

COSTMINE INTELLIGENCE

ASRS 2026 · RECLAMATION COST WORKSHOP

Mastering Reclamation Cost Estimates with **SHERPA**

Krista Noyes

Reclamation Cost Specialist

RECLAMATION WORKFLOW

The Site

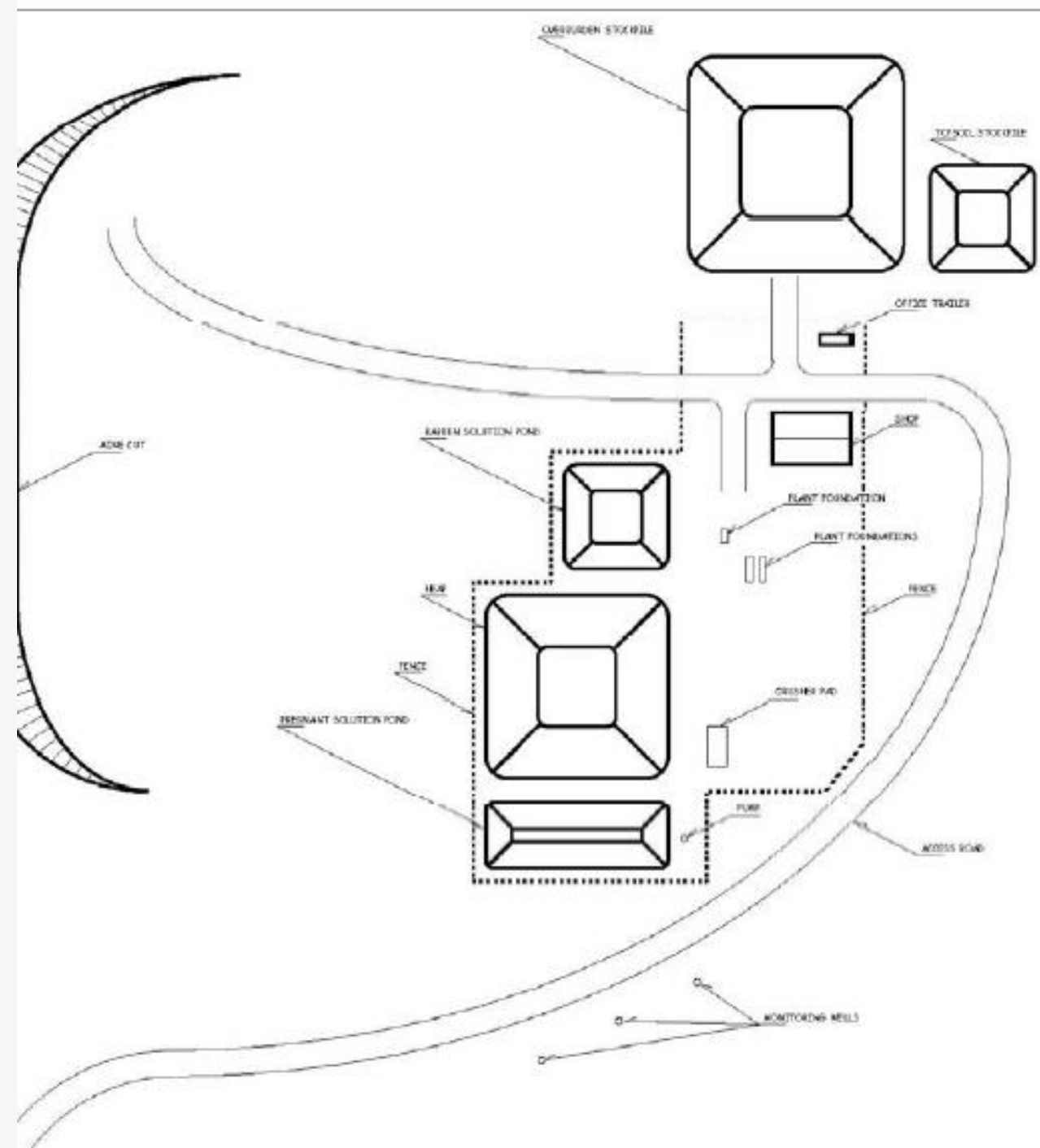
Map the site and catalog everything that remains before any costing begins.

01

SITE OVERVIEW

Abandoned Heap Leach Operation

- Heap pad
- Pregnant pond (empty)
- Barren pond (contains clean water)
- Overburden stockpile
- Topsoil stockpile
- Shop building
- Foundations from removed buildings
- Culvert removal
- Fence removal
- Vehicle disposal (abandoned)
- Machinery disposal (abandoned)
- Waste disposal
- Monitor well construction
- Sampling



Location Details

- **Project site**
 - Idaho Panhandle
 - 24 miles from town.
 - County landfill is 34 miles from project
 - Haz waste disposal is 245 miles away.
- **Monitoring**
 - 60 months
- **Timeline**
 - 24 months

LOCATION	
Region	Idaho
Area	Panhandle

ACCESS	
Distance to Support *	24 miles
Distance to Dump *	34 miles
Distance to Hazardous Waste Dump *	245 miles
Average Transport Speed to Support	35 mph
Average Transport Speed to Dump	35 mph
Average Transport Speed to Hazardous Dump	45 mph

PROJECT DURATION	
Closure Project Duration *	24 months
Post Closure Monitoring Period *	60 months

RECLAMATION WORKFLOW

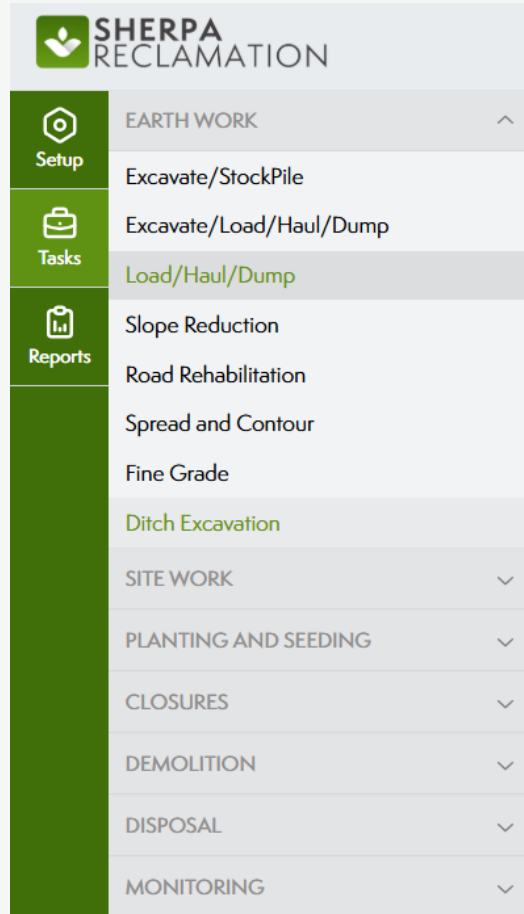
Earthwork

Clearing, grubbing, load / haul / dump, and re-grading the heap pad, ponds, and stockpiles to approved contours.

02

EARTHWORK

Defining the Tasks



Load/Haul/Dump

Job 1 - Place Overburden and Waste over the Project Site

Loader	-	4.5-cubic-yard front-end loader
Hauler	-	20-ton rear-dump truck
In-Place Material Density	-	2,400 pounds/cubic foot
Swell upon Excavation	-	10 percent
Average Transport Distance	-	420 feet
Average Transport Gradient	-	- 4.0 percent
Volume Transported (in-place)	-	11,420 cubic yards

Job 2 - Return Overburden and Waste to the Mine Cut

Loader	-	4.5-cubic-yard front-end loader
Hauler	-	20-ton rear-dump truck
In-Place Material Density	-	2,400 pounds/cubic foot
Swell upon Excavation	-	10 percent
Average Transport Distance	-	760 feet
Average Transport Gradient	-	2.0 percent
Volume Transported (in-place)	-	12,580 cubic yards

Job 3 - Place Topsoil over the Project Site

Loader	-	4.5-cubic-yard front-end loader
Hauler	-	20-ton rear-dump truck
In-Place Material Density	-	1,800 pounds/cubic foot
Swell upon Excavation	-	10 percent
Average Transport Distance	-	510 feet
Average Transport Gradient	-	- 4.0 percent
Volume Transported (in-place)	-	1,900 cubic yards

Job 4 - Return Topsoil to the Mine Cut

Loader	-	4.5-cubic-yard front-end loader
Hauler	-	20-ton rear-dump truck
In-Place Material Density	-	1,800 pounds/cubic foot
Swell upon Excavation	-	10 percent
Average Transport Distance	-	850 feet
Average Transport Gradient	-	2.0 percent
Volume Transported (in-place)	-	865 cubic yards

Job 1 – Inputs

JOB TITLE	Place Overburden and Waste over the Project Site	
MACHINES	Wheel Loader #1 Available sizes Wheel Loader 4.5 cubic yard Rear-Dump Truck #1 Available sizes Rear-Dump Truck 20.0 ton	
CURRENT FLEET	Rear-Dump Truck #20 Wheel Loader #20	
EQUIPMENT PARAMETERS	WHEEL LOADER #1 Bucket Volume Capacity 4.50 cu. yds. Bucket Weight Capacity 14.37 tons Availability 88.65 % Rolling Resistance 3.00 % Bucket Fill Factor 95.00 % Remove from fleet REAR-DUMP TRUCK #1 Bed Weight Capacity 20.00 tons Bed Volume Capacity 12.70 cu. yds. Availability 92.17 % Rolling Resistance 3.00 % Bed Fill Factor 95.00 % Remove from fleet	
MATERIAL SPECIFICATIONS	In-Place Density 2,400.00 lbs/cu. yd. Swell upon Excavation 10.00 % Excavated Density 2,181.82 lbs/cu. yd.	

TRANSPORT PROFILE	<table><thead><tr><th>Segment</th><th>Distance</th><th>Gradient</th></tr></thead><tbody><tr><td>Transport Segment #1</td><td> 420 feet</td><td> -4 %</td></tr><tr><td>Transport Segment #2</td><td> 0 feet</td><td> 0 %</td></tr><tr><td>Transport Segment #3</td><td> 0 feet</td><td> 0 %</td></tr><tr><td>Transport Segment #4</td><td> 0 feet</td><td> 0 %</td></tr><tr><td>Transport Segment #5</td><td> 0 feet</td><td> 0 %</td></tr></tbody></table>	Segment	Distance	Gradient	Transport Segment #1	420 feet	-4 %	Transport Segment #2	0 feet	0 %	Transport Segment #3	0 feet	0 %	Transport Segment #4	0 feet	0 %	Transport Segment #5	0 feet	0 %										
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EARTHWORK PARAMETERS	Volume 11,420.00 cu. yds. Loader Cycle Time 0.19 minutes Truck Cycle Time 2.15 minutes																												
COSTS	<table><thead><tr><th>EQUIPMENT OPERATION</th><th># of hours</th><th>Cost per hour</th><th>Total</th></tr></thead><tbody><tr><td>Front-End Loader</td><td> 9.40 hours</td><td> \$ 162.69 /hour</td><td> \$ 1,530</td></tr><tr><td>Rear-Dump Truck</td><td> 23.89 hours</td><td> \$ 76.17 /hour</td><td> \$ 1,820</td></tr><tr><td>CREW</td><td># of hours</td><td>Cost per hour</td><td>Total</td></tr><tr><td>Foreman</td><td> 7.92 hours</td><td> \$ 67.38 /hour</td><td> \$ 534</td></tr><tr><td>Loader Operator</td><td> 12.78 hours</td><td> \$ 48.69 /hour</td><td> \$ 622</td></tr><tr><td>Truck Driver</td><td> 31.24 hours</td><td> \$ 60.78 /hour</td><td> \$ 1,899</td></tr></tbody></table>	EQUIPMENT OPERATION	# of hours	Cost per hour	Total	Front-End Loader	9.40 hours	\$ 162.69 /hour	\$ 1,530	Rear-Dump Truck	23.89 hours	\$ 76.17 /hour	\$ 1,820	CREW	# of hours	Cost per hour	Total	Foreman	7.92 hours	\$ 67.38 /hour	\$ 534	Loader Operator	12.78 hours	\$ 48.69 /hour	\$ 622	Truck Driver	31.24 hours	\$ 60.78 /hour	\$ 1,899
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Job 1 – Load/Haul/Dump

COSTS	EQUIPMENT OPERATION			
		# of hours	Cost per hour	Total
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TOTAL
\$6,404

Spreading, Contouring & Roads

Spread and Contour

Job 1 - Waste & Overburden

Excavator	-	8.98-cubic-yard bulldozer
In-Place Material Density	-	2,400 pounds per cubic yard
Swell upon Excavation	-	10 percent
Dozing Distance	-	50 feet
Dozing Gradient	-	2.0 percent
Transport Distance	-	150 feet
Transport Gradient	-	2.0 percent
Volume (in-place)	-	24,000 cubic yards

Job 2 - Topsoil

Excavator	-	8.98-cubic-yard bulldozer
In-Place Material Density	-	1,800 pounds per cubic yard
Swell upon Excavation	-	10 percent
Dozing Distance	-	50 feet
Dozing Gradient	-	2.0 percent
Transport Distance	-	150 feet
Transport Gradient	-	2.0 percent
Volume (in-place)	-	2,765 cubic yards

Road Rehabilitation

Job 1 - 24-foot x 2,060 foot Access Road

Excavator	-	8.98-cubic-yard bulldozer
Road Length	-	2,060 feet
In-Place Material Density	-	2,400 pounds per cubic yard
Swell upon Excavation	-	10 percent
Re-Compacted Density	-	2,250 pounds per cubic yard
Average Site Side Slope	-	2.0 degrees
Road Cut Slope	-	45 degrees
Road Bed Width	-	24 feet

RECLAMATION WORKFLOW

Sitework & Revegetation

Soil stabilization and amendments, then seeding and planting to re-establish a stable, vegetated surface.

03

SITWORK

Grading & Site Prep

SHERPA
RECLAMATION

Setup

Tasks

Reports

EARTH WORK

SITE WORK

Fences

Soil Stabilization

Armoring

Scarifying

PLANTING AND SEEDING

CLOSURES

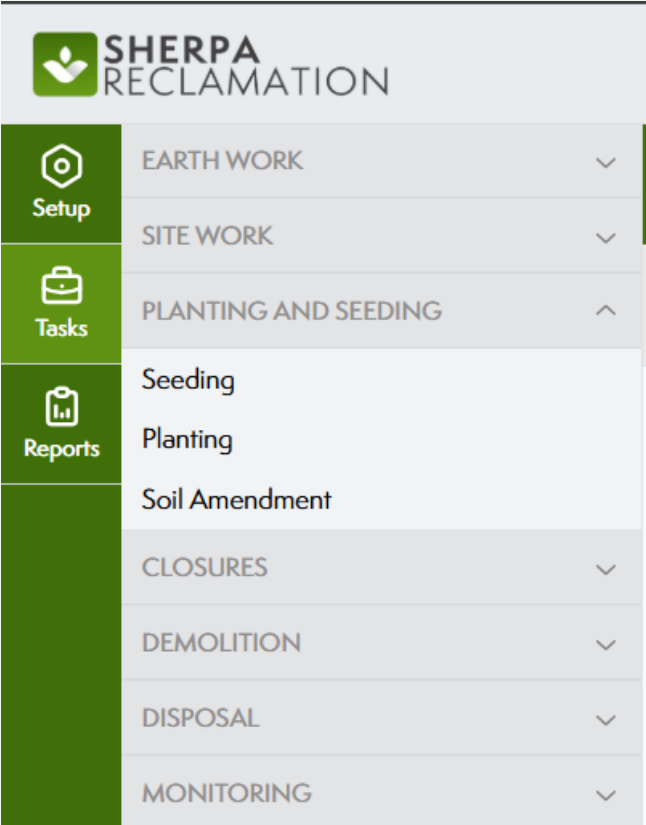
DEMOLITION

DISPOSAL

MONITORING

<u>Scarifying</u>			
<i>Job 1 - Plant, Pond, and Pad Site</i>			
Surface Area	-		2.26 acres
Average Side Slope	-		4.0 percent
<i>Job 2 - Mine Cut Site</i>			
Surface Area	-		1.89 acres
Average Side Slope	-		8.0 percent

Planting and Seeding



<u>Planting and Seeding</u>		
<i>Job 1 - Plant, Pond, and Pad Site</i>		
Seed Variety	-	Idaho fescue
Application Method	-	hydro-seeding
Surface Area	-	2.26 acres
<i>Job 2 - Mine Cut Site</i>		
Seed Variety	-	Idaho fescue
Application Method	-	hydro-seeding
Surface Area	-	1.89 acres

Closures

SHERPA RECLAMATION		
Setup	EARTH WORK	▼
	SITE WORK	▼
Tasks	PLANTING AND SEEDING	▼
	CLOSURES	▲
Reports	Adits	
	Shafts	
	Drill Holes	
	Leach Pads	
	Ponds / Impoundments	
	Pumping	
	DEMOLITION	▼
	DISPOSAL	▼
	MONITORING	▼

Pad Closure

Job 1 - Heap Leach Pad

Closure Method	-	remove
Lining	-	synthetic
Pad Surface Area	-	19,600 square feet
Heap Thickness (after pond fill)	-	20 feet
Distance to Disposal	-	260 feet

Pond Closure

Job 1 - Barren Solution Pond

Construction	-	excavation
Lining	-	do not remove
Pond Surface Area	-	6,400 square feet
Pond Depth	-	20 feet
Distance to Fill Source	-	260 feet

Job 2 - Pregnant Solution Pond

Construction	-	excavation
Lining	-	do not remove
Pond Surface Area	-	7,000 square feet
Pond Depth	-	20 feet
Distance to Fill Source	-	220 feet

Pumping

Job 1 - Heap Rinse

Flow Rate	-	40 gallons per minute
Relative Inlet Elevation	-	-20 feet
Relative Outlet Elevation	-	40 feet
Pumping Distance	-	220 feet
Duration	-	60 days

RECLAMATION WORKFLOW

Demolition & Disposal

Removing structures, foundations, culverts, and fencing — then hauling waste and salvage to the right facility.

04

DEMOLITION

Buildings, Culverts & Fencing

		
Setup	EARTH WORK	▼
	SITE WORK	▼
Tasks	PLANTING AND SEEDING	▼
	CLOSURES	▼
Reports	DEMOLITION	▲
	Buildings	
	Foundations	
	Pavement	
	Culvert	
	Fencing	
	DISPOSAL	▼
	MONITORING	▼

Building Demolition

Job 1 - Shop

Construction	-	steel frame/steel siding
Average Building Height	-	18 feet
Average Building Length	-	60 feet
Average Building Width	-	40 feet
Transport Distance to Disposal	-	34 miles

Culvert Removal

Job 1 - 6-foot-diameter Culvert

Construction	-	culvert
Diameter	-	72 inches
Average Depth to Centerline	-	144 inches
Total Length	-	110 feet
Transport Distance to Disposal	-	34 miles

Fence Removal

Job 1

Construction	-	chain link/barbed wire
Overall Height	-	12 feet
Total Length	-	1,360 feet
Number of Gates	-	3 gates
Transport Distance to Disposal	-	34 miles

Foundations & Slabs

Foundation Demolition

Jobs 1 & 2 - 5.0-ft. x 20.0-ft. x 8.0-ft. footings

Construction	-	footing
Reinforcement	-	re-bar
Cross Section	-	40 square feet
Length	-	20 feet
Transport Distance to Disposal	-	34 miles

Job 3 - 8.0-ft. x 10.0-ft. x 1.5-ft. pad

Construction	-	slab on grade
Reinforcement	-	wire mesh
Thickness	-	18 inches
Surface Area	-	80 square feet
Transport Distance to Disposal	-	34 miles

Job 4 - 15.0-ft. x 30.0-ft. x 2.5-ft. Crusher Pad

Construction	-	slab on grade
Reinforcement	-	re-bar
Thickness	-	30 inches
Surface Area	-	450 square feet
Transport Distance to Disposal	-	34 miles

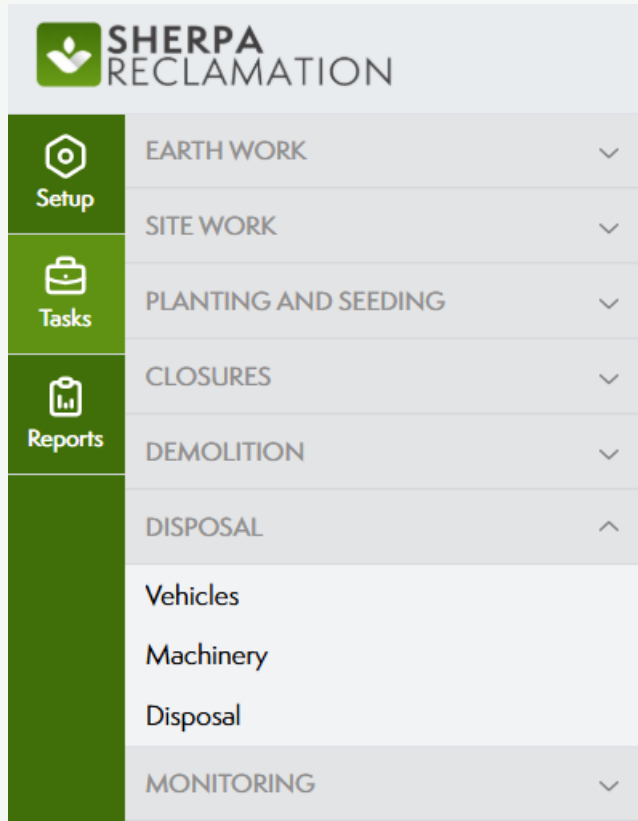
Job 5 - 40.0-ft. x 60.0-ft. x 0.5-ft. Shop Pad

Construction	-	slab on grade
Reinforcement	-	re-bar
Thickness	-	6 inches
Surface Area	-	2,400 square feet
Transport Distance to Disposal	-	34 miles

Job 6 - 4.0-ft. x 4.0-ft. x 1.0-ft. Pump Pad

Construction	-	slab on grade
Reinforcement	-	re-bar
Thickness	-	12 inches
Surface Area	-	16 square feet
Transport Distance to Disposal	-	34 miles

Vehicles & Machinery



Vehicle Disposal

Job 1 - ¾-ton Pick-Up Trucks

Vehicle Type	-	wheeled
Mobility Status-disabled	-	towable
Number of Vehicles	-	2 trucks
Average Vehicle Weight	-	3,000 pounds
Transport Distance	-	24 miles

Job 2 - 215-hp Bulldozers (45,000-pound)

Vehicle Type	-	tracked
Mobility Status-disabled	-	immobile
Number of Vehicles	-	2 bulldozers
Average Vehicle Weight	-	45,000 pounds
Transport Distance	-	24 miles

Job 3 - Office Trailer Removal (4,000-pound)

Vehicle Type	-	wheeled
Mobility Status-disabled	-	towable
Number of Vehicles	-	1 trailer
Average Vehicle Weight	-	4,000 pounds
Transport Distance	-	24 miles

Machinery Disposal

Job 1 - 2 each 620-pound Centrifugal Pumps

Mobility Status	-	attached
Operational Status	-	derelict
Number of Machines	-	2 pumps
Average Machine Weight	-	620 pounds
Transport Distance	-	24 miles

Job 2 - 1 each 8,800-pound Jaw Crusher

Mobility Status	-	attached
Operational Status	-	derelict
Number of Machines	-	1 crusher
Average Machine Weight	-	8,800 pounds
Transport Distance	-	24 miles

Waste Disposal

Waste Disposal

Job 1 - 22 each 55-Gallon Drums

Dump Location	-	dump
Hazardous Materials	-	oils
Weight	-	0.88 tons
Transportation Distance	-	34 miles

Job 2 - Concrete, Liner Material, Building Materials, Fencing, & Culvert

Dump Location	-	buried on site
Hazardous Materials	-	none
Weight:		
Concrete –		
4,864.5 cu. ft. × 144 lbs./cu. ft.	=	700,488 lbs
Pad Liner Material –		
(140 ft. × 140 ft.) × 2 lbs/sq. ft.	=	39,200 lbs
Building Material –		
16.873175 × ((60 ft. × 40 ft. × 18 ft.) ^{0.7879063})	=	75,775 lbs
Fencing Material –		
1,360 ft. × (2.9098 × (12 ft. ^{0.6730777}))	=	21,075 lbs
Culvert –		
110 ft. × (9.7999 × (6 ft. ^{1.0009342}))	=	6,478 lbs
Total Weight	-	843,016 lbs
Transportation Distance	-	0 miles

Job 3 - Pipe

Dump Location	-	dump
Hazardous Materials	-	none
Weight:		
Steel Pipe –		
240 ft. × (1.5596 × (4.0 in. ^{1.3980163}))	=	2,600 lbs
PVC Pipe –		
800 ft. × (0.2898 × (1.0 in. ^{1.4238123}))	=	232 lbs
Total Weight	-	2,832 lbs
Transportation Distance	-	34 miles

RECLAMATION WORKFLOW

Monitoring

Long-term monitoring-well construction and sampling to confirm the site stays within limits after closure.

05

MONITORING

Wells & Sampling




Setup


Tasks


Reports

EARTH WORK

SITE WORK

PLANTING AND SEEDING

CLOSURES

DEMOLITION

DISPOSAL

MONITORING

Wells

Samples

Water Treatment

<u>Monitor Well Construction</u>		
<i>Job 1</i>		
Number of Wells	-	3 wells
Average Well Depth	-	120 feet
Casing Diameter	-	4 inch
Drill Hole Diameter	-	8 inch
Slotted Casing Length	-	24 feet
<u>Sampling</u>		
<i>Job 1</i>		
Sample Frequency	-	Semi-monthly
Sample Preparation	-	filtration
Sample Category	-	non-metals
Constituents	-	total cyanide
Samples per Test	-	3 samples

RECLAMATION WORKFLOW

Costs & Summary

Administrative and overhead costs per BLM guidance, rolled into the final bonded reclamation estimate.

06

SUMMARY

Summary Report

SUMMARY REPORT
Summarized report on your project.

REQUIRED BOND VALUE
\$ 156,606,351

BOND ESTIMATE

Project Costs	Costs
Earth Moving	\$ 49,751
Site Work	\$ 1,295
Planting and Seeding	\$ 3,475
Closures	\$ 18,727
Demolition	\$ 42,433
Disposal	\$ 108,780,757
Monitoring	\$ 36,156
ISL Remediation	\$ 0
Mobilization	\$ 42,307
Administration	\$ 47,631,450
Required Bond Value	\$ 156,606,351

Summary Report – Fleet Requirements

FLEET REQUIREMENTS



Project Machinery	Machine Size
Hydraulic Backhoe	1.35 cubic yard
Hydraulic Backhoe	1.70 cubic yard
Bulldozer	215.00 horsepower
Flatbed Truck	15,000.00 pound gvw
Flatbed Truck	20,000.00 pound gvw
Flatbed Truck	100,000.00 pound gvw
Rear-Dump Hauler	20.00 ton
Pickup Truck	1.00 ton
Wheel Loader	4.50 cubic yard
Lowboy Tractor/Trailer	100,000.00 pound gvw
Tow Truck	15,000.00 pound gvw
Tanker Truck	15,000.00 pound gvw
Crawler Tractor	195.00 horsepower
Pump	3.00 horsepower

Summary Report – Crew Requirements

CREW REQUIREMENTS



Project Crew	Requirements
Project Foremen	160.47 hours
Loader Operators	118.83 hours
Haul Truck Drivers	175.88 hours
Bulldozer Operators	372,452.97 hours
Seeder Operators	32.49 hours
Laborers	748,586.60 hours
Service Truck Drivers	1,810.61 hours
Mechanics	6.51 hours
Backhoe Operators	12.19 hours
Tractor Operators	5.79 hours
Samplers	181.37 hours

Summary Report – Mobilization

MOBILIZATION



Machine	Unit Cost (dollars/mile)	Trips (each)	Total Cost (dollars)
Hydraulic Backhoe	\$ 17.90	2	\$ 859
Hydraulic Backhoe	\$ 14.47	2	\$ 695
Bulldozer	\$ 14.47	106	\$ 36,817
Rear-Dump Hauler	\$ 17.90	2	\$ 859
Wheel Loader	\$ 17.90	2	\$ 859
Crawler Tractor	\$ 14.47	2	\$ 695
Pump	\$ 15.87	2	\$ 762
Compressor	\$ 15.87	2	\$ 762

TOTAL

\$ 42,307

Summary Report – Project Overhead

PROJECT OVERHEAD

PROJECT OPERATION AND MAINTENANCE COSTS

\$ 108,974,901

Overhead Costs	Percentage		Costs
Project Contingency	7	%	\$ 7,628,243
Contractor's Profit	10	%	\$ 10,897,490
Liability Insurance	1.5	%	\$ 837,627
Bond Premium	3	%	\$ 3,269,247
Engineering and Design	6	%	\$ 6,538,494
Agency Contract Administration	14	%	\$ 15,256,486
Agency's Indirect Costs	21	%	\$ 3,203,862

PROJECT OVERHEAD COSTS

\$ 47,631,450

Administrative Costs

The administrative and overhead cost computations reflect current BLM guidelines.

Project Contingency	-	7.0% of project Operation & Maintenance Costs
Contractor's Profit	-	10.0% of project Operating & Maintenance Costs
Liability Insurance	-	1.5% of project Labor Costs
Bond Premium*	-	3.0% of project Operating & Maintenance Costs
Engineering and Design	-	6.0% of project Operating & Maintenance Costs
Agency Contract Administration	-	14.0% of project Operating & Maintenance Costs
Agency Indirect Costs	-	21.0% of Agency Contract Administration Costs

* If the estimated project cost is over \$100,000

Mastering Reclamation Costs

01

Map the site

Establish the site boundaries, contours, and haul distances.

02

Catalog what remains

Heap, ponds and waste, plus all buildings and structures on site.

03

Build the closure tasks

Define every task required to close and reclaim the site.

04

Choose the equipment

Match the appropriate equipment and crews to each task.

THANK YOU

Let's build your **reclamation estimate**
together.

Contact Costmine for a thorough demo

Krista Noyes · Reclamation Cost Specialist

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