	
X1	2 Deck Screening Plant (5X16, 48X60)	ScreenPlant	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Laborer I	\$ 23.88
X2	3 Deck Screening Plant (5X16, 48X60)	ScreenPlant	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Laborer I	\$ 23.88
X3	1 Deck Screening Plant (5X16, 48X60)	ScreenPlant	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Laborer I	\$ 23.88
X4	3 Deck Screening Plant (5X16, 42X60)	ScreenPlant	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Laborer I	\$ 23.88

NOTES
¹ Loader Cycle Time = load, dump, and maneuver time
² Performance information is unavailable for the Hitachi EX3600-5; therefore, perform
³ Performance information is unavailable for the Komatsu 730E; therefore, perform
⁴ Maximum loaded speed listed for trucks and scrapers
⁵ Equipment costs use 176 max work hours per month (from Bluebook)
⁶ Fuel consumption assumed to be the same for the D11T and D11T CD (fuel cons
⁷ Rental rates and component costs for Hitachi EX3600-5 and Komatsu HD-1500 t

Not all equipment is used in this RCE. Extra equipment is kept for alternatives and i

FUEL

Earthwork Oil Broker Quote (\$/gal) \$ 2.71

EARTHWORK AND O&M LABOR

		Total 2020 Rate (\$/hr)
NMDOL Type A Operator Group		
Equipment Operator IV	\$	28.65
Equipment Operator V	\$	28.77
Equipment Operator VI	\$	28.95
Laborer I	\$	23.88
Laborer II	\$	24.63
Truck Driver V	\$	24.65
Truck Driver VI	\$	24.82
Truck Driver VII	\$	24.96
Truck Driver VIII	\$	25.16
Equipment Operator VII	\$	28.97
Equipment Operator VIII	\$	30.93

Equipment costs use 176 max work hours per month (from Bluebook)

References
1. Equipment unit rates from EquipmentWatch Custom Cost Evaluator January 20
2. Diesel fuel cost is estimated based on a predictive equation developed by cornel
3. Labor rates based on New Mexico Department of Labor (NMDOL) Type H (Heavy
https://www.dhs.state.nm.us/Portals/0/DMLaborRelations/Prevailing_Wage_Posts
4. Production and Haul rates from Caterpillar Performance Handbook, Equipment i

Demolition

Building Demolition costs are calculated in "1 BuildingDemo", "2 BuildingCover", "3 BuildingVeg", and "4BuildingWaste" and summarized on the last line of this table.

Item	Material	Quantity	Unit	Unit Cost (\$/unit)	Direct Item Cost (\$)	Reference	Means Line Item	Description
46 kV power lines	Wiring	0	days	\$4,341.20	\$0	R.S. Means	Crew B-12N Crew B-17 Crew B-68C	Bare Costs: 2-laborers (B17: \$42.10/hr, \$673.6/day), 1-equipment operator (light) (B17: \$53/hr, \$424/day), 1-truck driver (heavy) (B17: \$48.95/hr, \$391.6/day), 1-48 HP backhoe loader (B17: \$26.718/hr, \$213.75/day), 1-8 cy 220 HP dump truck (B17: \$53.506/hr, \$428.05/day), 1-electrician (B68C: \$61.35/hr, \$490.8/day), 1-25-ton hydraulic crane (B12N: \$141.125/hr, \$1129/day), 1-crane operator (B12N: \$59.2/hr, \$473.6/day)
Power Poles		0	ea	\$220.56	\$0	R.S. Means	024113.80 0200	Number of power poles from 2020 Little Rock Infrastructure Dwg. Unit cost for Selective Demolition - wood utility poles 35-45 feet high.
Substation	Misc.	0	ea	\$12,266.20	\$0	R.S. Means	-	-
Pipelines	6"-8" Diameter Plastic	0	ft	\$3.01	\$0	Unit Cost Sheet	N/A	Demolition, water and sewer piping and fittings, excludes excavation, plastic pipe 6"-8" in diameter.
Spanning Arch Culvert Demolition	Earth Fill Removal (dozer excavate, haul, spread)	0	cy	\$5.20	\$0	R.S. Means	312316.46-6070	Earth fill is hauled an average of 300 feet and spread over the primary haul road. Excavating Bulk Dozer 700 HP 300' haul common earth
Spanning Arch Culvert Demolition	Concrete Foundation and Metal Arch (excavate and load)	0	cy	\$1.55	\$0	R.S. Means	312316.46-6010	Concrete and metal are excavated and loaded onto a truck. A 60% swell factor was used for the concrete foundations and metal arch volume was reduced by 50% assuming it is partially crushed. Excavating Bulk Dozer 700 HP 50' haul common earth
Spanning Arch Culvert Demolition	Concrete Foundation and Metal Arch (haul and dump)	0	cy	\$2.87	\$0	R.S. Means	312323.20-5040	Concrete and metal are hauled to in-pit stockpile area and buried. A 60% swell factor was used for the concrete foundations and metal arch volume was reduced by 50% assuming it is partially crushed. 22 cy off road, 15 min. cycle time, 5 mph, 1 mile cycle.
Concrete Slabs	Demolition	See Demo Sheets	-	-	#REF!	-	-	-

Total Direct Cost: #REF!

Material Handling Plan Summary Sheet

All activities for the Little Rock RCE are listed on this sheet and carried through the succeeding worksheets of the RCE. The column labeled ID contains the codes for the facility location, activity, material and equipment used for that particular row of work. The description lists the activity, top or outslope (if applicable), and the material. The source location lists the stockpile name (or sub-area) for the location of the activity. If borrow material is involved, it is transported from a borrow stockpile to a destination stockpile. Blank cells indicate that that column is not relevant to a particular activity.

Notes and Assumptions:

- 1 - Haul/Push Distance based on 2020 Little Rock CCP drawings
- 2 - Haul Grades based on 2020 Little Rock CCP drawings
- 3 - Grade Factors from 2013 Little Rock RCE Submittal and 2020 Little Rock CCP drawings

ID	Description	Source Location 1	Destination Location 2	Total Haul/Push Distance (ft) ¹	Grade (%) ^{2,3}	Equipment
1704-A-a-Dz2	Grade-Outslopes-Existing Ground	Deadman Diversion Outslope	-	20	-29.0%	Cat D11T CD
1700-B-b-Dz2	Dozer Assist-Cover	CLW Waste	Deadman Diversion	-	0.0%	Cat D11T CD
1701-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	-	0.0%	Cat D11T CD Multi-shank (w/ MSR-359H)
1702-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	-	-29.0%	Cat D11T CD Multi-shank (w/ MSR-359H)
1703-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	-	-29.0%	Cat D11T CD Multi-shank (w/ MSR-359H)
1700-C-b-Sh1	Load-Cover	CLW Waste	Deadman Diversion	-	0.0%	Hitachi EX3600-5
1701-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	-	0.0%	Cat D9T, SU Blade
1702-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	-	-29.0%	Cat D9T, SU Blade
1703-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	-	-29.0%	Cat D9T, SU Blade
1700-D-b-Tk4	Haul-Cover	CLW Waste	Deadman Diversion	4,941	-4.7%	Komatsu 730E
1701-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	763	8.7%	Cat 657G
1702-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	736	0.0%	Cat 657G
1703-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	329	-20.0%	Cat 657G
1700-A-d-Mg1	Grade-Diversion-Placed Cover	Deadman Diversion	-	-	0.0%	Cat 16M
1401-Jb-e-U2d	Manual Seeding-Flat Area (Haul Road)-Final Grade	Northern Haul Road	-	-	0.0%	-
1700-J-e-U2a	Revegetate-Diversion-Final Grade	Deadman Diversion	-	-	0.0%	-
1700-P-b-Comb1	Road Maintenance-Diversion	CLW Waste	Deadman Diversion	-	0.0%	Cat 14M, Off-Hwy Water Tanker Truck,6,000-gal.
1704-F-e-U3	Grade Benches-Outslopes-Final Grade	Deadman Diversion Outslope	-	20	-29.0%	-
1704-G-e-U6	Construct Downdrains-Outslopes-Final Grade	Deadman Diversion Outslope	-	20	-29.0%	-
1704-Gb-e-U7	Construct Downdrain Dissipators-Outslopes-Final Grade	Deadman Diversion Outslope	-	20	-29.0%	-
1704-H-e-U8a	Construct Channels w/ Riprap-Outslopes-Final Grade	Deadman Diversion Outslope	-	20	-29.0%	-
1400-M-e-U	Post-Closure O&M-Haul Roads-Final Grade	Haul Roads	-	-	0.0%	-
1700-M-e-U	Post-Closure O&M-Diversion-Final Grade	Deadman Diversion	-	-	0.0%	-
1700-W-e-U5	Deadman Diversion Channel-Diversion-Final Grade	Deadman Diversion	-	-	0.0%	-
1701-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	-	0.0%	Off-Hwy Water Tanker Truck,6,000-gal.
1702-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	-	-29.0%	Off-Hwy Water Tanker Truck,6,000-gal.
1703-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	-	-29.0%	Off-Hwy Water Tanker Truck,6,000-gal.

Notes and Assumptions:

1 - Acres and volumes based on 2020 Little Rock CCP drawings

2 - Cover Material Swell: The 'Loose Volume' is calculated based on the acreage to be covered, cover depth, and accounts for appropriate swell factor.

3 - Has been agreed upon with State agencies that swell occurs when cover material is moved from source to haul truck but not from the truck to placement on stockpile

ID	Description	Source Location 1	Destination Location 2	Area (ac) ¹	Cover Depth (in)	Bank/Stockpile Volume (bcy) ¹	Swell Factor (%) ³	Loose/Stockpile Volume (lcy) ²
1704-A-a-Dz2	Grade-Outslopes-Existing Ground	Deadman Diversion Outslope	-	-	-	47,432	0%	47,432
1402-E-a-Rp1	Rip-Flat Area (Haul Road)-Existing Ground	Little Rock Haul Road	-	-	-	-	0%	-
1403-E-a-Rp1	Rip-Flat Area (Haul Road)-Existing Ground	Southern Haul Road	-	-	-	-	0%	-
1700-B-b-Dz2	Dozer Assist-Cover	CLW Waste	Deadman Diversion	12.8	0.4	635	8%	686
1701-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9	-	-	0%	-
1702-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4	-	-	0%	-
1703-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Rel	Deadman Diversion	1.0	-	-	0%	-
1700-C-b-Sh1	Load-Cover	CLW Waste	Deadman Diversion	12.8	0.4	635	8%	686
1701-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9	-	48,339	0%	48,339
1702-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4	-	1,032,816	0%	1,032,816
1703-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Rel	Deadman Diversion	1.0	-	16,900	0%	16,900
1700-D-b-Tk4	Haul-Cover	CLW Waste	Deadman Diversion	12.8	0.4	635	8%	686
1701-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9	-	48,339	0%	48,339
1702-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4	-	1,032,816	0%	1,032,816
1703-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Rel	Deadman Diversion	1.0	-	16,900	0%	16,900
1700-A-d-Mg1	Grade-Diversion-Placed Cover	Deadman Diversion	-	12.8	0.4	686	0%	686
1401-Jb-e-U2d	Manual Seeding-Flat Area (Haul Road)-Final Grade	Northern Haul Road	-	9.7	-	-	0%	-
1402-J-e-U1	Revegetate-Flat Area (Haul Road)-Final Grade	Little Rock Haul Road	-	-	-	-	0%	-
1403-J-e-U2a	Revegetate-Flat Area (Haul Road)-Final Grade	Southern Haul Road	-	-	-	-	0%	-
1700-J-e-U2a	Revegetate-Diversion-Final Grade	Deadman Diversion	-	12.8	-	-	0%	-
1700-P-b-Comb1	Road Maintenance-Diversion	CLW Waste	Deadman Diversion	-	-	-	-	-
1704-F-e-U3	Grade Benches-Outslopes-Final Grade	Deadman Diversion Outslope	-	-	-	47,432	0%	47,432
1704-G-e-U6	Construct Downdrains-Outslopes-Final Grade	Deadman Diversion Outslope	-	-	-	47,432	0%	47,432
1704-Gb-e-U7	Construct Downdrain Dissipators-Outslopes-Final Grade	Deadman Diversion Outslope	-	-	-	47,432	0%	47,432
1704-H-e-U8a	Construct Channels w/ Riprap-Outslopes-Final Grade	Deadman Diversion Outslope	-	-	-	47,432	0%	47,432
1400-M-e-U	Post-Closure O&M-Haul Roads-Final Grade	Haul Roads	-	9.7	-	-	0%	-
1700-M-e-U	Post-Closure O&M-Diversion-Final Grade	Deadman Diversion	-	12.8	-	-	0%	-
1700-W-e-U5	Deadman Diversion Channel-Diversion-Final Grade	Deadman Diversion	-	12.8	-	-	0%	-
1701-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9	-	16,113	0%	16,113
1702-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4	-	344,272	0%	344,272
1703-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Rel	Deadman Diversion	1.0	-	5,633	0%	5,633

Productivity and Hours Required for Dozer Use--Earthmoving

Notes and Assumptions:
Uses volumes of outslope sections and dam breaches to calculate productivity
Uses push distances of outslope sections for grading productivity
Uses scraper push cycle time for dozer assist with scraper
Uses loader cycle time for dozer assist with loader at cover stockpiles
Grade Factor = -0.02(Grade %) + 1
May filter on equipment (D14) to show pertinent rows

Number of Dozers per Assist = 1

PERFORMANCE FACTORS																										
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Type of Equipment to Assist (ID)	Type of Equipment to Assist (Name)	Number of Dozers per Assist	Loose /Stockpile Volume (cy)	Area (ac)	Productivity (cy/hr)	Productivity (ac/hr)	Total Task Time (hrs)	Material Factor	Grade Factor	Material Weight (lb/cy)	Production Method/ Blade	Centroid to Centroid Push Distance (ft)	Normal Production (cy/hr)	Effective Blade Width (ft)	Speed (mph)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Direct Drive Trans.	Cut to Fill Haul Grade (%)
1704-A-a-Dz2	Grade-Outslopes-Existing Ground	Deadman Diversion Outslope	-	Cat D111T CD	--	--	--	47,432	-	14,697	-	3.2	1.2	1.6	3,600	1.2	20	12,133	22	3	1.00	50	1.0	1.0	1.0	-29%
1700-B-b-Dz2	Dozer Assist-Cover	CLW Waste	Deadman Diversion	Cat D111T CD	Sh1	Hitachi EX3600-5 Shovel	1	686	13	-	-	0.2	-	-	-	-	-	-	-	-	-	50	-	-	-	0%
1701-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Cat D9T, SU Blade	Sc2	Cat 657G Scraper	1	48,339	8	-	-	0.5	1.0	1.0	3,600	1.2	-	-	14	1	1.00	50	1.0	1.0	1.0	0%
1702-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Cat D9T, SU Blade	Sc2	Cat 657G Scraper	1	1,032,816	8	-	-	0.6	1.0	1.6	3,600	1.2	-	-	14	1	1.00	50	1.0	1.0	1.0	-29%
1703-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch	Deadman Diversion	Cat D9T, SU Blade	Sc2	Cat 657G Scraper	1	16,900	1	-	-	0.7	1.0	1.6	3,600	1.2	-	-	14	1	1.00	50	1.0	1.0	1.0	-29%

Productivity and Hours Required for Water Truck Use

Little Rock Mine
Stockpile Spreadsheet Worksheet #7
07/01/21

Notes and Assumptions:
6,000 gal water truck for compaction (water truck hours tied to 1/3 of grading time for fill material)
May filter on equipment (D14) to show pertinent rows
Compaction volume assumed to 1/3 of fill material

Sheet to which to tie hrs 12 Scrapers
Equipment for hrs Sc2

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Operational Maintenance Time (hrs)
1701-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	27
1702-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Mat	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	497
1703-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Sp	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	7

Productivity and Hours Required for Dust Suppression and Road Maintenance

Little Rock Mine
Stockpile Spreadsheet Worksheet #7
07/01/21

Notes and Assumptions:
6,000 gal water truck and 14M motor grader for dust suppression and site maintenance (water truck hours and 14M hours tied to loading time for cover material)
May filter on equipment (D14) to show pertinent rows

Sheet to which to tie hrs 11 Loader Shovel
Equipment for hrs Sh1
Equipment for hrs Ld1

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Operational Maintenance Time (hrs)
1700-P-b-Comb1	Road Maintenance-Diversion	CLW Waste	Deadman Diversion	Cat 14M, Off-Hwy Water Tanker Truck,6,000-gal.	0.23

Productivity and Hours Required for Ripper—Equipped Dozer Use

1 Min Break Min
Rip-side, Roundabout Method #5
0701021

Notes and Assumptions:
Use area to calculate task time
60 ft/min = 1 mph
Max fill on equipment (2'4") to show ambient noise

PERFORMANCE FACTORS														
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Area (ac)	Productivity (ac/hr)	Task Time (hr)	Ripping Length (ft)	Ripped Perimeter (ft)	Pocket Size (ft)	Distance to Pile (ft)	Number of Shovel Pockets	Turn Time (min/pass)	Work Hour (min/hr)
1701-S-4-R-1	Rip-Cut/Fill Fill/Backside Material	East to PM Fill Material	Deadman Diversion	Cat D11T CSD Multi-shank (w/ MFR-3389S)	1.81	2.8	2.7	1,000	18	50	50	3	0.25	50
1702-S-4-R-1	Rip-Cut/Fill Fill/Backside Material	Northern Road Fill Material	Deadman Diversion	Cat D11T CSD Multi-shank (w/ MFR-3389S)	8.43	2.8	2.9	1,000	18	50	50	3	0.25	50
1703-S-4-R-1	Rip-Cut/Fill Fill/Backside Material	Deadman Diversion and Steepside Ash Current Area Cut & Refill	Deadman Diversion	Cat D11T CSD Multi-shank (w/ MFR-3389S)	1.04	2.8	0.4	1,000	18	50	50	3	0.25	50

Notes and Assumptions:

Uses area to calculate time for perforating liners
3' sheepsfoot roller
Can be used for excavating and loading, or sheepsfoot compaction using a roller
May filter on equipment (D14) to show pertinent rows

5	6	7	8	9	10	11	12	13	14			
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Area (ac) or Volume (lcy)	Unit (ac or lcy)	Sheepsfoot Roller Width (ft) or Bucket Capacity (cy)	Unit (ft or cy)	Maximum Reach at Ground Level (ft)	Cycle Time (min)	Work Hour (min/hr)	Task Time (hr)

Productivity and Hours Required for Truck Use

Notes and Assumptions:
Uses haul distance to calculate haul and return time (total task time includes loading, maneuvering, dumping, hauling and return time) - moves from cover stockpile to destination stockpile
Volume of cover material based on area of destination
Cycles per truck = the greater of Heaped capacity or Struck capacity divided by Loader's per bucket capacity
1 mph = 88 ft/min
1 m/min = 0.03728227153424 mph
See Truck Optimization optimum number of trucks per loader
Haul Grade (%) assumes positive is uphill while the Effective Haul Grade (%) and Effective Return Grade (%) are positive for downhill and uphill
May filter on equipment (D14) to show pertinent rows

PERFORMANCE FACTORS																										
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Loading Equipment ID	Loose/Stockpile Volume (cy)	Truck Cycle Time (min)	Optimum Number of Trucks	Loader/Shovel/Excavator Net Bucket Capacity (cy)	Productivity (cy/hr)	Loader/Shovel/Excavator Task Time(hrs)	Truck Task Time (hrs)	Struck Capacity (cy)	Heaped Capacity (cy)	Loader/Shovel Cycles per Truck	Total Haul Distance (ft)	Haul Distance Segment 1 (ft)	Haul Distance Segment 2 (ft)	Haul Distance Segment 3 (ft)	Haul Grade Segment 1 (%)	Haul Grade Segment 2 (%)	Haul Grade Segment 3 (%)	Rolling Resistance (%)	Haul Distance Segment 1 (meters)	Haul Distance Segment 2 (meters)	Haul Distance Segment 3 (meters)
1700-D-b-TK4	Haul-Cover	CLW Waste	Deadman Diversion	Komatsu 730E	Sh1	686	9.5	4	28.1	2,968.1	0.2	0.2	101.0	145.0	5.0	4,941	3,498	1,443	-	-7.5%	2.1%	0.0%	2.5%	1,066	440	-

Productivity and Hours Required for Truck Use

Notes and Assumptions:

Uses haul distance to calculate haul and return time (total task time includes loading, maneuvering, dumping, hauling and return time) - moves from cover sto
Volume of cover material based on area of destination
Cycles per truck = the greater of Heaped capacity or Struck capacity divided by Loader's per bucket capacity
1 mph = 88 ft/min
1 m/min = 0.03728227153424 mph
See Truck Optimization optimum number of trucks per loader
Haul Grade (%) assumes positive is uphill while the Effective Haul Grade (%) and Effective Return Grade (%) are positive for downhill and uphill
May filter on equipment (D14) to show pertinent rows

Task Description	Source Location 1	Destination Location 2	Equipment	Effective Haul Grade Segment 1 (%)	Effective Haul Grade Segment 2 (%)	Effective Haul Grade Segment 3 (%)	Effective Return Grade Segment 1 (%)	Effective Return Grade Segment 2 (%)	Effective Return Grade Segment 3 (%)	Haul Time (min)	Return Time (min)	Loading Time (min)	Truck Exchange Time (min)	Dump/Maneuver Time (min)	Work Hour (min/hr)	Travel Time Loaded Segment 1 (min/m)	Travel Time Loaded Segment 2 (min/m)	Travel Time Loaded Segment 3 (min/m)	Travel Time Empty Segment 1 (min/m)	Travel Time Empty Segment 2 (min/m)	Travel Time Empty Segment 3 (min/m)
Haul-Cover	CLW Waste	Deadman Diversion	Komatsu 730E	5.0%	4.6%	2.5%	10.0%	0.4%	2.5%	2.9	2.5	2.25	0.7	1.1	50	0.00187	0.00199	0.00145	0.00195	0.00105	0.00105

Productivity and Hours Required for Front End Loader Use or Hydraulic Shovel Use

Assumptions:
Uses cover volume to calculate loading time of cover material
May filter on equipment (D14) to show pertinent rows

PERFORMANCE FACTORS															
5	6	7	8	9	10	11	12	13	14	15	16	17			
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Hauling Equipment ID	Loose/Stockpile Volume (cy)	Loader/ Shovel Cycle Time (min)	Per Loader/Shovel Productivity (cy/hr)	Loader/ Shovel Task Time (hrs)	Max of Loader/Shovel or Truck Task Time (hrs)	Net Bucket Capacity (cy)	Work Hour (min/hr)			
1700-C-b-Sh1	Load-Cover	CLW Waste	Deadman Diversion	Hitachi EX3600-5	Tk4	686	0.45	3,120.6	0.2	0.2	28.1	50			

Productivity for Scrapers

Notes and Assumptions:
Uses volumes of stockpile or cover for hauling and grading times
Haul & Scrape Grade (%) assumes positive is downhill
May filter on equipment (D14) to show pertinent rows

Number of scrapers used for grading cover = 1
1609.344 meters/mile

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Loose/Stockpile Volume (cy)	Total Haul Distance One Way (feet)	Haul & Scrape Grade (%)	Rolling Resistance (%)	Effective Grade Uphill (%)	Effective Grade Downhill (%)	Load Time (min)	Maneuver & Spread Time (min)	Full Scraper Haul Speed (mph)	Empty Scraper Return Speed (mph)	Scraper R/T Cycle Task Time (min)	Pusher Cycle Time (min/cycle)	Rated Load (lb)	Soil Weight (lbs/cy)	Heaped Capacity (cy)	Work Hour (min/hr)	Cycles per Scraper per Hr	Productivity per Heaped Scraper (cy/hr)	Total Task Time (hrs)	Number of Scrapers	Task Time w All Scrapers (hrs)
1701-A-I-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	East In-PR Fill Material	Deadman Diversion	Cat 657G	48,339	763.0	8.71%	2.5%	11.2%	6.2%	0.9	0.7	25.6	19.8	2.28	1.44	104,000	3,600	44	50	22	607	80	1.0	80
1702-A-I-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Cat 657G	1,032,816	736.0	-0.03%	2.5%	2.5%	0.0%	0.9	0.7	27.7	33.0	2.06	1.44	104,000	3,600	44	50	24	663	1,460	1.0	1,460
1703-A-I-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area C	Deadman Diversion	Cat 657G	16,900	329.0	-20.04%	2.5%	0.0%	0.0%	0.9	0.7	28.7	33.0	1.74	1.44	104,000	3,600	44	50	29	809	21	1.0	21

Productivity and Hours Required for Motorgrader Use---Grading

Notes and Assumptions:
Productivity (based on area of overall stockpile) = Sq.ft per hour = Speed x (Eff. Blade L -Blade Overlap) x Efficiency (Cat. Handbook Edition 47 pg 11-27)
Max. safe slope for motor graders is 2:1 (50%), proposed final grade for Tyrone cover grading on stockpiles is 33%, therefore use of graders an option (Cat. Handbook Edition 46 pg 11-30)
Grade Factor = -0.02(Grade %) + 1
May filter on equipement (D14) to show pertinent rows

ID	Task Description	Source Location 1	Destination Location 2	Grading Equipment	Area (ac)	Grading Shaping Productivity (ac/hr)	Task Time (hrs)	Grade Factor	Material Factor	Material Weight (lb/cy)	Production Method/Blade	Effective Blade Width (ft)	Pass Overlap (ft)	Speed (mph)	Work Hour (min/hr)	Operator Factor
1700-A-d-Mg1	Grade-Diversion-Placed Cover	Deadman Diversion	-	Cat 16M	13	2	5.2	1.0	1.2	3,600	1.20	16.00	2.00	2.50	50	0.75

Summary Calculation of Earthmoving Costs

Summarizes costs for line items involving earthworks

Notes and Assumptions:

Productivity (based on area of overall stockpile) = Sq.ft per hour = Speed x (Eff. Blade L -Blade Overlap) x Efficiency (Cat. Handbook Edition 47 pg 11-27)
Max. safe slope for motor graders is 2:1 (50%), proposed final grade for Little Rock cover grading on stockpiles is 33%, therefore use of graders an option (Cat. Handbook Edition 46 pg 11-30)
Grade Factor = -0.02(Grade %) + 1
May filter on equipment (D14) to show pertinent rows

ID	Description	Source Location 1	Destination Location 2	Equipment	Fuel Cost (\$/hr)	Lube, Tires, GEC, & Field Parts Adjusted Rental Cost (w/o fuel) (\$/hr)	Labor Cost (\$/hr)	Number of Units (Equipment)	Time Req'd Per Unit (hrs)	Direct Fuel Cost (\$)	Direct Lube, Tires, GEC, & Field Parts Adjusted Rental Cost (w/o fuel) (\$)	Direct Labor Cost (\$)	Total Equipment Cost (\$)	Total Production Volume (CY)	Total Production Area (AC)
1704-A-a-Dz2	Grade-Outslopes-Existing Ground	Deadman Diversion Outslope	-	Cat D11T CD	\$80.62	\$236.53	\$28.65	1	3.2	\$260	\$763	\$92	\$1,116	47,432	-
1402-E-a-Rp1	Rip-Flat Area (Haul Road)-Existing Ground	Little Rock Haul Road	-	Cat D11T CD Multi-shank (w/ MSR-359H)	\$80.62	\$254.38	\$28.65	1	-	\$0	\$0	\$0	\$0	-	-
1403-E-a-Rp1	Rip-Flat Area (Haul Road)-Existing Ground	Southern Haul Road	-	Cat D11T CD Multi-shank (w/ MSR-359H)	\$80.62	\$254.38	\$28.65	1	-	\$0	\$0	\$0	\$0	-	-
1700-B-b-Dz2	Dozer Assist-Cover	CLW Waste	Deadman Diversion	Cat D11T CD	\$80.62	\$236.53	\$28.65	1	0.2	\$19	\$55	\$7	\$80	686	-
1701-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Cat D11T CD Multi-shank (w/ MSR-359H)	\$80.62	\$254.38	\$28.65	1	2.7	\$219	\$690	\$78	\$986	-	7.9
1702-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Cat D11T CD Multi-shank (w/ MSR-359H)	\$80.62	\$254.38	\$28.65	1	2.9	\$233	\$736	\$83	\$1,052	-	8.4
1703-E-f-Rp1	Rip-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	Cat D11T CD Multi-shank (w/ MSR-359H)	\$80.62	\$254.38	\$28.65	1	0.4	\$29	\$91	\$10	\$130	-	1.0
1700-C-b-Sh1	Load-Cover	CLW Waste	Deadman Diversion	Hitachi EX3600-5	\$224.17	\$513.29	\$28.97	1	0.2	\$52	\$119	\$7	\$177	686	-
1701-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Cat D9T, SU Blade	\$38.89	\$207.08	\$28.65	1	0.5	\$20	\$104	\$14	\$138	48,339	-
1702-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Cat D9T, SU Blade	\$38.89	\$207.08	\$28.65	1	0.6	\$22	\$119	\$17	\$158	1,032,816	-
1703-B-f-Dz3	Dozer Assist-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	Cat D9T, SU Blade	\$38.89	\$207.08	\$28.65	1	0.7	\$26	\$139	\$19	\$185	16,900	-
1700-D-b-Tk4	Haul-Cover	CLW Waste	Deadman Diversion	Komatsu 730E	\$90.73	\$215.93	\$25.16	4	0.2	\$84	\$200	\$23	\$307	686	-
1701-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Cat 657G	\$100.30	\$234.41	\$28.65	1	79.7	\$7,992	\$18,678	\$2,283	\$28,952	48,339	-
1702-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Cat 657G	\$100.30	\$234.41	\$28.65	1	1,489.6	\$149,406	\$349,185	\$42,678	\$541,270	1,032,816	-
1703-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	Cat 657G	\$100.30	\$234.41	\$28.65	1	20.9	\$2,095	\$4,897	\$599	\$7,592	16,900	-
1700-A-d-Mg1	Grade-Diversion-Placed Cover	Deadman Diversion	-	Cat 16M	\$25.75	\$86.71	\$30.93	1	5.2	\$135	\$453	\$162	\$750	-	12.8
1700-P-b-Comb1	Road Maintenance-Diversion	CLW Waste	Deadman Diversion	Cat 14M, Off-Hwy Water Tanker Truck,6,000-gal.	\$52.95	\$167.02	\$53.60	1	0.2	\$12	\$39	\$12	\$63	-	-
1701-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	\$30.49	\$76.25	\$24.65	1	26.6	\$810	\$2,025	\$655	\$3,490	-	-
1702-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	\$30.49	\$76.25	\$24.65	1	496.5	\$15,138	\$37,864	\$12,240	\$65,242	-	-
1703-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cut & Relocate	Deadman Diversion	Off-Hwy Water Tanker Truck,6,000-gal.	\$30.49	\$76.25	\$24.65	1	7.0	\$212	\$531	\$172	\$915	-	-
TOTAL										\$176,764	\$416,688	\$59,150	\$652,603	2,245,599	30.1

Revegetation Costs

Little Rock Mine
Stockpile Spreadsheet Worksheet #15
07/01/21

Description:

Includes scarifying (ripping), discing, rangeland drill seeding, mulching, crimping, and daily per diem
May filter on equipment (D14) to show pertinent rows

ID	Description	Source Location 1	Destination Location 2	Area (ac)	Fuel Unit Cost (\$/ac)	Reveg w/o Fuel Unit Cost (\$/ac)	Fuel Direct Cost (\$)	Reveg w/o Fuel Direct Cost (\$)
1401-Jb-e-U2d	Manual Seeding-Flat Area (Haul Road)-Final Grade	Northern Haul Road	-	9.7	\$ -	\$ 248.64	\$ -	\$ 2,408
1700-J-e-U2a	Revegetate-Diversion-Final Grade	Deadman Diversion	-	12.8	\$ 4.46	\$ 854.60	\$ 57	\$ 10,900
TOTAL				22			\$ 57	\$ 13,307

Other Reclamation Activity Costs

Assumptions:
1 - Cost to construct drain or channel on re-graded stockpile
2 - The downdrain, ACB, well plug & abandon, and well replacement costs include fuel
May filter on equipment (D14) to show pertinent rows

ID	Description	Source Location 1	Destination Location 2	Quantity	Unit	Fuel Unit Cost (\$/unit)	Unit Cost w/o Fuel (\$/unit) ^{1,2}	Fuel Direct Cost (\$)	Direct w/o Fuel Cost (\$)
1401-Jb-e-U2d	Manual Seeding-Flat Area (Haul Road)-Final Grade	Northern Haul Road	-	-	-	\$ -	\$ 248.64	\$ -	\$ -
1700-J-e-U2a	Revegetate-Diversion-Final Grade	Deadman Diversion	-	-	-	\$ 4.46	\$ 854.60	\$ -	\$ -
1704-F-e-U3	Grade Benches-Outslopes-Final Grade	Deadman Diversion Outslope	-	2,232	ft	\$ 0.47	\$ 1.62	\$ 1,058.68	\$ 3,611
1704-G-e-U6	Construct Downdrains-Outslopes-Final Grade	Deadman Diversion Outslope	-	798	ft	\$ -	\$ 389.66	\$ -	\$ 310,945
1704-Gb-e-U7	Construct Downdrain Dissipators-Outslopes-Final Grade	Deadman Diversion Outslope	-	-	ea	\$ -	\$ 15,106.89	\$ -	\$ -
1704-H-e-U8a	Construct Channels w/ Riprap-Outslopes-Final Grade	Deadman Diversion Outslope	-	2,232	ft	\$ 1.58	\$ 7.23	\$ 3,520.51	\$ 16,147
1700-W-e-U5	Deadman Diversion Channel-Diversion-Final Grade	Deadman Diversion	-	1,400	ft	\$ -	\$ 490.73	\$ -	\$ 687,016
TOTAL								\$ 4,579	\$ 1,017,719

Little Rock Mine

Reclamation Summary Stockpiles, Haul Roads, Reservoirs, and Disturbed Areas

			Current Value
DIRECT COSTS			
	Earthmoving		\$652,603
	Revegetation		\$13,364
	Other		\$1,022,298
	Subtotal, Direct Costs		\$1,688,265
INDIRECT COSTS			
	Subtotal, Indirect Costs	30.0%	\$506,480
TOTAL COST			
			\$2,194,745
	Eight Year Annual Expenditure		\$274,343

Notes:

Indirect costs are based on 2019 agreement between FMI and agencies

Indirect costs include but are not limited to mobilization and demobilization, engineering redesign fee, contingencies, contractor profit and overhead, project management fee, and state procurement cost

Reclamation Summary

Notes and Assumptions
Used to summarize costs for Sheet 17b Facility Characteristics

ID	Description	Source Location 1	Destination Location 2	Area (ac)	Cover Material Excav, Haul, Grade (\$)	Cover Material Excav, Haul, Grade Fuel (\$)	Cover Material Excav, Haul, Grade Indirects (\$)	Pullback and Backfill (\$)	Pullback and Backfill Fuel (\$)	Pullback and Backfill Indirects (\$)	Top/Outslope Adjustment Grading w/o Fuel (\$)	Top/Outslope Adjustment Grading Fuel (\$)	Top/Outslope Adjustment Grading Indirects (\$)	Scarify, Seed & Mulch, Reveg w/o Fuel (\$)	Scarify, Seed & Mulch, Reveg Fuel (\$)	Scarify, Seed & Mulch, Reveg Indirects (\$)	Channels & Benches (\$)	Channels & Benches Fuel (\$)	Channels & Benches Indirects (\$)	Other (\$)	Other Fuel (\$)	Other Indirects (\$)	Capital Cost Totals (\$)	Capital Cost/Acre (\$)
1704-A-a-Dc2	Grade-Outcrops-Existing Ground	Deadman Diversion Outslope	-	0.0 \$	- \$	- \$	- \$	- \$	- \$	- \$	856 \$	260 \$	335 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	1,116 \$	-
1700-B-b-Du2	Doser Assist-Cover	CLW Waste	Deadman Diversion	12.8 \$	61 \$	- \$	19 \$	24 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	80 \$	6
1701-E-f-Rp1	Rp-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9 \$	- \$	- \$	- \$	- \$	788 \$	219 \$	286 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1702-E-f-Rp1	Rp-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4 \$	- \$	- \$	- \$	- \$	819 \$	233 \$	316 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1703-E-f-Rp1	Rp-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cu	Deadman Diversion	1.0 \$	- \$	- \$	- \$	- \$	101 \$	29 \$	39 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1700-C-b-Bh1	Load-Cover	CLW Waste	Deadman Diversion	12.8 \$	126 \$	- \$	52 \$	63 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1701-B-f-Du3	Doser Assist-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9 \$	- \$	- \$	- \$	- \$	119 \$	20 \$	42 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1702-B-f-Du3	Doser Assist-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4 \$	- \$	- \$	- \$	- \$	136 \$	22 \$	47 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1703-B-f-Du3	Doser Assist-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cu	Deadman Diversion	1.0 \$	- \$	- \$	- \$	- \$	158 \$	26 \$	55 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1700-D-b-TA4	Haul-Cover	CLW Waste	Deadman Diversion	12.8 \$	223 \$	- \$	84 \$	92 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	387 \$	24
1701-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9 \$	- \$	- \$	- \$	- \$	20,960 \$	7,992 \$	8,686 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1702-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4 \$	- \$	- \$	- \$	- \$	391,863 \$	149,406 \$	162,381 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1703-A-f-Sc2	Grade-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cu	Deadman Diversion	1.0 \$	- \$	- \$	- \$	- \$	5,496 \$	2,095 \$	2,277 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1700-A-f-Mg1	Grade-Diversion-Placed Cover	Deadman Diversion	-	12.8 \$	615 \$	- \$	135 \$	225 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	750 \$	59
1700-L-f-LG2	Revegetate-Diversion-Final Grade	Deadman Diversion	-	12.8 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	10,900 \$	57 \$	3,287 \$	- \$	- \$	- \$	- \$	- \$	- \$	10,957 \$	859
1700-P-b-Comb1	Road Maintenance-Diversion	CLW Waste	Deadman Diversion	12.8 \$	51 \$	- \$	12 \$	19 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	63 \$	5
1704-F-f-LJ3	Grade Benches-Outcrops-Final Grade	Deadman Diversion Outslope	-	0.0 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1704-G-f-U6	Construct Downdrains-Outcrops-Final Grade	Deadman Diversion Outslope	-	0.0 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1704-G-e-UJ7	Construct Downdrain Dispatons-Outcrops-Final Grade	Deadman Diversion Outslope	-	0.0 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1704-H-f-UBa	Construct Channels w/ Riprap-Outcrops-Final Grade	Deadman Diversion Outslope	-	0.0 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1700-M-e-UJ	Post Closure O&M-Diversion-Final Grade	Deadman Diversion	-	12.8 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1700-M-e-US	Deadman Diversion Channel-Diversion-Final Grade	Deadman Diversion	-	12.8 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1701-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	East In-Pit Fill Material	Deadman Diversion	7.9 \$	- \$	- \$	- \$	- \$	2,680 \$	810 \$	1,047 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1702-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Northern Haul Road Fill Material	Deadman Diversion	8.4 \$	- \$	- \$	- \$	- \$	56,104 \$	15,138 \$	16,573 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1703-X-f-Tw1	Compaction-Cut/Fill-Fill/Stockpile Material	Deadman Diversion and Spanning Arch Culvert Area Cu	Deadman Diversion	1.0 \$	- \$	- \$	- \$	- \$	703 \$	212 \$	275 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
					\$	1,075 \$	301 \$	413 \$	473,907 \$	176,203 \$	195,033 \$	856 \$	260 \$	335 \$	13,307 \$	57 \$	4,009 \$	330,703 \$	4,579 \$	100,585 \$	687,016 \$	- \$	206,105 \$	1,038,155

		1400	1700	
Facility		Haul Roads	Deadman Diversion	Total
Reclaimed Acres ¹		9.68	12.75	22.44
Direct Costs	Item	Capital Cost	Capital Cost	
	Cover Material Excav, Haul, Grade ¹	\$0	\$1,377	\$1,377
	Pulback or Backfill	\$0	\$650,110	\$650,110
	Top/Outslope Adjustment Grading ²	\$0	\$1,116	\$1,116
	Scarify, Seed & Mulch, Reveg ³	\$2,408	\$10,957	\$13,364
	Channels & Benches ⁴	\$0	\$335,282	\$335,282
	Demolition	\$0	\$0	\$0
	Other ⁵	\$0	\$687,016	\$687,016
	Capital Cost Totals	\$2,408	\$1,685,857,6166	\$1,688,265
	Capital Cost/Acre	\$249	\$132,180	\$75,243
Indirect Costs	Cover Material Excav, Haul, Grade ¹	\$0	\$413	\$413
	Pulback or Backfill	\$0	\$195,033	\$195,033
	Top/Outslope Adjustment Grading ²	\$0	\$335	\$335
	Scarify, Seed & Mulch, Reveg ³	\$722	\$3,287	\$4,009
	Channels & Benches ⁴	\$0	\$100,585	\$100,585
	Demolition	\$0	\$0	\$0
	Other ⁵	\$0	\$206,105	\$206,105
	Indirect Cost Totals	\$722	\$505,757	\$506,480
	Indirect Cost/Acre	\$75	\$39,654	\$22,573
Total Cost		\$3,129.92	\$2,191,614.90	\$2,194,745
Total Cost Cover		\$0	\$1,790	\$1,790
Total Cost Earthwork		\$0	\$845,143	\$845,143
Capital Cost Re-Veg		\$3,130	\$14,244	\$17,374
Capital Cost Other ⁶		\$0	\$893,121	\$893,121
Total Cost/Acre		\$323	\$171,834	\$97,816
Total Cost/Acre Cover		\$0	\$140	\$80
Total Cost/Acre Top/Outslope Adjustment		\$0	\$66,264	\$37,667
Total Cost/Acre Earthwork		\$0	\$114	\$55
Capital Cost/Acre Re-Veg		\$323	\$1,117	\$774
Capital Cost/Acre Other ⁶		\$0	\$70,025	\$39,805

1 Cover Material includes dozer assist, load, haul, grade cover, and water truck and motor grader for road maintenance and dust control during reclaimal

2 Top/Outslope Adjustment Grading includes rough grading and ripping before placing cover

3 Revegetation includes scarifying, discing, drill speeding, mulching, crimping, per dem, mobilization, seeding, and mulching

4 Channels & Benches includes channels, downdrains, benches

5 Other includes well installation/closure, well replacement, berm construction, fencing and signage, and seepage collection/interceptor trench installat

6 Capital costs before O&M

Truck Optimization

Notes and Assumptions

This sheet calculates the most efficient number of trucks (up to 10 or maximum) per loader or shovel for loading cover material at borrow stockpiles. See the calculation sheet for more information.

May filter on equipment (D14) to show pertinent rows

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Loading Equipment ID	Work Hour (min/hr)	Loader/ Shovel/ Excavator/ Cycles per Truck	Loader/Shovel/ Excavator Cycle Time (min)	Loader/Shovel/ Excavator Time Per Truck (min)	Truck Cycle Time Per Truck (min)	Max Number Trucks Per Loader/Shovel/ Excavator	Loader/ Shovel/ Excavator Cost (\$/hr)	Loader Net Bucket Capacity (cy)	Haul Volume (cy)	Productivity for X Trucks (cy/hr)									
															Max Trucks Round Up	Max Trucks Round Down	9	8	7	6	5	4	3	2
1000-D-b-Tk4	Haul-Cover	CLW Waste	West In-Pit Waste	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	5.99	2.66	\$ 542.26	28.09	-	3,515.73	2,343.82	10,547.19	9,375.28	8,203.37	7,031.46	5,859.55	4,687.64	3,515.73	2,343.82
1100-D-b-Tk4	Haul-Cover	CLW Waste	East In-Pit Waste	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	16.11	7.16	\$ 542.26	28.09	-	3,486.74	3,050.89	3,922.58	3,486.74	3,050.89	2,615.05	2,179.21	1,743.37	1,307.53	871.68
1200-D-b-Tk4	Haul-Cover	CLW Waste	CLW Waste	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	5.07	2.52	\$ 542.26	28.09	-	3,717.69	2,478.46	11,153.08	9,913.85	8,674.62	7,435.39	6,196.16	4,956.92	3,717.69	2,478.46
1300-D-b-Tk4	Haul-Cover	CLW Waste	NRW Waste	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	9.46	4.21	\$ 542.26	28.09	-	3,710.06	2,968.05	6,678.11	5,936.10	5,194.09	4,452.08	3,710.06	2,968.05	2,226.04	1,484.03
1700-D-b-Tk4	Haul-Cover	CLW Waste	Deadman Diversion	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	9.46	4.21	\$ 542.26	28.09	685.90	3,710.06	2,968.05	6,678.11	5,936.10	5,194.09	4,452.08	3,710.06	2,968.05	2,226.04	1,484.03
1803-D-b-Tk4	Haul-Cover	CLW Waste	Previously Reclaimed Area	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	9.46	4.21	\$ 542.26	28.09	-	3,710.06	2,968.05	6,678.11	5,936.10	5,194.09	4,452.08	3,710.06	2,968.05	2,226.04	1,484.03
2200-D-b-Tk4	Haul-Cover	CLW Waste	Allowance for Other Disturbed Areas	Komatsu 730E	Sh1	50.00	5.00	0.45	2.25	9.46	4.21	\$ 542.26	28.09	-	3,710.06	2,968.05	6,678.11	5,936.10	5,194.09	4,452.08	3,710.06	2,968.05	2,226.04	1,484.03

Truck Optimization

Notes and Assumptions

This sheet calculates the most efficient number of trucks (up to 10 or maximum) per loader or shovel for loading cover material at borrow stockpiles. See the calculation sheet for more information.

May filter on equipment (D14) to show pertinent rows

Task Description	Source Location 1	Destination Location 2	Equipment	Task Time for X Trucks (hr)										Loader/ Shovel Task Time (hr)	Truck Cost (\$/hr)	Cost of Using X Trucks per Loader (\$)										Lowest Cost (\$)	Optimum Number of Trucks Per Loader/Shovel/Exc avator	Optimum Number of Trucks Per Loader/ Shovel/ Excavator Within Max
				Max Trucks Round Up	Max Trucks Round Down	9	8	7	6	5	4	3	2			Max Trucks Round Up	Max Trucks Round Down	9	8	7	6	5	4	3	2			
Haul-Cover	CLW Waste	West In-Pit Waste	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00	
Haul-Cover	CLW Waste	East In-Pit Waste	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00	
Haul-Cover	CLW Waste	CLW Waste	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00	
Haul-Cover	CLW Waste	NRW Waste	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00	
Haul-Cover	CLW Waste	Deadman Diversion	Komatsu 730E	0.18	0.23	0.10	0.12	0.13	0.15	0.18	0.23	0.31	0.46	0.22	\$ 241.09	\$ 384.15	\$ 348.17	\$ 596.11	\$ 543.12	\$ 490.13	\$ 437.14	\$ 384.15	\$ 348.17	\$ 389.94	\$ 473.48	\$ 348.17	4	4.00
Haul-Cover	CLW Waste	Previously Reclaimed Area	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00
Haul-Cover	CLW Waste	Allowance for Other Disturbed Areas	Komatsu 730E	-	-	-	-	-	-	-	-	-	-	-	\$ 241.09	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	2	2.00

Scraper Optimization

Notes and Assumptions

This sheet calculates the most efficient number of scrapers (up to 10 or maximum) per dozer. The dozer assists scrapers for rough grading at waste rock stockpiles. See the calculation sheet for more information.
May filter on equipment (D14) to show pertinent rows

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Scraper R/T Task Time (min)	Pusher Cycle Time (min/cycle)	Max Number of Scrapers per Dozer	Dozer Type	Dozer Cost (\$/hr)	Task Time for one Scraper (hr)	Task Time for X Scrapers (hr)								Scrapers Cost (\$/hr)	Cost of Using X Scrapers per Dozer (\$)										
											Max Scrapers Round Up	Max Scrapers Round Down	9	8	7	6	5	4		3	2	Max Scrapers Round Up	Max Scrapers Round Down	9	8	7	6	5	4	
1002-A-a-Sc	Grade-Outslopes	West In-Pit Waste	-	Cat 657G	2.29	1.44	1.59	-	-	-	-	-	-	-	-	-	-	-	-	\$ 263.06	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
1701-A-f-Sc	Grade-Cut/Fill-Fill	East In-Pit Fill	Ma Deadman Diversion	Cat 657G	2.28	1.44	1.58	-	-	79.68	39.84	79.68	8.85	9.96	11.38	13.28	15.94	19.92	26.56	39.84	\$ 263.06	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47
1702-A-f-Sc	Grade-Cut/Fill-Fill	Northern Haul Ro	Deadman Diversion	Cat 657G	2.06	1.44	1.43	-	-	1,489.64	744.82	1,489.64	165.52	186.20	212.81	248.27	297.93	372.41	496.55	744.82	\$ 263.06	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11
1703-A-f-Sc	Grade-Cut/Fill-Fill	Deadman Diversion	Deadman Diversion	Cat 657G	1.74	1.44	1.21	-	-	20.89	10.45	20.89	2.32	2.61	2.98	3.48	4.18	5.22	6.96	10.45	\$ 263.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06

imization

ssumptions

iculates the most efficient number of scrapers (up to 10 or maximum) per
ers for rough grading at waste rock stockpiles. See the calculation sheet f

equipment (D14) to show pertinent rows

						Lowest Cost (\$)	Optimum Number of Scrapers Per Dozer	Optimum Number of Scrapers Per Dozer Within Max
Task Description	Source Location 1	Destination Location 2	Equipment	3	2	1		
Grade-Outslopes- West In-Pit Waste -			Cat 657G	\$ -	\$ -	\$ -	\$ -	1.00
Grade-Cut/Fill-Fill East In-Pit Fill Ma Deadman Diversio			Cat 657G	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	\$ 20,960.47	1.00
Grade-Cut/Fill-Fill Northern Haul Ro Deadman Diversio			Cat 657G	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	\$ 391,863.11	1.00
Grade-Cut/Fill-Fill Deadman Diversio		Deadman Diversio	Cat 657G	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	\$ 5,496.06	1.00

Vegetation Maintenance Costs - Full site

Based on observations of previously reclaimed areas, the annual vegetation failure is conservatively estimated to be 2% failure every year for a total of 12 years, starting the year reclamation is completed.

Vegetation maintenance begins at each facility sub-area/location the year that reclamation is completed for that facility sub-area/location.

May filter on equipment (D14) to show pertinent rows

Assumptions/Inputs:

Reclamation Start = January 1, 2025
Reclamation End = December 31, 2032
No. Years Reclamation = 8
No. Years Veg Maint = 12
% loss per year = 2%

ID	Description	Source Location 1	Destination Location 2	Total Area (ac)	Approx. Year Reclamation Start	Approx. Date Veg Maintenance Start	Approx. Date Veg Maintenance Complete	Number of Years of Veg Maintenance	% Loss Per Year	Veg Maint Area (ac)	Fuel Unit Cost (\$/ac)	Veg Maint Unit Cost (\$/ac)	Fuel Cost (\$)	Veg Maint Cost (\$)	Maint. Description
1400-M-e-U	Post-Closure O&M-Haul Roads-Final Grade	Haul Roads	-	9.7	Jan-32	Dec-32	Dec-44	12	2%	2.3	\$4.46	\$854.60	\$10	\$1,986	2% of veg fails every year for 12 years
1700-M-e-U	Post-Closure O&M-Diversion-Final Grade	Deadman Diversion	-	12.8	Jan-26	Dec-27	Dec-39	12	2%	3.1	\$4.46	\$854.60	\$14	\$2,616	2% of veg fails every year for 12 years
TOTAL O&M AREA				22 AC					TOTAL VEG MAINT AREA	5 AC	TOTAL		\$24	\$4,602	

Little Rock Mine

Operations and Maintenance Summary

		Current Value	
DIRECT COSTS	Facility and Structure Removal		\$0
	Earthmoving		\$0
	Vegetation		\$4,626
	Subtotal, Direct Costs		\$4,626
INDIRECT COSTS	Subtotal, Indirect Costs	17.5%	\$810
TOTAL COST			\$5,436

Notes:

Indirect costs are based on 2019 agreement between FMI and agencies

Indirect costs include but are not limited to mobilization and demobilization, engineering redesign fee, contingencies, contractor profit and overhead, project management fee, and state procurement cost

Component	Current Cost
Earthwork & Demo	\$2,194,745
Veg O&M	\$5,436
Total	\$2,200,180

Earthwork			
Year	Earthwork Current Cost	Vegetation Maint. Current Cost	Total Earthwork Current Cost
1	300,000	272	300,272
2	236,843	272	237,115
3	236,843	272	237,115
4	236,843	272	237,115
5	236,843	272	237,115
6	236,843	272	237,115
7	236,843	272	237,115
8	236,843	272	237,115
9	236,843	272	237,115
10	-	272	272
11	-	272	272
12	-	272	272
13	-	272	272
14	-	272	272
15	-	272	272
16	-	272	272
17	-	272	272
18	-	272	272
19	-	272	272
20	-	272	272
Total	2,194,745	5,436	2,200,180

Riprap and Gravel Unit Cost

Earthwork
Loading per cy

Task Description	Equipment	Load, Dump, Maneuver Time (min)	Work Time (min)	Loads/ hr	Net Bucket (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Loader+Oper Cost (\$/hr)	Load+Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Load riprap	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31
Load filter	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31
Transfer riprap for placing	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31
Transfer filter for placing	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31

Hauling

Task Description	Equipment	Exchange Time (min)	Delivery Travel Time ¹ (min)	Unload and Maneuver Time (min)	Return Travel Time ¹ (min)	Load Time (min)	Total Time (min)	Work Time (min)	Loads/ hr	Heaped Capacity (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Truck+Op Cost (\$/hr)	Truck + Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Haul riprap from source to site	Komatsu 730E	0.70	2.93	1.10	2.39	6.73	13.86	50	3.61	145	523	33.48	90.73	215.93	25.16	241.09	0.46	0.17	0.63
Haul filter from source to site	Komatsu 730E	0.70	2.93	1.10	2.39	6.73	13.86	50	3.61	145	523	33.48	90.73	215.93	25.16	241.09	0.46	0.17	0.63

Placing

Task Description	Equipment	Distance	Grade	Exchange Time (min)	Delivery Travel Time (min)	Unload and Maneuver Time (min)	Return Travel Time (min)	Load Time (min)	Total Time (min)	Work Time (min)	Loads/ hr	Heaped Capacity (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Truck + Op Cost (\$/hr)	Truck+Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Place riprap	Cat 725	400.00	-30%	0.70	3.25	1.10	0.74	0.87	6.67	50	7.50	19	141.01	6.02	16.31	76.63	24.82	101.45	0.72	0.12	0.84
Place filter	Cat 725	400.00	-30%	0.70	3.25	1.10	0.74	0.87	6.67	50	7.50	19	141.01	6.02	16.31	76.63	24.82	101.45	0.72	0.12	0.84

Grading

Task Description	Equipment	Productivity (cy/hr)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production Method/Blade Factor	Centroid to Centroid Push Distance (ft)	Normal Production (cy/hr)	Operator Factor	Work Time (min)	Visibility Factor ²	Elevation Factor	Transmission Factor	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer +Op Cost (\$/hr)	Dozer +Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Finish grade -Filter	Cat D6T, SU Blade	304.38	1.0	1.02	3500	1.0	50	727	1	50	1	1.00	1.00	19.57	65.97	28.65	94.62	0.31	0.06	0.38
Finish grade - Riprap	Cat D6T, SU Blade	230.34	0.8	1.02	3700	1.0	50	727	1	50	1	1.00	1.00	19.57	65.97	28.65	94.62	0.41	0.08	0.50

Riprap & Filter Production Rates

Equipment	Equipment Cost (\$/hr)	Fuel Cost (\$/hr)	# Equipment	Operator (\$/hr)	# Operator	Total Equipment Cost (\$/hr)	Total Fuel Cost (\$/hr)
Cat 988H	\$ 127.50	\$ 41.19	1	\$ 28.97	1	\$ 156.47	\$ 41.19
Cat 769D	\$ 106.35	\$ 26.40	3	\$ 24.96	3	\$ 393.92	\$ 79.19
1 Deck Screening Plant (5X16, 48X60)	\$ 75.59	\$ 13.14	1	\$ 23.88	1	\$ 99.47	\$ 13.14
3 Deck Screening Plant (5X16, 42X60)	\$ 111.31	\$ 13.14	1	\$ 23.88	1	\$ 135.19	\$ 13.14
Cat 980H	\$ 96.40	\$ 29.27	2	\$ 28.97	2	\$ 250.73	\$ 58.54
Cat 992K	\$ 239.31	\$ 69.46	0	\$ 28.97	0	\$ -	\$ -
Cat 966H	\$ 73.25	\$ 22.71	1	\$ 28.97	1	\$ 102.22	\$ 22.71
Off-Hwy Water Tanker Truck,6,000-gal.	\$ 76.25	\$ 30.49	1	\$ 24.65	1	\$ 100.90	\$ 30.49
Supervisor	\$ -	-	0	\$ 24.63	1	\$ 24.63	\$ -

Direct Costs	Equipment	Fuel
	\$ 1,264	\$ 258 \$/hr
	8	8 hr/work day
	\$ 10,108	\$ 2,067 \$/day
Production	400 tons input/hr (total)	
	0.30 % waste	
	0.70 % rip rap and gravel/filter	
	280 tons produced/hr (net)	
	560,000 lb/hr	
	3,650 lb/cy	
	153 cy/hr	
	8 hr/day (net (60 min/hr))	
	1,227 cy/day net production	
Production	\$ 8.24	\$ 1.68 \$/cy
Filter Delivery and placement	\$ 1.99	\$ 0.48 \$/cy
Rip Rap Delivery and placement	\$ 2.09	\$ 0.50 \$/cy

ASSUMPTIONS

Work Day

8 hrs
50 min hour

Equipment Rates

Source: 2020 EquipmentWatch
Corrected for 50 min work hour
Includes overhaul labor, parts & time

Production

Primary plant fed directly by two 769D haul trucks, 300 to 400 yd haul
400 tons input/hr (per Rusty McCauley, equipment peak production is 900 tons/hr)
30% - 60% waste depending on smallest rip rap size used. (per Rusty McCauley, consistent w/ Mc+C63Cain Springs waste rate of 43% - 1" minus)
3650 lb/cy (Caterpillar Performance Handbook p. 27-4, consistent with 1.8 tons/cy riprap unit weight)

Equipment & Labor	Rate (\$/hr)	Comment
One 988H Loader with Operator (bucket = 8.3 cy)	\$ 156.47	Used to load stockpiled material to 769D trucks and 777 haul trucks
Three 769D haul trucks with drivers (22 cy, 36 ton payload each)	\$ 393.92	Option: Two used to directly feed primary screening plant, one used to move material from end of conveyor
One 1 Deck Portable Screening Plant w/ 5x16 screen & 48"x60' conveyor + 1 Operator	\$ 99.47	Primary screening plant, grizzly used to split oversized, 6" - 12" and 6" minus (2 conveyers) One operator required in tower to run screening plant
One 3 Deck Portable Screening Plant w/ 5x16 screen & 42"x60' conveyor + 1 Operator	\$ 135.19	One operator required in tower to run screening plant Fed with 6" minus, Produce 6" - 6", 1.5" - 3", 3/8" - 1.5", 3/8 minus One operator required in tower to run screening plant
Two Cat 980H Loaders with Operator (bucket = 7.5 cy)	\$ 250.73	Used move material to conveyors or load trucks
Zero Cat 992K Loaders with Operator (bucket = 16 cy)	\$ -	Unused loader option
One Cat 966H Loader with Operator (bucket = 5.5 cy)	\$ 102.22	Used to move material from end of conveyors & load trucks
One Water Truck with Driver (10,000 gal)	\$ 100.90	Dust suppression
One Foreman	\$ 24.63	

1. Riprap and filter haul uses site-wide borrow haul time average

	Equipment	Fuel	Total
Total Unit Cost	\$ 12.31	\$ 2.67	\$ 14.98 \$/cy

Bench Grading Unit Cost

Bench Grading - 3:1 Stockpiles																									
Task Description	Equipment	Productivity (cy/hr)	Productivity (hrs/ft)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production Method/ Blade Factor	Centroid to Centroid																	
								Push Distance (feet)	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	# Passes	Speed (miles/hr)	Volume (cy/ft)	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Bench Equipment Cost (\$/ft)	Bench Fuel Cost (\$/ft)	
Excavate	Cat D11T CD	1660	-	1.2	1.0	3600	1.0	87	3396	0.75	50	1.0	1.0	1.0	-	-	9.26	0.0056	\$80.62	\$236.53	\$28.65	\$265.18	\$1.48	\$0.45	
Finish Grade	Cat D6T XL, SU Blade	-	0.0012	1.2	1.0	3600	1.0	-	-	0.75	50	1.0	1.0	1.0	3	1.0	-	0.0012	\$21.14	\$90.38	\$28.65	\$119.03	\$0.14	\$0.02	
																						\$1.62	\$0.47	\$2.09 Total	

Bench Grading -Tailings																									
Task Description	Equipment	Productivity (cy/hr)	Productivity (hrs/ft)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production	Centroid to Centroid	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	# Passes	Speed (miles/hr)	Volume (cy/ft)	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Bench Equipment Cost (\$/ft)	Bench Fuel Cost (\$/ft)	
							Method/ Blade Factor	Push Distance (feet)																	
Excavate	Cat D11T CD	1660	-	1.2	1.0	3600	1.0	87	3396	0.75	50	1.0	1.0	1.0	-	-	9.26	0.0056	\$80.62	\$236.53	\$28.65	\$265.18	\$1.48	\$0.45	
Finish Grade	Cat D6T XL, SU Blade	-	0.0012	1.2	1.0	3600	1.0	-	-	0.75	50	1.0	1.0	1.0	3	1.0	-	0.0012	\$21.14	\$90.38	\$28.65	\$119.03	\$0.14	\$0.02	
																							\$1.62	\$0.47	\$2.09 Total

Channel Unit Cost

Earthwork

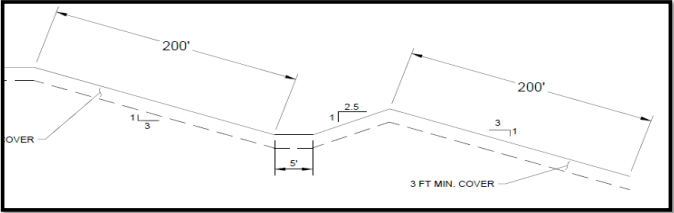
																						Bench		
Task Description		Equipment	Volume ³ (cy/ft)	Productivity (cy/hr)	Material Factor	Grade Factor	Material Weight (lb/cy)	Production Method/ Blade Factor	Centroid to Centroid Push Distance (feet)	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Equipment Cost (\$/ft)	Bench Fuel Cost (\$/ft)		
Channels	Excavate	Cat D11T CD	0.78	905	1.20	1.0	3600	1.00	175	1851	0.75		50	1.00	1.00	1.00	0.0009	80.62	236.53	28.65	265.18	0.23	0.07	
Channels	Waste	Cat D11T CD	0.78	806	1.20	1.0	3600	1.00	200	1649	0.75		50	1.00	1.00	1.00	0.0010	80.62	236.53	28.65	265.18	0.26	0.08	
																					0.48	0.15	0.63	Total

Filter	0.22 cy/ft	\$	2.24	\$	0.47
Rip Rap	0.44 cy/ft	\$	4.52	\$	0.96

Total Unit Cost	\$7.23	\$1.58	\$8.81	\$/ft
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CHANNELS

Dimensions:		
Left Side Slope: ¹	3.00	H:1V
Left Side Slope: ¹	2.50	H:1V
Depth: ¹	2.00	ft
Left Side Slope Length: ¹	3.61	
Right Side Slope Length: ¹	3.20	
Bottom Width:	5.00	ft
Left Anchor ¹	0.00	ft
Right Anchor ¹	0.00	ft
Perimeter: ¹	11.81	ft
Excavation Area: ¹	21.00	sf
Filter Area ²	5.90	sf
Riprap Area	11.81	sf



1. Assigned based on previous use at other FMI New Mexico operations
2. Bench cross width* 6" filter thickness or 12" riprap thickness
3. Volume (cy) =Area(sf)*Length(ft)/27

Downdrain Unit Cost

Rough Grade

Task Description	Equipment	Productivity (cy/hr)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production Method/Blade Factor	Centroid to Push	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	Volume (cy/ft)	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Equipment w/o Fuel Cost (\$/hr)	Fuel Cost (\$/ft)	Total Excavation Cost (\$/ft)
Excavate	Cat D11T CD	1394	1.2	1.6	3600	1.0	175	1851	0.75	50	1.0	1.0	1.0	1.9	0.0014	\$80.62	\$236.53	\$28.65	\$265.18	\$0.37	\$0.11	\$0.48
Waste	Cat D11T CD	1242	1.2	1.6	3600	1.0	200	1649	0.75	50	1.0	1.0	1.0	1.9	0.0016	\$80.62	\$236.53	\$28.65	\$265.18	\$0.41	\$0.13	\$0.54
																				\$0.78	\$0.24	\$1.01

Finish Grade & Place ACB

	Area (sf/ft)	Unit Cost (\$/sf)	\$/ft
Downdrain ACBs			
40T ¹	31	\$7.72	\$239.31
Installation ¹	31	\$4.82	\$149.33
ACB Cost/ft			\$388.64
Total Downdrain Cost (\$/ft)			\$389.66

Place ACB

	Area (sf)	Unit Cost (\$/sf)	\$/sf
Dissipater ACBs			
70T ¹	320	\$11.08	\$3,545.68
Installation ¹	320	\$4.82	\$1,541.46
40T ¹	506	\$7.72	\$3,906.20
Installation ¹	506	\$4.82	\$2,437.43
ACB Cost per Dissipater			\$11,430.77

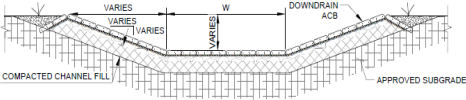
Install Cutoff Wall

Cutoff Wall (cast in place concrete)	cubic yard	\$/cubic yard	\$/dissipater ³
RSMeans (2020)	14	\$ 262.58	\$3,676.12
Total Dissipator Cost (\$/each)			\$15,106.89

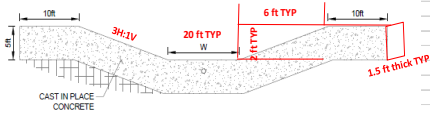
DOWNDRAIN Dimensions:			
Left Side Slope: ²	3	H:1V	
Right Side Slope: ²	3	H:1V	
Depth: ²	2	ft	
Perimeter: ²	31	ft	
Excavation Area ³	52	sf	
ACB Area ³	31	sf	

DISSIPATERS	ACB ²				Cutoff Wall ^{1,4} Cross-Sectional Area	Thickness	Volume
	Surface Area 1	Surface Area 2	Surface Area 3	Total	(sf)	(ft)	(cy)
	(sf)	(sf)	(sf)	(sf)	(sf)		
	253	320	253	825	260	1.5	14

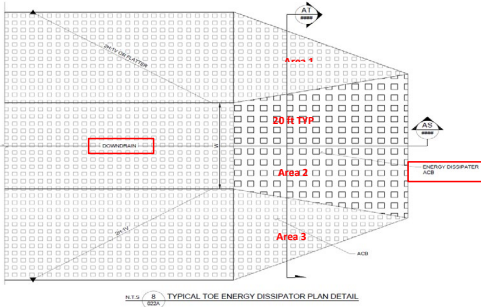
1. Quote from Contech ES 2019, adjusted for inflation; Downdrain ACB installation includes fine grade base/subgrade soils (assuming subgrade at + 0.5 ft); equipment is D6 LGP dozer with Power Angle Tilt Blade (PAT) and GPS Blade Control
2. Assigned based on previous use at other FMI New Mexico operations
3. One cutoff wall per dissipator
4. Typical flow depth is 2'; concrete depth is 5' (diagram is not drawn to scale); concrete thickness is 1.5'



N.T.S. AU 022A TYPICAL DOWNDRAIN SECTION



N.T.S. AX 022A TYPICAL CUTOFF WALL SECTION



N.T.S. B TYPICAL TOE ENERGY DISSIPATOR PLAN DETAIL

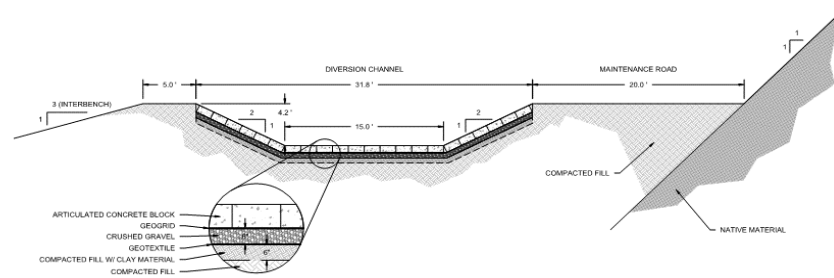
Deadman Diversion Channel Unit Cost

Rough Grade

Task Description	Equipment	Productivity (cy/hr)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production Method/Blade Factor	Centroid to Push	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	Volume (cy/ft)	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Dozer Cost (\$/hr)	Equipment w/o Fuel Cost (\$/ft)	Fuel Cost (\$/ft)	Total Excavation Cost (\$/ft)
Excavate	Cat D11T CD	1394	1.2	1.6	3600	1.0	175	1851	0.75	50	1.0	1.0	1.0	4.4	0.0031	\$80.62	\$236.53	\$28.65	\$265.18	\$0.83	\$0.25	\$1.08
Waste	Cat D11T CD	1242	1.2	1.6	3600	1.0	200	1649	0.75	50	1.0	1.0	1.0	4.4	0.0035	\$80.62	\$236.53	\$28.65	\$265.18	\$0.93	\$0.28	\$1.21
																				\$1.76	\$0.54	\$2.30

Finish Grade & Place ACB

Area (sf/ft) (cy/ft for clay)	Unit Cost (\$/sf) (\$/cy for clay)	\$/ft
Downdrain ACBs		
50T ^{1a}	\$10.27	\$326.59
Clay Material & Activities	\$14.71	\$8.66
Installation ^{1b}	\$4.82	\$153.18
ACB Cost/ft		\$488.43
Total Downdrain Cost (\$/ft)		\$490.73



DEADMAN DIVERSION
SECTION VIEW

Clay Activities

Load & Transfer

Task Description	Equipment	Load, Dump, Maneuver Time (min)	Work Time (min)	Loads/ hr	Net Bucket (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Loader+Op Cost (\$/hr)	Load+Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Load clay	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31
Transfer clay for placing	Cat 992K	0.65	50	76.92	14.00	1076.92	25.63	69.46	239.31	28.97	268.28	0.25	0.06	0.31

Hauling

Task Description	Equipment	Exchange Time (min)	Travel Time ¹ (min)	Unload and Maneuver Time (min)	Return Travel Time ¹ (min)	Load Time (min)	Total Time (min)	Work Time (min)	Loads/ hr	Heaped Capacity (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Truck+Op Cost (\$/hr)	Truck + Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Haul clay from source to site	Komatsu 730E	0.70	2.93	1.10	2.39	6.73	13.86	50	3.61	145	523	33.48	90.73	215.93	25.16	241.09	0.46	0.17	0.63

Placing

Task Description	Equipment	Distance	Grade	Exchange Time (min)	Delivery Travel Time (min)	Unload and Maneuver Time (min)	Return Travel Time (min)	Load Time (min)	Total Time (min)	Work Time (min)	Loads/ hr	Heaped Capacity (cy/load)	Production Rate (cy/hr)	Fuel Use Gal per Hour	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (\$/hr)	Truck + Op Cost (\$/cy)	Truck+Op Cost (\$/cy)	Fuel Cost (\$/cy)	Total Cost (\$/cy)
Place clay	Cat 725	400.00	-30%	0.70	3.25	1.10	0.74	0.87	6.67	50	7.50	19	141.01	6.02	16.31	76.63	24.82	101.45	0.72	0.12	0.84

DOWNDRAIN Dimensions:			
Left Side Slope:	3		H:1V
Right Side Slope:	3		H:1V
Depth:	4.2		ft
Perimeter:	31.8		ft
Excavation Area	118		sf
ACB Area	31.8		sf

1a. Quote from Contech ES 2021; Downdrain ACB cost includes the Armorflex 50T ACB mats with galvanized cable, geotextile fabric, geogrid, and freight to the jobsite via Over the Road Flatbed Trucks.
1b. Quote from Contech ES 2019, adjusted for inflation; Installation includes fine grade base/subgrade soils (assuming subgrade at +0.5 ft); equipment is DG LGP dozer with Power Angle Tilt Blade (PAT) and GPS Blade Control.

New Haul Road Unit Cost

Sheet used for testing purposes and maintained for spreadsheet integrity. No reclamation haul roads needed in Little Rock RCE.

Earthwork

Activity	Equipment	Volume (cy/ft) ¹	Productivity (cy/hr)	Material Factor	Grade Factor ³	Material Weight (lb/cy)	Production Method/ Blade	Centroid to Centroid Push Distance ² (feet)	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Direct Drive Trans. Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Equipment Cost (\$/ft)	Fuel Cost (\$/ft)	Equipment + Fuel Cost (\$/ft)	
Grading	Cat D11T CD	266.67	2306	1.20	1.20	3600	1.00	100	3007	1.00	50	1.00	1.00	1.00	0.1157	80.62	236.53	28.65	265.18	30.67	9.33	40.00

¹Volume based on dozing rock bench to create 120' wide haul road, assuming the existing slope of the rock is 1:1 (120x120/2=7200 sf)

²100' push distance assumed

³Maximum haul road grade of 10% used to calculate grade factor

Plastic Pipe Demolition Unit Cost

R.S. Means Item 026510300320	\$305.54	9,000-12,000 gal (avg. 10,500 gal) tank sludge removal cost
	\$0.03	sludge removal cost per gal
	\$0.22	sludge removal cost per cf
	\$0.02	sludge removal per foot of 7" pipe, assuming 1/3 full

Cost Cover Material Excav, Haul, Grade

Location	Cover Material Volume (cy)	Cost Cover Material Excav, Haul, Grade	Unit Cost (\$/cy)	
West In-Pit Waste	-	\$0	\$0.00	
East In-Pit Waste	-	\$0	\$0.00	
CLW Waste	-	\$0	\$0.00	
NRW Waste	-	\$0	\$0.00	
Deadman Diversion	686	\$1,377	\$2.01	
Allowance for Other Disturbed Areas	-	\$0	\$0.00	
	686			
			\$2.01	Site-Wide Weighted Average Unit Cover Material Excav, Haul, Grade Cost (\$/cy)
			\$2.99	Cover Material Excav, Haul, Grade Cost per ft of pipe (\$/ft)
Total Cost		\$3.01		

Assumptions:

All pipes are 6"-8" (average 7")
Pipe demo cost includes flushing
Cover Material Volumes located in Tab 4
Cost Cover Material located in Tab 17b
Cover material unit cost assumes 40 sf of cover per foot of pipeline - 3' of cover over a 7' pipeline with 3:1 side slopes (and 27 cf per cy)

Plastic Pipe Demolition Unit Cost

R.S. Means Item 026510300320	\$305.54	9,000-12,000 gal (avg. 10,500 gal) tank sludge removal cost
	\$0.03	sludge removal cost per gal
	\$0.22	sludge removal cost per cf
	\$0.31	sludge removal per foot of 28" pipe, assuming 1/3 full

Cost Cover Material Excav, Haul, Grade

Location	Cover Material Volume (cy)	Cost Cover Material Excav, Haul, Grade	Unit Cost (\$/cy)	
West In-Pit Waste	-	\$0	\$0.00	
East In-Pit Waste	-	\$0	\$0.00	
CLW Waste	-	\$0	\$0.00	
NRW Waste	-	\$0	\$0.00	
Deadman Diversion	686	\$1,377	\$2.01	
Allowance for Other Disturbed Areas	-	\$0	\$0.00	
	686			
			\$2.01	Site-Wide Weighted Average Unit Cover Material Excav, Haul, Grade Cost (\$/cy)
			\$6.86	Cover Material Excav, Haul, Grade Cost per ft of pipe (\$/ft)
Total Cost		\$7.17		

Assumptions:

All pipes are 20"-36" (average 28")

Pipe demo cost includes flushing

Cover Material Volumes located in Tab 4

Cost Cover Material located in Tab 17b

Cover material unit cost assumes 92 sf of cover per foot of pipeline - 3' of cover over a 7' pipeline with 3:1 side slopes (and 27 cf per cy)

Revegetation Unit Cost

Revegetation consists of 5 operations - scarifying, discing, drill seeding, mulching, and crimping.
Cost information is obtained from EquipmentWatch (EQW), if available, or RS Means 2021 rates.

Tractor used for each operation is Deere 7430	Cost	Unit	Information or Calculation
EQW base rate for tractor rental	\$ 3,598.80	\$ per month	EQW for Deere 7430
EQW base rate for tractor rental	\$ 20.45	\$ per hour	= (\$/month)/176
EQW field labor rate per hour of operation	\$ 3.42	\$ per hour	EQW for Deere 7430, which includes mechanic's wage of \$23.09 (NMDOL, 2019)
EQW lube material cost	\$ 2.32	\$ per hour	EQW for Deere 7430
EQW field parts cost	\$ 0.80	\$ per hour	EQW for Deere 7430
EQW tire material cost	\$ 1.00	\$ per hour	EQW for Deere 7430
EQW fuel burn rate	5.98	gallons per hour	EQW for Deere 7430
Local fuel cost	\$ 2.71	\$ per gallon	Local quote
Fuel cost	\$ 16.21	\$ per hour	= (EQW fuel burn rate) x (local fuel cost)
NM Department of labor equipment operator rate	\$ 24.63	\$ per hour	NM Department of Labor (NMDOL)
Total tractor cost	\$ 68.82	\$ per hour	Sum of \$ per hour costs shown in boxes

Tractor coverage/rate of operation, fuel cost per acre			
Tractor/equipment net width	12	feet	Assigned as a typical net width of coverage for each pass
Tractor/equipment travel speed	2.5	miles per hour	Assigned as approximate average speed of equipment (3 mph for 50 min/hr)
For 1 acre, total traveling distance	3630	feet per acre	= (43560 sf/ac)/(net width)
Time of travel over 1 acre	0.275	hour per acre	= [(traveling distance feet/acre)/(5280 ft/mile)]/(travel speed)
Fuel cost per acre	\$ 4.46	\$ per acre	Already included in total tractor cost... Fuel cost/acre = (fuel cost/hour) x (travel time hour/acre)

Operation			
<u>Scarifying</u>			
Base rate for ripper rental	\$ 881.00	per month	EQW Ripper, Miscellaneous MSR-189H, to 260 HP
Base rate for ripper rental	\$ 5.01	\$ per hour	= (\$/month)/176
Field labor rate per hour of operation	\$ 0.74	\$ per hour	EQW for ripper, incl mechanic's wage \$23.09 (NMDOL, 2019)
Lube material cost	\$ 0.15	\$ per hour	EQW for ripper
Field Parts & Ground Engaging Component Cost	\$ 2.36	\$ per hour	EQW for ripper
Total cost with tractor+operator included	\$ 77.08	per hour	= total tractor cost + (rake without tractor, with ratio)
<u>Discing</u>			
Disc harrow attachment, for tractor	\$ 670.65	per month	RS Means 01 54 33 20 1500
Disc harrow attachment, for tractor	\$ 3.81	per hour	= (\$/month)/176
Field Parts & Ground Engaging Component Cost	\$ 2.36	\$ per hour	Assume similar to GEC cost for ripper (EQW)
Total cost with tractor included	\$ 74.99	per hour	= total tractor cost + (disc harrow, with ratio)
<u>Drill seeding (assume similar to discing)</u>			
Disc harrow attachment, for tractor	\$ 670.65	per month	RS Means 01 54 33 20 1500
Disc harrow attachment, for tractor	\$ 3.81	per hour	= (\$/month)/176
Field Parts & Ground Engaging Component Cost	\$ 2.36	\$ per hour	Assume similar to GEC cost for ripper (EQW)
Total cost with tractor+operator included	\$ 74.99	per hour	
<u>Mulching</u>			
Mulcher, diesel powered, trailer mounted	\$ 2,127.72	per month	EQW for trailer mounted mulcher (Finn B260)
Mulcher, diesel powered, trailer mounted	\$ 12.09	per hour	= (\$/month)/176
Field labor rate per hour of operation	\$ 1.71	\$ per hour	EQW for trailer mounted mulcher (Finn B260), incl mechanic's wage \$23.09 (NMDOL, 2019)
Lube material cost	\$ 1.29	\$ per hour	EQW for trailer mounted mulcher (Finn B260)
Field parts cost	\$ 0.19	\$ per hour	EQW for trailer mounted mulcher (Finn B260)
Tire material cost	\$ 0.60	\$ per hour	EQW for trailer mounted mulcher (Finn B260)
Fuel burn rate	4.13	gallons per hour	EQW for trailer mounted mulcher (Finn B260)
Local fuel cost	\$ 2.71	\$ per gallon	Local quote
Fuel cost	\$ 11.19	\$ per hour	= (EQW fuel burn rate) x (local fuel cost)
NM Department of labor equipment operator rate	\$ 24.63	\$ per hour	NM Department of Labor (NMDOL)
Total cost with tractor+operator included	\$ 120.53	per hour	
<u>Crimping (assume similar to discing)</u>			
Disc harrow attachment, for tractor	\$ 670.65	per month	RS Means 01 54 33 20 1500
Disc harrow attachment, for tractor	\$ 3.81	per hour	= (\$/month)/176
Field Parts & Ground Engaging Component Cost	\$ 2.36	\$ per hour	Assume similar to GEC cost for ripper (EQW)
Total cost with tractor+operator included	\$ 74.99	per hour	
<u>Summary for operations</u>			
Total cost for all operations combined (hour)	\$ 422.59	per hour	Each of the 5 operations is done individually as part of revegetation (includes fuel cost)
Total cost for all operations combined w/o fuel(acre)	\$ 111.75	per acre	---
Total cost for all operations combined w/ fuel(acre)	\$ 116.21	per acre	Total is based on "tractor coverage/rate of operation" = (total cost of operations/hour) x (hours of travel time/acre)

Materials (From Rocky Mountain Reclamation)			
Seed	\$ 222.85	per acre	From supplier (Rocky Mountain Reclamation)
Hay mulch	\$ 519.99	per acre	From supplier (Rocky Mountain Reclamation): Mulch is applied at a rate of 2 tons per acre

Summary for operations + materials			
Total revegetation unit cost	\$ 859.06	per acre	Total is for all operations (combined) + seed material + hay mulch material + fuel

Table 10: Channel/Bench Grading and Excavation Costs

Berm Grading Unit Cost

Berm Grading - 1.5H:1V																						
Task Description	Equipment	Productivity (cy/hr)	Material Factor	Grade Factor	Soil Weight (lb/cy)	Production	Centroid to Centroid	Normal Production (cy/hr)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Transmission Factor	Volume (cy/ft)	Productivity (hrs/ft)	Fuel Cost (\$/hr)	Equipment Cost (\$/hr)	Operator Cost (IV) (\$/hr)	Dozer Cost (\$/hr)	Berm Equipment Cost (\$/ft)	Berm Fuel Cost (\$/ft)	
						Method/ Blade Factor	Push Distance (feet)															
Excavate	Cat D9T, SU Blade	519	1.2	1.02	3600	1.0	100	1062	0.75	50	1.0	1.0	1.0	0.43	0.0008	\$38.89	\$207.08	\$28.65	\$235.73	\$0.19	\$0.03	
Finish Grade	Cat D9T, SU Blade	933	1.2	1.02	3600	1.0	50	1909	0.75	50	1.0	1.0	1.0	0.5	0.0005	\$38.89	\$207.08	\$28.65	\$235.73	\$0.13	\$0.02	
																				\$0.32	\$0.05	\$0.37 Total

¹Berm 1.5:1 slope, 1' high, 10' top width

Excavate			
Width		Height	
10	1	10	cf/ft
1.5	1	1.5	cf/ft
Total Excavation Volume =		11.5	cf/ft
Total Excavation Volume =		0.43	cy/ft

Finish Grade			
slope length x1	1.8	ft	
slope length x1	1.8	ft	
top length	10	ft	
length =	13.6	ft	
depth	1	ft	
width	1	ft	
Total Finish Grade Volume =		13.6	cf/ft
Total Finish Grade Volume =		0.5	cy/ft

Substation Demolition Unit Cost

Transformer demolition

RS Means 260505101570: Transformer, dry type, primary, 3 phase, to 600 V, 750 kVA, electrical demolition, remove, including removal of supports, wire & conduit terminations

- RS Means includes Crew R-3 of 2 electricians + 0.5 Crane operator (and crane) for 18 hours

\$ 1,069.16 each

Power pole demolition

There are 5 power poles. Assume the cost to remove this small number of poles is allocated with other pole removals elsewhere in the RCE

Structure demolition

Masonry/brick building with no foundation

Use building demo cost of \$0.23/cf developed from RS Means (see Building Demo sheet)

Building demo at 400 sf x 30 ft high = 12000 cf @ \$0.23/cf = \$2,760

\$2,760 each

Drain oil from transformer

Transformer capacity = 1,200 gallons, which requires $1200/55 = 22$ 55-gallon drums

The oil is contained in 55-gallon drums and handled as waste requiring special handling (shipped off-site)

Based on cost at other FMI New Mexico operations (\$229,331 for 30 loads @ 80 drums/load), cost/load = $229,331/30 = \$7,644/\text{load}$

\$7,644 per load

Steam clean transformer after draining the oil

RS Means 015433406300: Rent steam cleaner 100 gph, Incl. Hourly Oper. Cost.

Assume this is needed for 1 week: \$313.04 per week

\$313.04 per week

Disposal of oil residue from cleaning

Use oil absorbent booms (<https://www.newpig.com/pig-oil-only-absorbent-boom/p/BOM406>)

Assume 5 bags of oil absorbent booms (8 booms per bag) are need to absorb the oil residue from cleaning

Cost (1/20/20) is \$96/bag for 5 to 11 bags, yielding a total cost of \$480

\$480 booms

Assume 2 55-gallon drums will contain all booms used; these drums will be handled as waste requiring special handling

Assume these 2 drums fit on the same load as the 22 drums of transformer oil, so no additional cost to ship off-site

\$0

\$ 12,266.20 total estimated cost for substation demo

Specific inputs in EquipmentWatch that are adjusted

EquipmentWatch Line Item	Description of EquipmentWatch Changes to Eliminate Duplicate Costs
Mechanics Wages	Per New Mexico law, the \$23.88/hour Mechanics labor rate is based on the most current New Mexico Department of Labor (DOL) Type H (Heavy Engineering) labor rates. FICA, Medicare, Social Security, Unemployment Taxes, and Workmans' Comp are accounted for in Overhead.
Sales Tax	The Sales Tax is set at \$0/hour because New Mexico does not charge sales tax on state contracts. Sales Tax adjusted from 5.1% to 0%
Maximum work hours per month	Per EquipmentWatch BlueBlook Rental calculations, a standard value of 176 hr/ month is assumed to be the maximum working hours per month. This value is used to determine the hourly cost of equipment use based on the monthly rental rate. This value is adjusted outside of EquipmentWatch in the Equipment worksheet.
Total Field Parts Cost	Annual Field Repair Parts Cost includes major equipment components. The Annual Field Repair costs are \$0/yr because Tyrone will be renting equipment. However, EquipmentWatch sets Annual Misc Supply Parts to \$0 and Annual Ground Engaging Component costs to \$0 when this input is set to \$0. We want to use the standard values for Annual Misc Supply Parts and Annual Ground Engaging Component costs. As a work around, the sum of the standard values for Annual Misc Supply Parts and Annual Ground Engaging Component costs is input here and the inputs for Annual Misc Supply Parts and Annual Ground Engaging Component costs are set to \$0.
	Annual Misc Supply Parts
	Annual Ground Engaging Component (GEC)
Annual Use Hours	The Annual Use Hours are adjusted in EquipmentWatch to eliminate the EquipmentWatch 50 minute work hour.
Fuel Rate	The Fuel Rate is set to \$1/gal as the starting point to calculate fuel consumption and then fuel cost. <u>Example Calculation for CAT 14M:</u> First, the Fuel Rate is set to \$1/gal. Then, Equipment Watch calculates fuel cost to be \$8.29/hr. Fuel consumption is calculated as $(\$8.29/\text{hr})/(\$1.00/\text{gal}) = 8.29 \text{ gal/hr}$. Fuel consumption is then multiplied by the Fuel Quote value (\$2.06/gal) to yield a <u>Fuel Cost for 14M of \$17.08/hr.</u>

Standard costs are used for other EquipmentWatch components

Definitions

Field Repair	Operating cost includes field repair defined as routine, daily servicing of the equipment and would include repairing, replacing or adjusting small components such as pumps, carburetors, injectors, batteries, filters, belts, gaskets, and hoses. The cost of extraordinary operating expendables is not included. Certain ground engaging components, such as hammer and drill bits, drill steel, augers, saw blades, and tooth-bits, are normally excluded from the "Estimated Operating Cost/Hr." because of their highly variable wear patterns. It is recommended that these costs be recovered separately
Field Repair - Labor	Field repair labor costs are accrued on a machine working-hour basis to offset charges incurred to perform normal field repair and maintenance. Costs listed under this heading represent an annual average over the economic life of the equipment. For adjustments and comparisons, the average labor cost per hour can be related to the average mechanic's wage (including fringe benefits) published.
Field Repair - Parts	Field repair parts costs are accrued on a machine working-hour basis to offset the costs for supplying parts necessary to keep the equipment operating in good condition. These parts consist of anything short of a major component overhaul or replacement. This annual cost includes "miscellaneous supply parts" referred to in the cost adjustment section. Costs listed under this heading represent an annual average over the economic life of the equipment.
Miscellaneous Supply Parts	Miscellaneous Supply Parts are parts normally stocked in bulk for an entire fleet, rather than for individual machines, this cost includes cables, hoses, steel etc.
Ground Engaging Components (GEC)	These costs include repair and/or replacement, either in whole or part, of ground engaging components such as pads, drums, teeth and cutting edges.
Tires	Tire costs include the repair and/or replacement of tires. Listed tire costs are based on the current price of tires, typical contractor discounts, and the tire life listed which reflects average working conditions.
Fuel	Fuel costs are calculated using average load factors, equipment horsepower, and the price of fuel per gallon. Actual fuel consumption will depend on variations in load factors, elevation, engine performance, operator efficiency, and terrain.
Lube	Lubrication includes the costs of oils, grease, coolants and filters. Labor and ancillary equipment involved in servicing is also included. (e.g. The cost of a lube truck and operator is included in this cost). For dual engine models, costs for both equipment and carrier are included.

	Cat D11T, U Blade	Cat D11T CD	Cat D9T SU Blade	Cat D9T SU Blade	Cat D6T XL, SU Blade	Cat 319D L	Cat 962K	Cat 988H	Cat 988H	Cat 966H	Cat 963K	Cat 16M	Cat 14M	MSR-359H	MSR-189H (revveg)	Fire B260 mulcher (revveg)	Cat 637G	Cat 657G	Hitachi EX3600-S	Deere 7430	Komatsu HD-1500 S	Cat 765D	Cat 725	Komatsu 730E	Cat 777F	Cat 740	Off-Hwy Water Tanker Truck,8,500-gal.	Off-Hwy Water Tanker Truck,10,000-gal.	2 Deck Screening Plant (5X16, 48X60)	3 Deck Screening Plant (5X16, 48X60)	1 Deck Screening Plant (5X16, 48X60)	3 Deck Screening Plant (5X16, 42X60)	
Hours per year	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085	2085
Annual overhaul hours	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435	435
Subtotal	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673	1673
50 minute hour	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279
Annual Use Hours	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390
Adjusted Annual Use Hours	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679
Equipment Watch Annual Use Hours	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400

Abbreviation Name

ac	acre
ACB	Articulated Concrete Blocks
bcy	bulk cubic yards
cy	cubic yards
cf	cubic feet
ea	each
EQW	EquipmentWatch
ft	feet (or linear feet)
gal	gallon
hr	hour
lb	pound
lcy	loose cubic yards
MMD	Mining and Minerals Division
NMA	North Mine Area
NM	New Mexico
NMDOL	New Mexico Department of Labor
O&M	Operation and Maintenance
Reveg	Revegetate
sf	square feet
SOW	Scope of Work (see references)
UC	Unit Cost
yr	year