

APPENDIX D

RECLAMATION COST ESTIMATE & DRAWING

True North End of Mine Life Estimated Reclamation Cost

	Manpower (\$)	Equipment (\$)	Materials (\$)
1 Roads	\$43,021	\$99,208	\$32,009
2 Open Pit	\$6,707	\$14,414	\$5,684
3 Rock Dumps	\$202,618	\$789,999	\$46,084
4 Ore/Growth Medium Stockpile	\$4,097	\$9,342	\$2,297
5 Buildings*	\$6,933	\$19,863	\$34
6 Groundwater Wells (\$3.49 /foot)	\$7,382	\$3,575	\$1,656
7 Maintenance Complex/Blasting Supplies Area	\$4,058	\$909	\$1,596
8 Pit Backfill	\$26,594	\$104,048	\$1,413
9 Monitoring^			
10 Supervisor Supervision	\$44,677	\$0	\$0
SUBTOTAL			

Mobilization/Demobilization	5% of contract cost
Profit	10% of contract cost
Sub Total	
Contract Administration	5% of contract cost
Contingency	5% of contract cost

\$ Cost/Acre by Area									
ROADS	OPEN PIT**	ROCK DUMPS***	ORE/GROWTH	MEDIUM STOCKPILE	BLDGS	MAINT/BLASTING	PIT BACKFILL	MONITORING (lump su	
\$587	\$509	\$2,121		\$739	\$161,969	\$1,291	\$10,081	\$266,284	
Total Acres per Area									
296.80	52.70	427.30		21.30	0.32	14.80	13.1		

* Building total cost includes extra \$25,000 for building demolition in case buiding salvage isn't possible.

** Acreage total reflects reclaimed area along pit(s) perimeter not entire pit(s) disturbance area.

*** Average cost per/acre for all rock dumps.

^ Monitoring rates reflect 1.5 % annual increase for inflation.

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet:

BASE CASE ASSUMPTIONS (numerical)

Items	Deliver \$/lb.	Applied lb./Acre	Unit Cost/ft.	Operator Wages	Equip. Cost/Hour
Fertilizer	\$0.38	100	(fertilizer = 10*20*10 local vender)		
Seed	\$6.35	11	(seed mix 50% Arcta Red,20% Tundra Bluegrass,20% Alpine Bluegrass, 10% Hairgrass)		

3/8" Hole Plug(bentonite)	\$10.15	per 50 lbs
Benseal(bentonite)	\$11.35	per 50 lbs
EZ-MUD	\$84.50	per 5 gallons

	Base Rate	Fringes	FICA 7.65%	SIIS 9.31%	Unemployment 1.3%	Wage Rate	
Laborer	\$21.55	\$7.08	\$2.19	\$2.67	\$0.37	\$33.86	(Davis-Bacon Wage Rate)
Truck Driver	\$25.91	\$8.06	\$2.60	\$3.16	\$0.44	\$40.17	(Davis-Bacon Wage Rate)
Heavy Equipment Operator	\$25.91	\$8.06	\$2.60	\$3.16	\$0.44	\$40.17	(Davis-Bacon Wage Rate)
Dozer Operator	\$25.91	\$8.06	\$2.60	\$3.16	\$0.44	\$40.17	(Davis-Bacon Wage Rate)
Foreman	\$27.45	\$8.06	\$2.72	\$3.31	\$0.46	\$41.99	(Davis-Bacon Wage Rate)

	Rate \$/day
Monitoring Equipment	
Dissolved oxygen meter	\$35.00
Ph meter	\$30.00
Conductivity meter	\$35.00
4WD pickup	\$60.00
Water sounder meter	\$45.00

	NC Lease Rate	FGMI Operation Rate	Equip. Rate (rounded to nearest \$)	
777D Dump Truck*	\$116.25	\$62.74	179.00	
992G*	\$142.00	\$105.65	248.00	
D10R Cat *	105	\$60.90	166.00	
Motor Grader 163H*	37.5	\$40.49	78.00	Major equipment rates based on
Broad Spreader-Challenger 35 Tractor*	13.13	\$40.49	54.00	NC lease rates and FGMI operation rates.
Water Truck 20,000 Gal 651E*	37.5	\$22.60	60.00	
Scraper 657E*	131.25	\$105.65	237.00	
375 Excavator*	84.37	\$85.30	170.00	
Hydraulic Hammer Model H180 (cost per month 8,000 @ 200hrs)			\$40.00	

* All CAT equipment rates are based on monthly lease rates with avg 400 hrs per month operation.

_ Foreman rates approx. 1.06 x base operator rates.

Foreman Wage Rates	Hours	Foreman** Labor Cost
\$41.99	1064	\$44,677.36

** Note: foreman labor cost for the entire project was assumed to equal to the total hours for support equipment in each task area.
A total of 1064 hours was calculated for support equipment.

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: ROADS

ACRES				
Type	Road Length	Road Width	Road Surface Acres	Road Fill/toe Acres
Mine Site Roads*	46,082	100	105.8	0
Fill/toe areas			0.0	191
			105.8	191.0
				<u>Total Acres</u> 296.8

*Mine site road totals are approximate at the end of mine life.
 Total footage includes all rock dump and mine access roads outside the open pit.

LABOR HOURS AND COST ROAD SURFACE				
Equipment Activity	Man Hours/Acre	Total Man Hours	Wage Rates	Labor Costs
D10R Spread Topsoil	1.02	108	\$40.17	\$4,338
D10R Scarify	0.75	79	\$40.17	\$3,173
Seed/Fert.	1	106	\$40.17	\$4,258
Grader 163H	1.77	187	\$40.17	\$7,512
20,000 Water/651E	1.77	187	\$40.17	\$7,512
375 Excavator	0.65	69	\$40.17	\$2,772
Total Hrs	6.95	735	Total	\$29,565

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST ROAD SURFACE								
Equipment Activity	Equip. Hours/Acre	Total Equip. Hours	Equip. \$\$/Hour D10R	Equip. \$\$/Hour Seed/Fert.	Equip. \$\$/Hour Grader 163H	Equip. \$\$/Hour 20,000 Water/651E	Equip. \$\$/Hour 375	Equip. Costs
D10R Spread Topsoil*	1.02	108	\$166					\$17,928
D10R Scarify	0.75	79	\$166					\$13,114
Seed/Fert.	1	106		\$54				\$5,724
Grader 163H	1.77	187			\$78			\$14,586
20,000 Water/651E	1.77	187				\$60		\$11,220
375 Excavator	0.65	69					\$170	\$11,730
Total Hrs	6.96	736					Total	\$74,302

** Dozer time is for pushing road side crests down @ 0.6 yd3/LF or 296 yd3/Ac use production rate for pushing 12" topsoil.

LABOR HOURS AND COST FILL/TOE AREAS				
Equipment Activity	Man Hours/Acre	Total Man Hours	Wage Rates	Labor Costs
D10R Scarify	0.25	48	\$40.17	\$1,928
Seed/Fert.	1	191	\$40.17	\$7,672
Grader 163H	0.25	48	\$40.17	\$1,928
20,000 Water/651E	0.25	48	\$40.17	\$1,928
Total Hrs	1.75	335	Total	\$13,456

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST FILL/TOE AREAS								
Equipment Activity	Equip. Hours/Acre	Total Equip. Hours	Equip. \$\$/Hour D10R	Equip. \$\$/Hour Seed/Fert.	Equip. \$\$/Hour Grader 163H	Equip. \$\$/Hour 20,000 Water/651E	Equip. Costs	
D10R Scarify	0.25	48	\$166				\$7,968	
Seed/Fert.	1	191		\$54			\$10,314	
Grader 163H	0.25	48			\$78		\$3,744	
20,000 Water/651E	0.25	48				\$60	\$2,880	
Total Hrs	1.75	335					Total \$24,906	

MATERIAL COST			
Materials	Delivered \$\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$11,278
Seed	\$6.35	11	\$20,731
		Total	\$32,009

GRAND TOTALS:	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
Cost per Acre:	\$43,021	\$99,208	\$32,009	\$174,238
	\$145	\$334	\$108	\$587

Assumptions:
 Road acreages are broken down into hard driving surfaces and fill areas.
 Road widths (hard driving surfaces only) are approximately 100 feet.
 Scarified road surfaces will provide suitable growth medium.
 D10R dozer time (spreading topsoil) is attributed to recontouring any bermed material along access roads and side road crowns.
 Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: OPEN PIT (Final Configuration)

ACRES			
Type	Surface* Acres	Perimeter Feet	Perimeter Acres
Phase II Pit	<u>170.50</u>	<u>22953</u>	<u>52.7</u> (22,953*100)/43,560=52.7
Totals	170.50	22953	52.7
Total =			52.7

*Phase II pit acres includes current \$300 pit configuration

LABOR HOURS AND COST				
Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	Labor Costs
D10R Spread	0.48	25	\$40.17	\$1,004
D10R Berm Const.	0.25	13	\$40.17	\$522
Seed/Fert.	1	53	\$40.17	\$2,129
Scraper 657E	0	0	\$40.17	\$0
Grader 163H	0.72	38	\$40.17	\$1,526
20,000 Water/651E	<u>0.72</u>	<u>38</u>	\$40.17	<u>\$1,526</u>
Total Hrs	3.17	167		\$6,707

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST										
Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. \$/Hour D10R	Equip. \$/Hour D10R	Equip. \$/Hour Seed/Fert.	Equip. \$/Hour 657E	Equip. \$/Hour Grader 163H	Equip. \$/Hour Water/651E	Equip. \$/Hour 20,000	Equip. Costs
D10R Spread	0.48	25	\$166							\$4,150
D10R Berm Const	0.25	13		\$166						\$2,158
Seed/Fert.	1	53			\$54					\$2,862
Scraper 657E	0	0				\$237				\$0
Grader 163H	0.72	38					\$78			\$2,964
20,000 Water/651E	<u>0.72</u>	<u>38</u>						\$60		<u>\$2,280</u>
Total Hrs	3.17	167								\$14,414

MATERIAL COST			
Materials	Delivered \$/Pound	Pounds/ Acre	Materials Cost
Fertilizer	\$0.38	100	\$2,003
Seed	\$6.35	11	<u>\$3,681</u>
Total			\$5,684

GRAND TOTALS:	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
	\$6,707	\$14,414	\$5,684	\$26,805
Cost per Acre:	\$127	\$274	\$108	\$509

Assumptions:

East Pit will be backfilled during active mining therefore no berming will be required.
 Pit perimeter will be reclaimed 100 feet back from the pit rim and bermed (6 ft).
 Bermed soil will be taken from 100 foot reclaimed area along pit perimeter.
 Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: Upper Spruce Rock Dump

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed	Actual	Reclaimed
		Sloped	Sloped	Flat
		Dump	Dump	Dump
Dump ID	Acres	Acres	Acres	Acres
Louis Rock Dump	37.90	45.5	7.9	53.4
East Rock Dump	25.80	31.0	4.9	35.9
Upper Spruce Rock Dump*	59.45	71.3	59.5	130.8
Lower Spruce Rock Dump	38.30	46.0	25.6	71.6
Shop Rock Dump A	30.90	37.1	40.5	77.6
Shop Rock Dump B	33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile	0.00	0.0	21.3	21.3
North Rock Dump	<u>6.60</u>	<u>7.9</u>	<u>6.9</u>	<u>14.8</u>
Totals	232.7	279.2	169.4	448.6

*Assumed 50% of Upper Spruce Rock dump is sloped and 50% of Upper Spruce Rock dump is flat.

Upper Spruce Rock Dump		
Total Man	Labor	
Hours	Wage Rates	Costs
1621	\$40.17	\$65,116
		\$65,116

Upper Spruce Rock Dump										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour							
Activity	Acre	Hours	D10R	D10R	Seed/Fert.	657E	Grader 163H	Water/651E	20,000	Costs
D10R Reslope & Spread Topsoil	1.75	125	\$166							\$20,750
D10R Scarify	0.25	18		\$166						\$2,988
Seed/Fert.	1	71			\$54					\$3,834
Scraper 657E	6.38	455				\$237				\$107,835
Grader 163H	2.00	143					\$78			\$11,154
20,000 Water/651E	<u>2.00</u>	<u>143</u>						\$60		<u>\$8,580</u>
Total Hrs	13.38	955								\$155,141

Upper Spruce Rock Dump										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour							
Activity	Acre	Hours	D10R	D10R	Seed/Fert.	657E	Grader 163H	Water/651E	20,000	Costs
D10R Spread Topsoil	1.02	61	\$166							\$10,126
D10R Scarify	0.25	15		\$166						\$2,490
Seed/Fert.	1	59			\$54					\$3,186
Scraper 657E	6.38	379				\$237				\$89,823
Grader 163H	1.28	76					\$78			\$5,928
20,000 Water/651E	<u>1.28</u>	<u>76</u>						\$60		<u>\$4,560</u>
Total Hrs	11.21	666								\$116,113

MATERIAL COSTS			
Materials	\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$4,970
Seed	\$6.35	11	<u>\$9,136</u>
Total			\$14,106

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$65,116	\$271,254	\$14,106	\$350,476
Cost per Acre:	\$498	\$2,074	\$108	\$2,679

Assumptions:
 Topsoil cover will be 12" thick.
 Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Lower Spruce Rock Dump

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed	Actual	Reclaimed
		Sloped	Sloped	Flat
				Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9
East Rock Dump		25.80	31.0	4.9
Upper Spruce Rock Dump		59.45	71.3	59.5
Lower Spruce Rock Dump		38.30	46.0	25.6
Shop Rock Dump A		30.90	37.1	40.5
Shop Rock Dump B		33.70	40.4	2.8
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3
North Rock Dump		<u>6.60</u>	<u>7.9</u>	<u>6.9</u>
Totals		232.7	279.2	169.4
				448.6

Lower Spruce Rock Dump		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
841	\$40.17	\$33,783
		\$33,783

Lower Spruce Rock Dump										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Costs</u>
D10R Reslope & Spread Topsoil	1.75	80	\$166							\$13,280
D10R Scarify	0.25	11		\$166						\$1,826
Seed/Fert.	1	46			\$54					\$2,484
Scraper 657E	5.59	257				\$237				\$60,909
Grader 163H	1.98	91					\$78			\$7,098
20,000 Water/651E	<u>1.98</u>	<u>91</u>						\$60		<u>\$5,460</u>
Total Hrs	12.55	576								\$91,057

Lower Spruce Rock Dump										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Costs</u>
D10R Spread Topsoil	1.02	26	\$166							\$4,316
D10R Scarify	0.25	6		\$166						\$996
Seed/Fert.	1	26			\$54					\$1,404
Scraper 657E	5.59	143				\$237				\$33,891
Grader 163H	1.25	32					\$78			\$2,496
20,000 Water/651E	<u>1.25</u>	<u>32</u>						\$60		<u>\$1,920</u>
Total Hrs	10.36	265								\$45,023

MATERIAL COSTS			
Materials	\$\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$2,721
Seed	\$6.35	11	<u>\$5,001</u>
Total			\$7,722

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$33,783	\$136,080	\$7,722	\$177,585
Cost per Acre:	\$472	\$1,901	\$108	\$2,480

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Louis Rock Dump

ACRES					
Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed	Actual	Reclaimed	Reclaimed
		Sloped	Sloped	Flat	Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.0	0.0	21.3	21.3
North Rock Dump		<u>6.6</u>	<u>7.9</u>	<u>6.9</u>	<u>14.8</u>
Totals		232.7	279.2	169.4	448.6

Louis Rock Dump		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
568	\$40.17	<u>\$22,817</u>
		\$22,817

Louis Rock Dump										
Sloped Areas:										
Equipment	Equip.	Total	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.
<u>Activity</u>	<u>Hours/Acre</u>	<u>Hours</u>	<u>\$/Hour D10R</u>	<u>\$/Hour D10R</u>	<u>\$/Hour Seed/Fert.</u>	<u>\$/Hour 657E</u>	<u>\$/Hour Grader 163H</u>	<u>\$/Hour 20,000 Water/651E</u>	<u>\$/Hour 20,000</u>	<u>Costs</u>
D10R Reslope & Spread Topsoil	1.75	80	\$166							\$13,280
D10R Scarify	0.25	11		\$166						\$1,826
Seed/Fert.	1	45			\$54					\$2,430
Scraper 657E	3.98	181				\$237				\$42,897
Grader 163H	2.00	91					\$78			\$7,098
20,000 Water/651E	<u>2.00</u>	<u>91</u>						\$60		<u>\$5,460</u>
Total Hrs	10.98	499								\$72,991

Louis Rock Dump										
Flat Areas:										
Equipment	Equip.	Total	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.
<u>Activity</u>	<u>Hours/Acre</u>	<u>Hours</u>	<u>\$/Hour D10R</u>	<u>\$/Hour D10R</u>	<u>\$/Hour Seed/Fert.</u>	<u>\$/Hour 657E</u>	<u>\$/Hour Grader 163H</u>	<u>\$/Hour 20,000 Water/651E</u>	<u>\$/Hour 20,000</u>	<u>Costs</u>
D10R Spread Topsoil	1.02	8	\$166							\$1,328
D10R Scarify	0.25	2		\$166						\$332
Seed/Fert.	1	8			\$54					\$432
Scraper 657E	3.98	31				\$237				\$7,347
Grader 163H	1.27	10					\$78			\$780
20,000 Water/651E	<u>1.27</u>	<u>10</u>						\$60		<u>\$600</u>
Total Hrs	8.79	69								\$10,819

MATERIAL COSTS			
<u>Materials</u>	<u>\$/Pound</u>	<u>Pounds/Acre</u>	<u>Cost of Materials</u>
Fertilizer	\$0.38	100	\$2,029
Seed	\$6.35	11	<u>\$3,730</u>
		Total	\$5,759

	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
GRAND TOTALS:	\$22,817	\$83,810	\$5,759	\$112,386
Cost per Acre:	\$427	\$1,569	\$108	\$2,105

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: East Pit Rock Dump

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed	Actual	Reclaimed
		Sloped	Sloped	Flat
				Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9
East Pit Rock Dump		25.80	31.0	4.9
Upper Spruce Rock Dump		59.45	71.3	59.5
Lower Spruce Rock Dump		38.30	46.0	25.6
Shop Rock Dump A		30.90	37.1	40.5
Shop Rock Dump B		33.70	40.4	2.8
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3
North Rock Dump		<u>6.60</u>	<u>7.9</u>	<u>6.9</u>
Totals		232.7	279.2	169.4
				448.6

East Pit Rock Dump		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
444	\$40.17	\$17,835
		\$17,835

East Pit Rock Dump										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Costs</u>
D10R Reslope & Spread Topsc	1.75	54	\$166							\$8,964
D10R Scarify	0.25	8		\$166						\$1,328
Seed/Fert.	1	31			\$54					\$1,674
Scraper 657E	5.69	176				\$237				\$41,712
Grader 163H	2.00	62					\$78			\$4,836
20,000 Water/651E	<u>2.00</u>	<u>62</u>						\$60		<u>\$3,720</u>
Total Hrs	12.69	393								\$62,234

East Pit Rock Dump										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Costs</u>
D10R Spread Topsoil	1.02	5	\$166							\$830
D10R Scarify	0.25	1		\$166						\$166
Seed/Fert.	1	5			\$54					\$270
Scraper 657E	5.69	28				\$237				\$6,636
Grader 163H	1.22	6					\$78			\$468
20,000 Water/651E	<u>1.22</u>	<u>6</u>						\$60		<u>\$360</u>
Total Hrs	10.4	51								\$8,730

MATERIAL COSTS			
<u>Materials</u>	<u>\$\$/Pound</u>	<u>Pounds/Acre</u>	<u>Cost of Materials</u>
Fertilizer	\$0.38	100	\$1,364
Seed	\$6.35	11	<u>\$2,508</u>
		Total	\$3,872

	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
GRAND TOTALS:	\$17,835	\$70,964	\$3,872	\$92,671
Cost per Acre:	\$497	\$1,977	\$108	\$2,581

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: North Rock Dump

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed	Actual	Reclaimed
		Sloped	Sloped	Flat
		Reclaimed	Flat	Dump
<u>Dump ID</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump	37.90	45.5	7.9	53.4
East Rock Dump	25.80	31.0	4.9	35.9
Upper Spruce Rock Dump	59.45	71.3	59.5	130.8
Lower Spruce Rock Dump	38.30	46.0	25.6	71.6
Shop Rock Dump A	30.90	37.1	40.5	77.6
Shop Rock Dump B	33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile	0.00	0.0	21.3	21.3
North Rock Dump	6.60	7.9	6.9	14.8
Totals	232.7	279.2	169.4	448.6

North Rock Dump		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
129	\$40.17	\$5,182
		\$5,182

North Rock Dump										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	20,000	<u>Costs</u>
D10R Reslope & Spread Topsoil	1.75	14	\$166							\$2,324
D10R Scarify	0.25	2		\$166						\$332
Seed/Fert.	1	8			\$54					\$432
Scraper 657E	2.66	21				\$237				\$4,977
Grader 163H	2.02	16					\$78			\$1,248
20,000 Water/651E	2.02	16						\$60		\$960
Total Hrs	9.7	77								\$10,273

North Rock Dump										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	20,000	<u>Costs</u>
D10R Spread Topsoil	1.02	7	\$166							\$1,162
D10R Scarify	0.25	2		\$166						\$332
Seed/Fert.	1	7			\$54					\$378
Scraper 657E	2.66	18				\$237				\$4,266
Grader 163H	1.30	9					\$78			\$702
20,000 Water/651E	1.30	9						\$60		\$540
Total Hrs	7.53	52								\$7,380

MATERIAL COSTS			
<u>Materials</u>	<u>\$/Pound</u>	<u>Pounds/Acre</u>	<u>Cost of Materials</u>
Fertilizer	\$0.38	100	\$562
Seed	\$6.35	11	\$1,034
Total			\$1,596

	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
GRAND TOTALS:	\$5,182	\$17,653	\$1,596	\$24,431
Cost per Acre:	\$120	\$409	\$37	\$1,651

Assumptions:
 Topsoil cover will be 12" thick.
 Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: Shop Rock Dump A

ACRES					
Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed	Actual	Reclaimed	Reclaimed
		Sloped	Sloped	Flat	Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		<u>6.60</u>	<u>7.9</u>	<u>6.9</u>	<u>14.8</u>
Totals		232.7	279.2	169.4	448.6

Shop Rock Dump A		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
495	\$40.17	\$19,884
		\$19,884

Shop Rock Dump A										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. Costs
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>20,000 Water/65</u>		<u>Costs</u>
D10R Reslope & Sprea	1.75	71	\$166							\$11,786
D10R Scarify	0.25	10		\$166						\$1,660
Seed/Fert.	1	40			\$54					\$2,160
Scraper 657E	4.55	184				\$237				\$43,608
Grader 163H	0.88	81					\$78			\$6,318
20,000 Water/651E	<u>0.88</u>	<u>81</u>						\$60		<u>\$4,860</u>
Total Hrs	9.31	467								\$70,392

Shop Rock Dump A										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. Costs
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>20,000 Water/65</u>		<u>Costs</u>
D10R Spread Topsoil	1.02	3	\$166							\$498
D10R Scarify	0.25	1		\$166						\$166
Seed/Fert.	1	3			\$54					\$162
Scraper 657E	4.55	13				\$237				\$3,081
Grader 163H	0.88	4					\$78			\$312
20,000 Water/651E	<u>0.88</u>	<u>4</u>						\$60		<u>\$240</u>
Total Hrs	9	28								\$4,459

MATERIAL COSTS			
Materials	\$\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$2,949
Seed	\$6.35	11	<u>\$5,420</u>
		Total	\$8,369

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$19,884	\$74,851	\$8,369	\$103,104
Cost per Acre:	\$256	\$965	\$108	\$1,329

Assumptions:
 Topsoil cover will be 12" thick.
 Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Shop Rock Dump B

ACRES					
Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed	Actual	Reclaimed	Reclaimed
		Sloped	Sloped	Flat	Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		<u>6.60</u>	<u>7.9</u>	<u>6.9</u>	<u>14.8</u>
Totals		232.7	279.2	169.4	448.6

Shop Rock Dump B		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
451	\$40.17	<u>\$18,117</u>
		\$18,117

Shop Rock Dump B										
Sloped Areas:										
Equipment	Equip. Hours/	Total	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. Costs
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>20,000 Water/651E</u>		<u>Costs</u>
D10R Reslope & Spread Topsoil	1.75	71	\$166							\$11,786
D10R Scarify	0.25	10		\$166						\$1,660
Seed/Fert.	1	40			\$54					\$2,160
Scraper 657E	3.54	143				\$237				\$33,891
Grader 163H	2.00	81					\$78			\$6,318
20,000 Water/651E	<u>2.00</u>	<u>81</u>						\$60		<u>\$4,860</u>
Total Hrs	10.54	426								\$60,675

Shop Rock Dump B										
Flat Areas:										
Equipment	Equip. Hours/	Total	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. Costs
<u>Activity</u>	<u>Acre</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>20,000 Water/651E</u>		<u>Costs</u>
D10R Spread Topsoil	1.02	3	\$166							\$498
D10R Scarify	0.25	1		\$166						\$166
Seed/Fert.	1	3			\$54					\$162
Scraper 657E	3.54	10				\$237				\$2,370
Grader 163H	1.43	4					\$78			\$312
20,000 Water/651E	<u>1.43</u>	<u>4</u>						\$60		<u>\$240</u>
Total Hrs	9	25								\$3,748

MATERIAL COSTS			
Materials	\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$1,642
Seed	\$6.35	11	<u>\$3,018</u>
Total			\$4,660

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$18,117	\$64,423	\$4,660	\$87,200
Cost per Acre:	\$419	\$1,491	\$108	\$2,019

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: North/Central Shepard Pit Backfill

ACRES		
Type	Surface	
	<u>Acres</u>	
North/Central Shepard Pit	13.10	(approx. plan view of backfill area)

LABOR HOURS AND COST				
Equipment	Man	Total	Wage	Labor
<u>Activity</u>	<u>Hours/Acre</u>	<u>Hours</u>	<u>Rates</u>	<u>Costs</u>
992G Loader	5.67	74	\$40.17	\$2,973
D10R Spread Rock	9.49	124	\$40.17	\$4,981
D10R scarify	0.25	3	\$40.17	\$121
Seed/Fert.	1	13	\$40.17	\$522
777D Dump Truck	22.87	300	\$40.17	\$12,051
Grader 163H	5.65	74	\$40.17	\$2,973
20,000 Water/651E	<u>5.65</u>	<u>74</u>	\$40.17	<u>\$2,973</u>
Total Hrs	44.91	662		\$26,594

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST									
Equipment	Equip.	Total	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.	Equip.
<u>Activity</u>	<u>Hours/Acre</u>	<u>Hours</u>	<u>992G</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>777D</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>Costs</u>
992G Loader	5.67	74	\$248						\$18,352
D10R Spread Rock	9.49	124		\$166					\$20,584
D10R scarify	0.25	3		\$166					\$498
Seed/Fert.	1	13			\$54				\$702
777D Dump Truck	22.87	300				\$179			\$53,700
Grader 163H	5.65	74					\$78		\$5,772
20,000 Water/651E	<u>5.65</u>	<u>74</u>						\$60	<u>\$4,440</u>
Total Hrs	44.91	662							\$104,048

MATERIAL COST			
Materials	Delivered	Pounds/	Materials
<u>Materials</u>	<u>\$/Pound</u>	<u>Acre</u>	<u>Cost</u>
Fertilizer	\$0.38	100	\$498
Seed	\$6.35	11	<u>\$915</u>
			Total \$1,413

GRAND TOTALS:	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
	\$26,594	\$104,048	\$1,413	\$132,055
Cost per Acre:	\$2,030	\$7,943	\$108	\$10,081

Assumptions:

Pit will be backfilled to provide minimum 1% slope for drainage.

All fill material is provided from Lower Spruce Creek Rock Dump

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total 992G time and will serve as support equipment

Number 777D and D10's to be sized to keep 992G hourly time as the maximum in this task.

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Orestockpile/Growth Medium Area

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed	Actual	Reclaimed
		Sloped	Sloped	Flat
		Reclaimed	Flat	Dump
<u>Dump ID</u>		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Louis Rock Dump		37.90	45.5	7.9
East Rock Dump		25.80	31.0	4.9
Upper Spruce Rock Dump		59.45	71.3	59.5
Lower Spruce Rock Dump		38.30	46.0	25.6
Shop Rock Dump A		30.90	37.1	40.5
Shop Rock Dump B		33.70	40.4	2.8
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3
North Rock Dump		<u>6.60</u>	<u>7.9</u>	<u>6.9</u>
Totals		232.7	279.2	169.4
				448.6

Ore Stockpile/Growth Medium Area		
Total Man		Labor
<u>Hours</u>	<u>Wage Rates</u>	<u>Costs</u>
102	\$40.17	\$4,097
		\$4,097

Ore Stockpile/Growth Medium Area										
Sloped Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acres</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Equip. Costs</u>
D10R Reslope & Spread Topso	1.99	0	\$166							\$0
D10R Scarify	0.25	0		\$166						\$0
Seed/Fert.	1	0			\$54					\$0
Scraper 657E	0	0				\$237				\$0
Grader 163H	1	0					\$78			\$0
20,000 Water/651E	1	0						\$60		\$0
Total Hrs	5.24	0								\$0

Ore Stockpile/Growth Medium Area										
Flat Areas:										
Equipment	Equip. Hours/	Total Equip.	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour	Equip. \$\$/Hour
<u>Activity</u>	<u>Acres</u>	<u>Hours</u>	<u>D10R</u>	<u>D10R</u>	<u>Seed/Fert.</u>	<u>657E</u>	<u>Grader 163H</u>	<u>Water/651E</u>	<u>20,000</u>	<u>Equip. Costs</u>
D10R Spread Topsoil	1.02	22	\$166							\$3,652
D10R Scarify	0.25	5		\$166						\$830
Seed/Fert.	1	21			\$54					\$1,134
Scraper 657E	0	0				\$237				\$0
Grader 163H	1.27	27					\$78			\$2,106
20,000 Water/651E	<u>1.27</u>	<u>27</u>						\$60		<u>\$1,620</u>
Total Hrs	4.81	102								\$9,342

MATERIAL COSTS			
Materials	\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$809
Seed	\$6.35	11	\$1,488
		Total	\$2,297

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$4,097	\$9,342	\$2,297	\$15,736
Cost per Acre:	\$192	\$439	\$108	\$739

Assumptions:
Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: Maintenance Complex Buildings

ACRES			
Building or Site ID	Foundation Area (sq.)	Site Acres	
Maint. Bay 1-3	9,600	0.22	
Electrical Bldg.	1,440	0.03	
Wash/Aprons	3,000	0.07	
	Total =	0.32	

LABOR HOURS AND COST				
Equipment Activity	Man Hours/Acre	Total Man Hours	Wage Rates	Labor Costs
375 Excavator*	178.8	57	\$40.17	\$2,290
D10R Reslope	1.02	0.33	\$40.17	\$13
D10R Scarify	0.25	0.08	\$40.17	\$3
Seed/Fert.	1	0.32	\$40.17	\$13
Scraper 657E	2.66	0.85	\$40.17	\$34
Grader 163H	89.4	57	\$40.17	\$2,290
20,000 Water/651E	89.4	57	\$40.17	\$2,290
	Total Hrs	362.53	172.58	Total \$6,933

*375 excavator mounted with hydraulic hammer

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST									
Equipment Activity	Equip. Hours/Acre	Total Equip. Hours	Equip. \$\$/Hour 375	Equip. \$\$/Hour D10R	Equip. \$\$/Hour 657E	Equip. \$\$/Hour Seed/Fert.	Equip. \$\$/Hour Grader 163H	Equip. \$\$/Hour 20,000 Water/651E	Equip. Costs
375 Excavator*	178.8	57.22	\$170						\$9,727
Hydraulic Hammer**	244.2	48.84	\$40						\$1,954
D10R Reslope	1.02	0.33		\$166					\$55
D10R Scarify	0.25	0.08		\$166					\$13
Seed/Fert.	1	0.32				\$54			\$17
Scraper 657E	2.66	0.85			\$237				\$201
Grader 163H	89.40	57					\$78		\$4,463
20,000 Water/651E	89.40	57						\$60	\$3,433
	Total Hrs	606.73	222.08						Total \$19,863

*375 excavator mounted with hydraulic hammer

** Hydraulic hammer \$ 8,000 per month @ 200 hrs use.

MATERIAL COST			
Materials	Delivered \$\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$12
Seed	\$6.35	11	\$22
			Total \$34

	Manpower	Equipment	Materials	Demolition Building***	Total
GRAND TOTALS:	\$6,933	\$19,863	\$34	\$25,000	\$51,830
Cost per Acre:	\$21,666	\$62,072	\$106		\$161,969

Assumptions:

Buildings and equipment removed for salvage; only foundations remain.

Foundations above grade and concrete floor structures to be broken up with hydraulic hammer and buried in place with dozer.

***Building demolition cost is 1/2 of SR Means cost for demolition of similar building type and size.

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total 375 excavator time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Maintenance Complex/Blasting Supplies Storage

ACRES	
Building or Site ID	Site Acres
Maintenance Complex	10.80
Blasting Supplies Storage	4
Total =	14.80

LABOR HOURS AND COST				
Equipment Activity	Man Hours/Acre	Total Man Hours	Wage Rates	Labor Costs
D10R Reslope	1.02	15	\$40.17	\$603
D10R Scarify	0.25	4	\$40.17	\$161
Seed/Fert.	1	15	\$40.17	\$603
Scraper 657E	2.66	29	\$40.17	\$1,165
Grader 163H	0.51	19	\$40.17	\$763
20,000 Water/65	0.51	19	\$40.17	\$763
Total Hrs	5.95	101	Total	\$4,058

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST										
Equipment Activity	Equip. Hours/Acre	Total Equip. Hours	Equip. \$\$/Hour 375	Equip. \$\$/Hour D10R	Equip. \$\$/Hour 657E	Equip. \$\$/Hour Seed/Fert.	Equip. \$\$/Hour Grader 163H	Equip. \$\$/Hour 20,000 Water/65	Equip. \$\$/Hour 651E	Equip. Costs
D10R Reslope	1.02	15		\$166						\$2,490
D10R Scarify	0.25	4		\$166						\$664
Seed/Fert.	1	15				\$54				\$799
Scraper 657E	2.66	29			\$237					\$6,873
Grader 163H	0.51	19					\$78			\$1,482
20,000 Water/65	0.51	19						\$60		\$1,140
Total Hrs	5.95	101							Total	\$13,448

MATERIAL COST			
Materials	Delivered \$\$/Pound	Pounds/Acre	Cost of Materials
Fertilizer	\$0.38	100	\$562
Seed	\$6.35	11	\$1,034
Total			\$1,596

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	\$4,058	\$13,448	\$1,596	\$19,102
Cost per Acre:	\$274	\$909	\$108	\$1,291

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

Groundwater & Surface water

18 samples per sample event

Note: Cost analysis assumes monitoring starts from closure and state water quality is met at the end of two years.

<u>Year</u>	<u>Type</u> <u>Surface Water</u> <u>(profile 1)</u>	<u>Type</u> <u>Groundwater</u> <u>(profile 2)</u>	<u>Profile 1</u> <u>Cost</u>	<u>Profile 2</u> <u>Cost</u>	<u>Analytical</u> <u>Total</u>	<u>Totals</u>
1	36	48	\$13,860	\$18,480	\$32,340	\$47,275.00
2	36	48	\$14,068	\$18,757	\$32,826	\$48,191.00
3	9	12	\$3,570	\$4,760	\$8,329	\$12,199.00
4	9	12	\$3,623	\$4,831	\$8,454	\$12,398.00
5	9	12	\$3,678	\$4,904	\$8,581	\$12,600.00
6	9	12	\$3,733	\$4,977	\$8,710	\$12,807.00
7	9	12	\$3,789	\$5,052	\$8,841	\$13,017.00
8	9	12	\$3,846	\$5,127	\$8,973	\$13,230.00
9	9	12	\$3,903	\$5,204	\$9,108	\$13,447.00
10	9	12	\$3,962	\$5,283	\$9,244	\$13,668.00
15	9	12	\$4,268	\$5,691	\$9,959	\$14,834.00
20	9	12	\$4,598	\$6,130	\$10,728	\$16,106.00
25	9	12	\$4,953	\$6,604	\$11,557	\$17,495.00
30	9	12	<u>\$5,336</u>	<u>\$7,114</u>	<u>\$12,450</u>	<u>\$19,017.00</u>
		Totals	\$77,186	\$102,915	\$180,101	\$266,284

<u>Year</u>	<u>Profile1-2 Cost/ea*</u>	<u>Tech. Cost/hr*</u>	<u>**Tech. Cost 5 days</u>	<u>4WD Vehicle Cost/ day*</u>	<u>4WD Vehicle Cost/yr*</u>	<u>Sample^ Equipment Cost/ year*</u>	<u>Total</u>
2001	\$385.00	\$33.86	\$10,835.20	\$60.00	\$1,200.00	\$2,900.00	\$14,935.20
2002	\$390.78	\$34.37	\$11,160.26	\$60.90	\$1,218.00	\$2,987.00	\$15,365.26
2003	\$396.64	\$34.89	\$2,791.20	\$61.81	\$309.05	\$769.15	\$3,869.40
2004	\$402.59	\$35.41	\$2,832.80	\$62.74	\$318.32	\$792.23	\$3,943.35
2005	\$408.63	\$35.94	\$2,875.20	\$63.68	\$327.87	\$815.99	\$4,019.07
2006	\$414.76	\$36.48	\$2,918.40	\$64.64	\$337.71	\$840.47	\$4,096.58
2007	\$420.98	\$37.03	\$2,962.40	\$65.61	\$347.84	\$865.69	\$4,175.93
2008	\$427.29	\$37.59	\$3,007.20	\$66.59	\$358.27	\$891.66	\$4,257.13
2009	\$433.70	\$38.15	\$3,052.00	\$67.59	\$369.02	\$918.41	\$4,339.43
2010	\$440.21	\$38.72	\$3,097.60	\$68.60	\$380.09	\$945.96	\$4,423.65
2011	\$446.81	\$39.30	\$3,144.00	\$69.63	\$391.50	\$974.34	
2012	\$453.51	\$39.89	\$3,191.20	\$70.67	\$403.24	\$1,003.57	
2013	\$460.31	\$40.49	\$3,239.20	\$71.73	\$415.34	\$1,033.68	
2014	\$467.21	\$41.10	\$3,288.00	\$72.81	\$427.80	\$1,064.69	
2015	\$474.22	\$41.72	\$3,337.60	\$73.90	\$440.63	\$1,096.63	\$4,875.00
2016	\$481.33	\$42.35	\$3,388.00	\$75.01	\$453.85	\$1,129.53	
2017	\$488.55	\$42.99	\$3,439.20	\$76.14	\$467.47	\$1,163.41	
2018	\$495.88	\$43.63	\$3,490.40	\$77.28	\$481.49	\$1,198.31	
2019	\$503.32	\$44.28	\$3,542.40	\$78.44	\$495.93	\$1,234.26	
2020	\$510.87	\$44.94	\$3,595.20	\$79.62	\$510.81	\$1,271.29	\$5,377.30
2021	\$518.53	\$45.61	\$3,648.80	\$80.81	\$526.14	\$1,309.43	
2022	\$526.31	\$46.29	\$3,703.20	\$82.02	\$541.92	\$1,348.71	
2023	\$534.20	\$46.98	\$3,758.40	\$83.25	\$558.18	\$1,389.17	
2024	\$542.21	\$47.68	\$3,814.40	\$84.50	\$574.92	\$1,430.85	
2025	\$550.34	\$48.40	\$3,872.00	\$85.77	\$592.17	\$1,473.78	\$5,937.95
2026	\$558.60	\$49.13	\$3,930.40	\$87.06	\$609.94	\$1,517.99	

<u>Year</u>	<u>Cost/ea*</u>	<u>Cost/hr*</u>	<u>5 days</u>	<u>Cost/ day*</u>	<u>Cost/yr*</u>	<u>Cost/ year*</u>	<u>Total</u>
2027	\$566.98	\$49.87	\$3,989.60	\$88.37	\$628.24	\$1,563.53	
2028	\$575.48	\$50.62	\$4,049.60	\$89.70	\$647.08	\$1,610.43	
2029	\$584.11	\$51.38	\$4,110.40	\$91.05	\$666.49	\$1,658.75	
2030	\$592.87	\$52.15	\$4,172.00	\$92.42	\$686.49	\$1,708.51	\$6,567.00
		Total	\$60,509			Total	\$86,182

* Rates increase 1.5 % per year - costs start @ year 2000.

** Assume it will take 5 days and two technicians to complete one sample event.

^ Sampling equipment includes ph,dissolved oxygen, conductivity and water sounder

TRUE NORTH RECLAMATION PLAN
 Cost Estimation Worksheet: Groundwater Wells

5" well = 0.136 ft³/Lf

Groundwater Wells						
Well ** ID	Depth Length (ft)	Well Dia. (in)	Required Well* Vol.(1.02 gal/ft)	Required 50# Bags Benseal (50#/30 gal)	Required Gals EZ MUD Benseal (10 oz/30 gal)	Number of *** Pipe Sticks (20 ft)
TMW-1	192	5	196	7	65	10
TMW-2	330	5	337	11	112	17
TMW-3	360	5	367	12	122	18
TMW-4	220	5	224	7	75	11
TMW-6	350	5	357	12	119	18
TMW-7	460	5	469	16	156	23
TMW-8	307	5	313	10	104	15
TMW-9	60	5	61	2	20	3
TMW-10	395	5	403	13	134	20
TMW-11	435.5	5	444	15	148	22
TMW-12	100	5	102	3	34	5
TMW-13	400	5	408	14	136	20
Totals	3,610		Total	122	9.59	182

* Manufacturer's recommendation for required benseal slurry per foot (5" well). 9.59 say 10 gals of EZ MUD
 ** Assume all wells have dedicated pumps and are installed as close to the bottom as possible.
 *** Assume 4 hours for removal of 10 sticks

LABOR HOURS AND COST				
Equipment Activity	Man Hrs	Total Man Hours	Wage Rates	Labor Costs
Laborer (1) -grouting hrs/100 ft	1	36	\$33.86	\$1,219
Laborer (2) - grouting hrs/100 ft	1	36	\$33.86	\$1,219
Laborer (3) -pulling pipe/pumps - hrs per 10 stick	4	73	\$33.86	\$2,472
Laborer (4) - pulling pipe/pump - hrs per 10 sticks	4	73	\$33.86	\$2,472
Total Hrs	10	218	Total	\$7,382

EQUIPMENT COST			
Equipment Activity	Equip. \$/Day	Equip. # Days	Equip. Costs
4WD Flat bed Truck	\$150	3	\$450
Pump/mixing Equipment	\$100	3	\$300
Boom/Pump Truck	\$315	5	\$1,575
Cutting Torch	\$250	5	\$1,250
Total			\$3,575

MATERIAL COST		
Materials	Delivered \$/BAG	Cost of Materials
3/8" Hole Plug(bentonite)	\$10.15	\$102
Benseal(bentonite)	\$11.35	\$1,385
EZ-MUD	\$84.50	\$169 (2-5 Gal containers)
Total		\$1,656

GRAND TOTALS:	<u>Manpower</u>	<u>Equipment</u>	<u>Materials</u>	<u>Total</u>
Cost per ft:	\$7,382	\$3,575	\$1,656	\$12,613
	\$2.04	\$0.99	\$0.46	\$3.49

Assumptions:
 Groundwater wells are to be filled by tremieing with benseal/ez-mud slurry.
 Groundwater wells to be plugged with 3/8" hole plug at surface after well casing removal.
 Surface casing will be severed with cutting torch below ground surface.

777D Production pg 9-4 Cat Performance Handbook Ed29(CPH)

Capacity 79.1 yd3 pg 9-4 CPH

Work:Hauling waste rock from Upper Spruce Creek Rock Dump to Central Shepard Pit for backfilling.

Assumptions:

- 1)maximum haul road grades are 8 %
- 2)correction factors applied are listed below
- 3)haul distances are average
- 4)backfill waste rock supplied from Upper Spruce Creek Rock Dump

Production correction factors	Excellent Opr.	Job Eff.
	1	0.83

				Cycle time	(Cycle time estimated from Cat Handbook pg 9-30)	
		Total Cycle time (one trip)		11.7		
		Trips/hr		5.13		
		777D Capacity (yd3)		79.1		
	Feet	% Grade	100 ft sections			
Lower Spruce Creek Dump	2125	8	21.25	170.00		
Lower Spruce Creek Dump Access	432	0	4.32	0.00		
Pit Access Rd	795	0	7.95	0.00		
Pit Access Rd	205	8	2.05	16.40		
Shepard Pit Ave Haul Dist.	<u>631</u>	0	<u>6.31</u>	<u>0</u>	Wt Ave	
	4188		41.88	186.40	4.45	Use - 4 %
					<u>Central Shepard Pit Rock Total</u>	
777D	yd3/Hr				<u>Yd3 fill</u>	<u>Acres</u>
Production =	336.80	=	(1.0*0.83*6.9*79.1)		79,782	13.1
						<u>Yd3/ac</u>
						6,090

777D Rock	Central Shepard Pit Backfill					
Production =	18.08	Hrs/Ac				
(Hrs/Ac)						
				777D Prod. = (6,090/336.80/13.1) =18.08		
				Hrs/Ac		

					<u>Central Shepard Topsoil Total</u>	
					<u>Yd3 fill</u>	<u>Acres</u>
					21,143	13.1
						<u>Yd3/ac</u>
						1,614

Assume hauling topsoil from Lower Spruce Creek Rock Dump Perimeter	Topsoil Cover					
777D Topsoil	4.79	Hrs/Ac				
Production =						
(Hrs/Ac)						
				777D Prod. = (21,143/336.80/13.1) =4.79		
				Hrs/Ac		

992G Production pg 12-35 Cat Performance Handbook Ed29(CPH)

Capacity 15 yd3 pg 12-35 CPH

Work:Loading waste rock into 777D dump trucks Central Shepard Pit.

Assumptions: 1)bucket capacity Cat handbook pg 12-47 @ 3,500 lbs/yd3 say 100% fill factor - loose material

2)correction factors applied are listed below

Excellant Opr	Job Eff.	Fill Factor
1	0.83	1.00

Production correction factors

3)haul distances are minimal no tramming time required.

Cycle time (min)

Empty (tramming time) 0.00

Loaded (tramming time) 0.00

Avg load, dump, & maneuver time(min) 0.55 Cat handbook pg 12-39 Ed 29

Total Cycle time (one trip) 0.55

Trips/hr 109.09

992G Capacity (yd3) 15

Fill Factor 1

Central Shepard Pit Rock Volume/ac
6,090

Central Shepard Pit Topsoil Volume/ac
1,614

Production/hr 1358 yd3/hr = (109.09*15*1.0*1.0*.83)

Central Shepard Pit Rock

992G Production

Production/hr

Production/Ac 4.48 hrs/ac (6,090/1358)

Central Shepard Pit Topsoil

992G Production

Production/hr

Production/Ac 1.19 hrs/ac (1614/1358)

GENERAL INFORMATION			
Reclamation slope 2.5-3.0H:1V		6" Topsoil =	807 yd3/Ac
Active rock dump slope 1.5H:1V		12" Topsoil =	1614 yd3/Ac
Angle of repose			
Rock Density	3500	#/yd3	
Soil Density	2460	#/yd3	
Production Density	2300	#/yd3	
Slope Acre Correction		1.2	

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP)		Density	pg1-49 (CPH)
Dozer Track Type		Factor = (2300 lbs/yd3/3500 lbs/yd3) = 0.65	
Work:Pushing down bench crests from 1.5:1 to 3:1 slope			
Assumptions: 50 foot average push			
Production correction factors:	Excellant Opr	Rock	Job Eff. Grade Eff. Rehandle factor
	1	0.7	0.83 1.6 1
Rock Dumps (20 ft lifts) Material/ac	1971	yd3/ac	
D10R	LCY/Hr		Density
Production =	2030.25	=	(1*0.7*0.83*1.6*0.65*1*2800*1.2) = 2030.25

D10R	
Production =	0.97
(Hrs/Ac)	

D10R Prod. =	(1,970yd3/ac/2030.25 LCY/Hr) = 0.97
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Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP)		Density	pg1-49 (CPH)
Dozer Track Type		Factor = (2300 lbs/yd3/2460 lbs/yd3) = 0.93	
Work:Pushing and contouring 12" topsoil over 3:1 slope			
Assumptions: 12" topsoil layer, 100 foot avg. pushes			
Production correction factors:	Excellant Opr	Topsoil	Job Eff. Grade Eff. Rehandle factor
	1	1.2	0.83 1.6 0.93
12" Topsoil Material/ac	1614	yd3/ac	
D10R	LCY/Hr		Density
Production =	2074.87	=	(1*1.2*0.83*1.6*0.93*1400*1)

D10R	
Production =	0.78
(Hrs/Ac)	

D10R Prod. =	(1614yd3/ac/2074.87 LCY/Hr) = 0.78
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Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP)		Density	pg1-49 (CPH)
Dozer Track Type		Factor = (2300 lbs/yd3/2460 lbs/yd3) = 0.93	
Work:Pushing and contouring 12" topsoil over flat slope			
Assumptions: 12" topsoil layer			
Production correction factors:	Excellant Opr	Topsoil	Job Eff. Grade Eff. Rehandle factor
	1	1.2	0.83 0.93 1
12" Topsoil Material/ac	1614	yd3/ac	
D10R	LCY/Hr		Density
Production =	1574.68	=	(1*1.2*0.83*0.93*1700*1)

D10R	
Production =	1.02
(Hrs/Ac)	

D10R Prod. =	(1614yd3/ac/1574.68 LCY/Hr) = 1.02
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Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CPH)		Berm Area =	(0.5*7.8*6)*2 = 46.8 sq. ft
Dozer Track Type		Berm Volume =	(46.8 sq.ft)(1 ft)/27 = 1.73
Work:Reclamation along pit perimeter		Pit Perimeter Distance =	22953
Assumptions:		Pit Perimeter Volume =	39709
1) 100 foot width section reclaimed		Pit Perimeter Acres =	52.7
2) Berm to be established along pit perimeter approx. 6 feet high		Material/Acre (39,709yd3/52.7 ac) =	753
3) Berm material to be obtained from reclaimed area along pit perimeter			
4) Dozer average run = 100 foot			
Production correction factors	Excellant Opr	Topsoil	Job Eff. Grade Eff. Rehandle factor
	1	1.2	0.83 0.93 1

D10R	LCY/Hr		Density
Production =	1574.68	=	(1*1.2*0.83*0.93*1700*1)

Density	pg1-49 (CPH)
Factor =	(2300 lbs/yd3/2460 lbs/yd3)

D10R	
Production =	0.48
(Hrs/Ac)	

D10R Prod. =	(753yd3/ac/1574.68 LCY/Hr) = 0.48
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Dozer Production D10R with Multishank Adjustable Parallelogram Ripper			
Dozer Track Type			
Work:Scarifying with rippers			
Assumptions:			
1)ripping in 1st gear-2.5 mph, offset ripping			
2)scarifying 12" topsoil			
3)scarifying/ripping road surfaces will require 3 passes to rip			
Shank Gauge 8' 8"			

2 Pass Ripper Width =	12.99	ft
D10R	Topsoil Ripping Rate	
Production =	0.25	Hrs/Ac
(Hrs/Ac)		

1st gear speed	13200	ft/hr
D10R	Road Ripping Rate	
Production =	0.75	Hrs/Ac
(Hrs/Ac)		

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP)		Density	pg1-49 (CPH)
Dozer Track Type		Factor = (2300 lbs/yd3/3500 lbs/yd3) = 0.65	
Work:Pushing Waste Rock In North/Central Shepard Pit			
Assumptions: 100 foot average run			
Production correction factors:	Excellant Opr	Rock	Job Eff. Grade Eff. Rehandle factor
	1	0.7	0.83 1 1
Rock Dumps Material/ac	6,090	yd3/ac	
D10R	LCY/Hr		Density
Production =	642.01	=	(1.0*0.7*0.83*1.0*0.67*1.0*1700) = 642.01

D10R	
Production =	9.49
(Hrs/Ac)	

D10R Prod. =	(12,011 yd3/ac/642.01 LCY/Hr) = 18.71
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GENERAL ASSUMPTIONS

Reclamation slope 2.5-3H:1V			12" Topsoil =	1614	yd3/Ac
Angle of repose 1.5H:1V					
Production Density	3000	#/yd3			
Soil Density	2460	#/yd3			
Slope Acre Correction		1.2			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) Density pg1-49 (CPH)
 Capacity 34.6 yd3 pg 8-71 CPH Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from growth medium pile to Shop Rock Dump A

Assumptions:	1)maximum haul road grades are 8 %			
	2)correction factors applied are listed below			
	Excellant Opr	Job Eff.	Density	Factor
Production correction factors:	1	0.83	1.22	
	3)haul distances are average			
	4)topsoil supplied from growth medium area adjacent to maintenance complex			
	5)12" topsoil layer		Acres	%
Shop Rock Dump A	Flat	40.5	56.72	
	Sloped	<u>30.9</u>	43.28	
		<u>71.4</u>		

Growth Medium Stockpile
 Ave Haul Dist. 848 feet (borrow area)

Ave Haul Dist. 0 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Shop Rock Dump A	<u>2632</u>	8.00
	3480	

Shop Rock Dump A **3480** @ **8.00**

pg 8-71 (CPH)
 Production Approx. = 350 yd3/hr

657E yd3/Hr
 Production = 354.41 = (1.0*0.83*1.22*350)

657E Shop Rock Dump A
Production = 4.55 Hrs/Ac
(Hrs/Ac)

657E Prod. = (1614yd3/ac/354.41 LCY/Hr) = 4.55

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)

Density pg1-49 (CPH)
 Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Capacity 34.6 yd3 pg 8-71 CPH

Work: Scraping and hauling topsoil from growth medium pile to Shop Rock Dump B

Assumptions:
 1) maximum haul road grades are 8 %
 2) correction factors applied are listed below

Production correction factors:	Excellant Opr	Job Eff.	Density Factor
	1	0.83	1.22
	3) haul distances are average		
	4) topsoil supplied from growth medium area adjacent to maintenance complex		
	5) 12" topsoil layer	Acres	%
Shop Rock Dump B	Flat	2.8	7.67
	Sloped	<u>33.7</u>	92.33
		36.5	

Growth Medium Stockpile

Ave Haul Dist. 848 feet (borrow area)

Ave Haul Dist. 0 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Shop Rock Dump B	<u>1346</u>	8.00
	2194	

Shop Rock Dump B **2194 @ 8.00**

pg 8-71 (CPH)
 Production Approx. = 450 yd3/hr

657E yd3/Hr
 Production = 455.67 = (1.0*0.83*1.22*450)

657E	Shop Rock Dump B
Production =	3.54 Hrs/Ac
(Hrs/Ac)	

657E Prod. = (1614 yd3/ac / 455.67 LCY/Hr) = 3.54

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)
 Capacity 34.6 yd3 pg 8-71 CPH

Density pg1-49 (CPH)
 Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from Lower Spruce Creek Rock Dump perimeter to Lower Spruce Creek Rock Dump

- Assumptions:
- 1) maximum haul road grades are 8 %
 - 2) correction factors applied are listed below
 - 3) haul distances are average
 - 4) topsoil will be stockpiled along the dump perimeter during initial clearing.
 - 5) 12" topsoil layer

Production correction factors:	Excellant Opr	Job Eff.	Density Factor
	1	0.83	1.22

Lower Spruce Rock Dump	Flat	Acres	%
		25.6	40.06
	Sloped	<u>38.3</u>	59.94
		63.9	

Growth Medium Stockpile
 Ave Haul Dist. 2525 feet (borrow area)
 * assume borrow area is 2,525 feet average haul.

Lower Spruce Rock Dump
 Ave Haul Dist. 2125 feet

Lower Spruce Rock Dump	Feet	% Grade
	2125	8
	<u>2525</u>	8
	4650	

Lower Spruce Rock Dump **4650 @ 8.00**

pg 8-71 (CPH)
 Production Approx. = 285 yd3/hr

657E yd3/Hr
 Production = 288.59 = (1.0*0.83*1.22*285)

657E	Lower Spruce Rock Dump		
Production =	5.59	Hrs/Ac	657E Prod. = (1614yd3/ac/288.59 LCY/Hr) = 5.59
(Hrs/Ac)			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)

Density pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH

Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from Lower Spruce Creek Rock Dump perimeter to Upper Spruce Creek Rock Dump

Assumptions:
 1) maximum haul road grades are 8 %
 2) correction factors applied are listed below

Production correction factors:	Excellant Opr	Job Eff.	Density Factor
	1	0.83	1.22

3) haul distances are average
 4) topsoil will be stockpiled along the dump perimeter during initial clearing.
 5) 12" topsoil layer

Lower Spruce Rock Dump	Flat	Acres	%
	Sloped	59.45	50.00
		<u>59.45</u>	50.00
		118.9	

Growth Medium Stockpile

Ave Haul Dist. 2525 feet (borrow area)

* assume borrow area is 2,525 feet average haul.

Upper Spruce Rock Dump

Ave Haul Dist. 2372 feet

Upper Spruce Rock Dump	Feet	% Grade
	2372	8
	<u>2525</u>	8
	4897	

Upper Spruce Rock Dump 4897 @ 8.00

pg 8-71 (CPH)
 Production Approx. = 250 yd3/hr

657E yd3/Hr
 Production = 253.15 = (1.0*0.83*1.22*250)

657E	Upper Spruce Rock Dump
Production =	6.38 Hrs/Ac
(Hrs/Ac)	

657E Prod. = (1614yd3/ac/253.15 LCY/Hr) = 6.38

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)
 Capacity 34.6 yd3 pg 8-71 CPH

Density pg1-49 (CPH)
 Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from growth medium pile to East Pit Rock Dump

Assumptions:
 1) maximum haul road grades are 8 %
 2) correction factors applied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22
	3) haul distances are average		
	4) topsoil supplied from growth medium area adjacent to maintenance complex		
	5) 12" topsoil layer	Acres	%
East Pit Rock Dump	Flat	4.91	13.68
	Sloped	<u>30.96</u>	86.24
		35.9	

Growth Medium Stockpile
 Ave Haul Dist.

848 feet (borrow area)
 2360 haul from growth medium stockpile to East Pit Rock Dump

East Pit Rock Dump
 Ave Haul Dist.

1160 feet

	Feet	% Grade
East Pit Rock Dump	1160	8
	848	8
	<u>2360</u>	8
	4368	

East Pit Rock Dump **4368 @ 8.00**

pg 8-71 (CPH)
 Production Approx. = 280 yd3/hr

657E yd3/Hr
 Production = 283.53 = (1.0*0.83*1.22*280)

657E East Pit Rock Dump
Production = 5.69 Hrs/Ac
(Hrs/Ac)

657E Prod. = (1614 yd3/ac / 283.53 LCY/Hr) = 5.69

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)
 Capacity 34.6 yd3 pg 8-71 CPH

Density pg1-49 (CPH)
 Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from adjacent growth medium pile to Louis Rock Dump

- Assumptions:
- 1) maximum haul road grades are 8 %
 - 2) correction factors applied are listed below
 - 3) haul distances are average
 - 4) topsoil supplied from growth medium area adjacent to Louis Rock Dump
 - 5) 12" topsoil layer

Production correction factors:	Excellant Opr	Job Eff.	Density Factor
	1	0.83	1.22
Louis Rock Dump	Flat	7.9	17.25
	Sloped	<u>37.9</u>	82.75
		45.8	

Growth Medium Stockpile
 Ave Haul Dist. 848 feet (borrow area)

Louis Rock Dump
 Ave Haul Dist. 2090 feet

Louis Rock Dump	Feet	% Grade
	2090	8
	<u>848</u>	8
	2938	

Louis Rock Dump **2938 @ 8.00**

pg 8-71 (CPH)
 Production Approx. = 400 yd3/hr

657E yd3/Hr
 Production = 405.04 = (1.0*0.83*1.22*400)

657E	Louis Rock Dump
Production =	3.98 Hrs/Ac
(Hrs/Ac)	

657E Prod. = (1614yd3/ac/405.04 LCY/Hr) = 3.98

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) Density pg1-49 (CPH)
 Capacity 34.6 yd3 pg 8-71 CPH Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work: Scraping and hauling topsoil from growth medium area to maintenance complex

Assumptions: 1)maximum haul road grades are 8 %
 2)correction factors applied are listed below

	Excellant Opr	Job Eff.	Density
Production correction factors:	1	0.83	Factor
			1.22

3)haul distances are average
 4)topsoil supplied from growth medium area adjacent to maintenance complex
 5)12" topsoil layer

Maintenance complex	Flat	Acres	%
	Sloped	10.85	100.00
		<u>0</u>	0.00
		10.85	

Growth Medium Stockpile
 Ave Haul Dist. 848 feet

Maintenance complex
 Ave Haul Dist. 765 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Maintenance complex	<u>765</u>	8.00
	1613	

Maintenance complex 1613 @ 8.00 pg 8-71 (CPH)
 Production Approx. = 600 yd3/hr
 657E yd3/Hr
 Production = 607.56 = (1.0*0.83*1.22*600)

657E	Maintenance complex		
Production =	2.66	Hrs/Ac	657E Prod. = (1614yd3/ac/607.56 LCY/Hr) = 2.66
(Hrs/Ac)			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH)

Density pg1-49 (CPH)
 Factor = (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Capacity 34.6 yd3 pg 8-71 CPH

Work: Scraping and hauling topsoil from North Rock Dump perimeter to North Rock Dump

- Assumptions:
- 1) maximum haul road grades are 8 %
 - 2) correction factors applied are listed below
 - 3) haul distances are average
 - 4) topsoil will be stockpiled along the dump perimeter during initial clearing.
 - 5) 12" topsoil layer

Production correction factors:	Excellant Opr	Job Eff.	Density
	1	0.83	Factor
			1.22
North Rock Dump	Flat	Acres	%
	Sloped	10.85	100.00
		<u>0</u>	0.00
		10.85	

Growth Medium Stockpile

Ave Haul Dist. 660 feet

* assume topsoil area is 660 feet average haul.

North Rock Dump

Ave Haul Dist. 833 feet

	Feet	% Grade
Growth Medium Stockpile	660	8.00
North Rock Dump	<u>833</u>	8.00
	1493	

North Rock Dump 1493 @ 8.00

pg 8-71 (CPH)
 Production Approx. = 600 yd3/hr

657E yd3/Hr
 Production = 607.56 = (1.0*0.83*1.22*600)

657E	North Rock Dump		
Production =	2.66	Hrs/Ac	657E Prod. = (1614yd3/ac/607.56 LCY/Hr) = 2.66
(Hrs/Ac)			

Seeding/Fertilizing Production

Work:Seeding and Fertilizing

Assumptions:

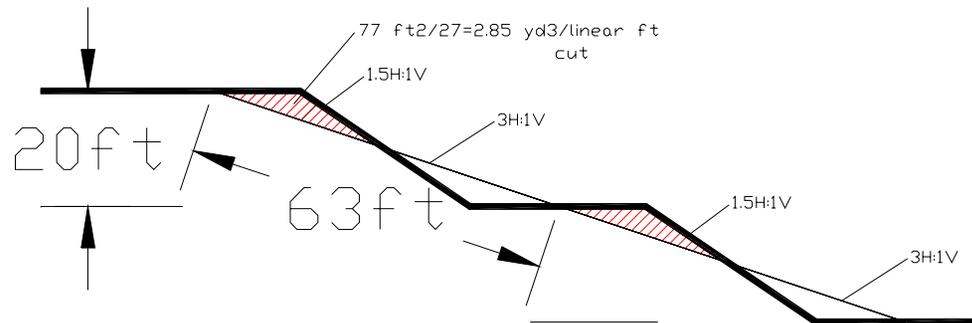
- 1)Challenger 35 Tractor CAT Performance Handbook pg 2-6 (CPH)
- 2)Seed and fertilizer are to be broadcasted with 12 volt mounted broadcaster
- 3)Spreading rates = 1st gear speed = 1.6 mi/hr = 8448 ft/hr
- 4)Single run spread widths: Seed = 8 ft, Fertilizer = 20 ft

Seeding Width =	8	ft	1st gear speed	8448	ft/hr
Fertilizer Width =	20	ft			

Seeding Production = 0.64 Hrs/ac (43,560/(8x8448))
 Fertilizing Production = 0.26 Hrs/ac (43,560/(20x8448))

Challenger 35 Seeding/Fertilizer Production = (Hrs/Ac)	1.0	Hrs/Ac
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Excavator Production EX350 with 2.5 yd3 bucket pg 4-148 Cat Performance Handbook Ed29(CPH)				
Excavator Track Type				
Work:Excavating road culverts				
Assumptions: Material to be excavated for removal of 46 culverts, assume each culvert excavation 20X10X10 @ 100 long				
There are approximately a total of 46,000 feet of mine access/haul roads and its assumed there is one culvert every 1,000 feet.				
Cycle time = 0.30 minutes pg 4-148 Cat Performance Handbook Ed29(CPH),2.25 yd3 bucket				
	Ave Opr	Job Eff.	EX350 pg 4-152 (yd3/hr	Excavation Yd3/ac
Production correction factors:	1	0.83	450	242
EX359	CY/Hr			Excavation Per culvert (yd3)
Production =	373.50	=	(1.0*0.83*450) = 373.50	556 (((10+20)/2)*10)*100)/27
EX350				Excavation for 46 culverts (yd3)
Production =	0.65	Hrs/Ac	(242/373.50) = 0.65	25,576 (556*46)
(Hrs/ac)				



$$\begin{aligned} \text{Volume/Acre} &= 2.85 \text{ yd}^3/\text{LF} = 2.85 \text{ yd}^3/63 \text{ ft} \\ 43,560 \text{ ft}^2/63 \text{ ft} &= 691.4 \text{ ft} \\ 691.4 * 2.85 &= 1,970.6 = \mathbf{1,971 \text{ yd}^3/\text{Ac}} \end{aligned}$$

Fairbanks Gold Mining, Inc.
a subsidiary of Kinross Gold U.S.A. Inc.

True North Mine

TRUE NORTH MINE SITE
20 FOOT BENCH VOLUME CALCULATION

Dwg: TrueNorthBenchVolumePhaseII Date: 11/29/01 Scale: 1"=20'

Approximate Topsoil Volume Requirements

	ROADS	PIT PERIMETER DUMPS/ORE STOCKPILE	BUILDINGS	PIT BACKFILL
Acres	297	53	448.60	13
Topsoil Requirements yd3 @ 1614 yd3/ac (12" soil cover)	0	0	724,040	21,143
Total Topsoil Requirements (yd3)	745,700			

Potential Topsoil Volumes From Designated Dump Areas

<u>Site</u>	<u>Area (acres)</u>	<u>Soil Depth (ft)</u>	<u>Volume (cy)</u>
Louis Rock Dump (Louis Creek)*	45.8	1.42	104,925
East Pit Rock Dump (Louis Creek)*	30.71	1.42	70,355
Spruce Rock Dump (Spruce Creek)*	182.8	1.31	386,342
Shop Rock Dump A & B**	107.9	0.5	87,039
North Rock Dump**	13.5	0.5	10,890
Zeppelin, Central, Shepard, Hindenburgh pits***	170	0.5	137,133
Total Potential			796,684

yd3

* Depth based on exploration drill borehole data by Golder Associates.

* Soil depth was calculated by averaging organic depth for all drillholes within initial proposed dump limits.

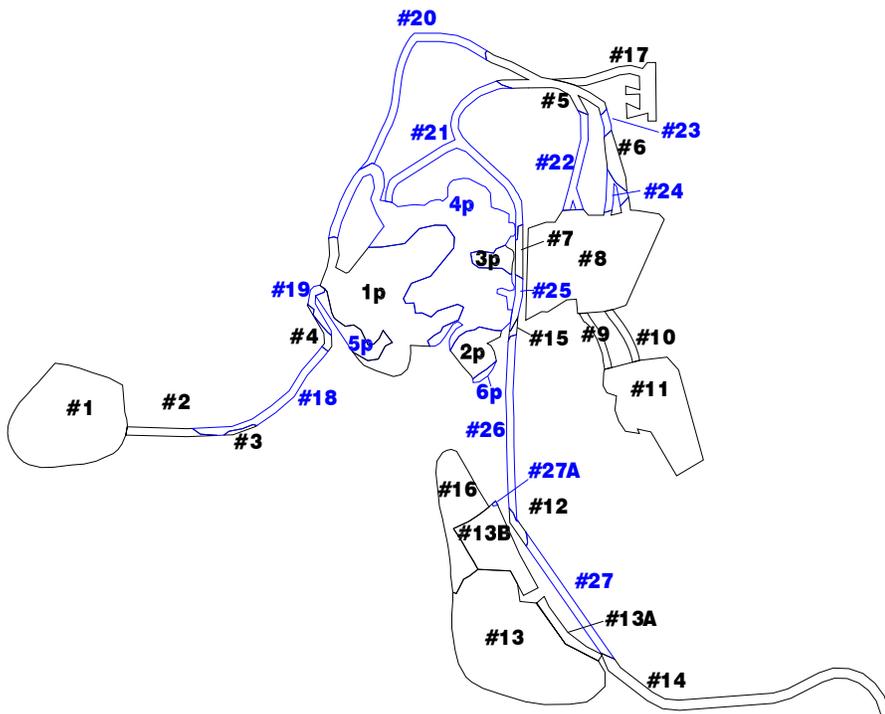
** Soil depth was conservatively estimated to be 0.5 ft thick based on field boreholes (Louis and Spruce Creeks).

***Additional topsoil should be available from Zeppelin, Central, and Shepard pit areas assume 0.5 ft soil depth.

**Calculated Topsoil/Organics Totals By Area
Stockpiles, Pit, and other Cleared Areas**

Area#	Topsoil Cubic Yards	Organics Cubic Yards
1	113,050	18,842
2		
3		
4		
5		
6		
7		
8	134,117	22,353
9		
10		
11	78,625	13,104
12		
13	156,714	26,119
13A	8,813	1,469
13B	38,283	6,381
14		
15		
16	43,697	7,283
17	25,424	4,237
1p	129,590	21,598
2p	18,725	3,121
3p	9,072	1,512
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
27A	245	41
4p	151,742	25,290
5p	14,418	2,403
6p	1,745	291
Totals	924,262	154,044

Note: Topsoil and organic volumes calculated by assuming 0.5 feet of organics underlain by 3 feet of topsoil.

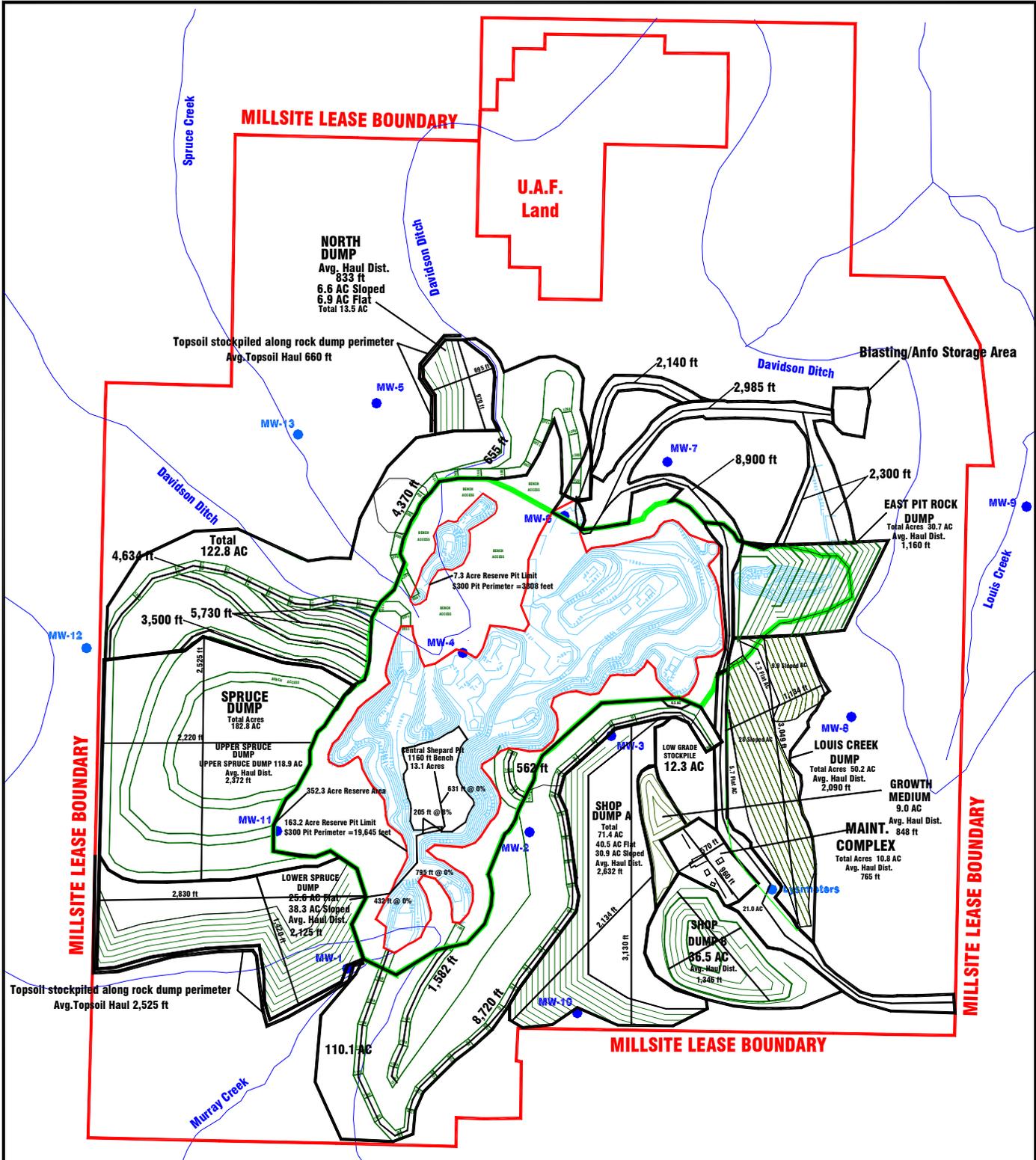


1p 6p Pit Designation
 #7 Upland Areas
 #25 Wetland Areas



TRUE NORTH PROJECT
 Upland/Wetland Areas

m hesite.dwg	Fig. 3
1"=150 0'	
JB 8/18/00	



LEGEND:

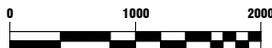
- Contour Line
- Dump/Road Contour
- Dump/Road Toe
- Pit Design Limit
- Pit Disturbance Limit

NOTES:

Topographic lines based upon 2000 flyover topography, and should not be used for detailed engineering purposes. Pit outlines based upon most current drilling information and economics, and are updated periodically.



SCALE (ft):



Revisions:

12/21/01	designed permit drawings per P200 management.
12/22/01	modify road layout proposed for MW access. Add MW-12.
11/11/01	change dump names, complete volumes. Add MW-15.
12/18/01	phase II reclamation cost estimate

Date: December 20, 2001

APPENDIX

D

TRUE NORTH PROJECT
Reclamation-Admendment