

Appendix 20

Financial Assurance Estimate

Financial Assurance Estimate

for

Azusa Rock Quarry

State Mine ID # 91-19-0035

Submitted to:



City of Azusa

Economic & Community Development Department

213 E. Foothill Blvd.

Azusa, CA 91702

Prepared for:



VULCAN MATERIALS COMPANY

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1.0 INTRODUCTION

The Azusa Rock Quarry (a.k.a. Fish Canyon Quarry) is located within the boundaries of the City of Azusa, east of Los Angeles. The quarry is situated in Fish Canyon, at the base of the San Gabriel Mountains, near the mouth of the San Gabriel River.

The mining operation typically utilizes heavy equipment and blasting to remove rock from the hillsides. The raw rock material is then transported to Vulcan's Reliance Irwindale Plant for processing.

Quarrying has taken place at this site since 1938. On November 27, 1956 Kirst Construction Company, Inc., later known as Azusa Rock Company, Inc., was granted a Special Use Permit (Resolution No. 3546) by the City of Azusa "for the extraction and removal of rock, sand and gravel; operation of a rock plant; rock crusher plant; and operation of a ready-mix concrete plant." Numerous Resolutions since that date have further modified the original permit and extended the life of the operation. On November 19, 1988 the quarry was permitted for 25 years, with a 25-year renewal provided the operation remains in substantial compliance.

The mining areas in Azusa are classified MRZ-2 by the State of California, Department of Conservation. The significant mineral resources of the Azusa Rock Quarry, recognized by the State, are also recognized in local land use planning.

The ultimate end use is not specified in the reclamation plan, but it is assumed that it will be compatible with the applicable land uses of surrounding properties. Portions of the 270 acre site have already been reclaimed, including grading and revegetation of slopes.

A Reclamation Plan Amendment has been proposed to the City of Azusa. The proposed revised Reclamation Plan includes dividing reclamation into multiple sub phases among the east and west portion of the project site. The east portion of the site will have two reclamation sub phases (Phases I-E and II-E) and the west portion of the site will have five separate reclamation sub phases (Phases I-W through V-W).

Reclamation will begin on the mined slopes of the east side of the quarry immediately following City approval of the Revised Reclamation Plan and conduct concurrent reclamation on the balance of the property. The technique of micro-benching and sculpting will be used to reclaim the slopes. Native plant species will be precisely implemented for revegetation following slope sculpting.

On the west side of the quarry, as each sub phase of mining progresses down the slope, the higher elevation from the previously mined area of the sub phase will commence reclamation. As with the east side, the west side will employ micro-benching and naturalized drainages to create a visual compatibility with the open spaces and vegetative forms of the surrounding area.

This estimate accounts for: removal of all equipment and facilities, completion of all rough grading, stabilizing existing slopes; and revegetation, monitoring and maintenance. The individual activities required to complete site reclamation are in accordance with the approved reclamation plan. This estimate considers all SMARA required reclamation activities based on current site conditions plus the anticipated conditions over the following year.

This estimate utilizes the following resources:

- Means Site Work & Landscape Cost Data, 27th Edition
- Department of Industrial Relations, Prevailing Wage Determinations (8/22/08)
- Caltrans, Labor Surcharge & Equipment Rental Rates (8/1/08-3/31/09)
- Caterpillar Handbook, Edition 37
- Cost Estimates from S & S Seed Company
- Cost Estimates from El Nativo Growers, Inc.
- Reclamation Plan (Dec. 1987)
- Azusa Rock, Inc. Revised CUP and Reclamation Plan Project Description, RGP Planning & Development Services (Sept. 2008)
- Revegetation Guidelines, Azusa Rock, Inc., Martha Blane & Assoc. (Aug. 2008)
- Interviews with Vulcan employees
- Personal experience of the estimator

This reclamation estimate provides anticipated costs for direct and indirect expenses that would be faced by the responsible party.

Based upon the requirements of the approved reclamation plan, the following elements represent the direct costs of reclamation:

1. Removal of equipment, disposal of structures, and disposal of miscellaneous rubbish
2. Site grading
3. Revegetation
4. Revegetation Monitoring and Maintenance

The following elements represent the indirect costs of reclamation:

1. Supervision
2. Profit and Overhead
3. Contingencies
4. Mobilization

Taken together, the Direct and Indirect reclamation costs identify the total cost for reclamation. Finally, lead agency administrative costs (10%) are added to the total cost of reclamation to determine the overall financial assurance requirement.

2.0 ESTIMATED DIRECT COST OF RECLAMATION

2.1 Removal of Processing Plant and Mining Equipment

At the conclusion of mining operations, all plant equipment, support structures, and other manmade improvements will need to be removed from the site. Plant equipment on the site includes an aggregate processing plant, and overland conveyor. The aggregate plant includes a primary crusher, and assorted conveyors to transport material. Support structures on the site include an office trailer, and water storage tanks. Costs for removing concrete footings and foundations and miscellaneous rubbish have also been included. Equipment costs were determined by Caltrans Labor Surcharge & Equipment Rental Rates (8/1/08-3/31/09). Labor rates are provided by the Department of Industrial Relations Prevailing Wage Determinations.

This estimate assumes that the office building can be loaded onto a 6 axle lowboy trailer and hauled off the site within 8 hours. Plant equipment will be demolished, loaded onto trucks, and removed from the site.

Office Building Removal:

No.	Type	Rate	Hours	Total
1	Grove RT 525 25t Crane	\$64.42	8	\$515
1	Crane Operator	\$55.10	8	\$441
1	Semi truck with 6 axle lowboy & 2 pilot cars	\$2,385.00	L.S.	\$2,385
1	938G Wheel Loader	\$87.82	8	\$703
1	Loader Operator	\$54.81	8	\$438
1	Pick Up	\$17.91	8	\$143
1	Foreman	\$55.27	8	\$442
2	Laborer	\$40.42	8	\$647
Total Cost of Removing Office Building				\$5,714

Removal of the plant equipment will require a CAT 330 Hydraulic Excavator, with a La Bounty Shear attachment, and a CAT 330 Hydraulic Excavator, with a grappling attachment, to cut and load manageable sized sections onto an over-the-road truck to haul to a scrap yard. Although the steel, electrical components, and conveyor belting has substantial value, no salvage value has been assumed.

Plant Equipment Removal:

No.	Type	Rate	Hours	Total
1	CAT 330 w/ Steel Shear*	\$257.00	100	\$25,700
1	Excavator Operator	\$54.81	100	\$5,481
1	CAT 330 w/ Grapple*	\$162.00	120	\$19,440
1	Excavator Operator	\$54.81	120	\$6,577
4	Semi truck with 6 axle lowboy Trailer (includes operator)	\$150.00	90	\$54,000
1	938G Wheel Loader	\$87.82	120	\$10,538
1	Loader Operator	\$54.81	120	\$6,577
1	Welding Truck	\$51.00	120	\$6,120
2	Welder	\$46.05	120	\$11,052
1	Foreman	\$55.27	120	\$6,632
2	Pickup Truck	\$17.91	120	\$4,298
4	Laborer	\$40.42	120	\$19,402
Total Cost of Dismantling and Removing Processing Plant				\$175,817

*Cost provided by Hawthorne Equipment, Lakeside, CA

Costs for demolishing and removing footings and foundations on the site were derived from the Caltrans Labor Surcharge and Equipment Rental Rates manual (8/1/08 – 3/31/09). Labor rates are provided by the Department of Industrial Relations Prevailing Wage Determinations. It is estimated that approximately 2,000 cubic yards of concrete will need to be removed.

According to the CAT Handbook, an H120c hydraulic hammer attached to a 315C excavator can demolish approximately 230 cubic yards of concrete within 8 hours. Once the concrete has been broken into pieces that are 2-feet in diameter or smaller, the excavator will be used to load the material into haul trucks. According to the CAT handbook, the 315C has an average cycle time of 20 seconds. Assuming that the average bucket load will be 0.75 yd³, it will take 14.8 hours for the excavator to load 2,000 yd³ into the trucks. Additional time has been added to this time to account for truck warm-up and mobilization. The table below represents a cost estimate for demolishing and removing all footings and foundations on the site.

No.	Type	Rate	Hours	Total
1	315C Excavator w/ Rock Breaker attachment	\$140.00	75	\$10,500
1	Operator Cost	\$54.81	75	\$4,111
1	315C Excavator w/ bucket	\$52.25	17	\$888
1	Operator Cost	\$54.81	17	\$932
8	Haul Truck	\$75.57	20	\$12,091
8	Operator Cost	\$45.55	20	\$7,288
2	Laborer for rubbish removal	\$40.42	30	\$2,425
1	Pick Up	\$17.91	30	\$537
Concrete Recycling Fees*		N/A	N/A	\$9,440
Total Cost of Removing Footings and Foundations				\$48,212

* Note: Concrete recycling fees of \$80/truckload were obtained from Hanson Aggregates.

As mentioned previously, excavated material is transported off-site to Vulcan's Reliance Irwindale Plant. This is accomplished via a 12,600 linear feet conveyor belt system.

Removal of the overland conveyor will require demolition of the steel structures and foundations, loading of the steel onto over-the-road trucks and transported off-site, removal of all concrete foundation, removal of miscellaneous rubbish, removal of conveyor belts, and removal of access roads.

This task involves the use of a Cat 330 Hydraulic Excavator with a La Bounty Shear attachment and Cat 330 Hydraulic Excavator with a grappling attachment to cut individual sections into manageable sizes and then loading onto an over-the-road truck to haul off-site. Although the steel, electrical components, and conveyor belting has substantial value, no salvage value has been assumed.

Equipment:

No.	Type	Rate	Hours	Total
1	Cat 330 w Steel Shear*	\$257.00	45	\$11,565
1	Cat 330 w Grapple*	\$162.00	60	\$9,720
1	Cat 966 Loader	\$101.15	60	\$6,069
1	Cat 315 w Breaker	\$140.00	24	\$3,360
1	Grove RT-635 40t Crane	\$82.78	60	\$4,967
2	Truck w/Flat Bed Trailer	\$79.93	75	\$11,990
1	Truck w/Semi-End Dump	\$75.57	36	\$2,721
1	Welding Truck	\$51.00	60	\$3,060
2	Pick up	\$17.91	120	\$4,298
5	Haul-away Trash Containers	\$707.00	N/A	\$3,535
Total Equipment Cost				\$61,285

*Cost provided by Hawthorne Equipment, Lakeside, CA

Labor:

No.	Labor	Rate	Hours	Total
3	Excavator Operator	\$54.81	45	\$7,399
1	Loader Operator	\$54.81	60	\$3,289
1	Crane Operator	\$55.10	60	\$3,306
3	Truck Driver	\$45.17	62	\$8,402
2	Welder	\$46.05	60	\$5,526
2	Laborer	\$40.42	120	\$9,701
1	Foreman	\$55.27	60	\$3,316
Total Labor Cost				\$40,939

It should be noted that this overland conveyor and haul road is located primarily on Federal property under the authority of the U.S. Army Corps of Engineers. As such, the operator has been required to obtain a license to install and operate the system from that agency and to post a \$300,000 performance and restoration bond. For purposes of this estimate the bond amount will not be added to the Financial Assurance Cost Estimate total. Inclusion of this work within this estimate, as specifically requested by the State Department of Conservation, may be viewed as a very conservative measure.

Aside from the processing plant facilities, other equipment is used at the site.

- 1 CAT 950 Front End Loader
- 1 CAT D8 Bulldozer
- 1 CAT D6 Bulldozer
- 1 Water Truck

It is assumed that all of the equipment will be in good repair and can be loaded directly onto a lowboy trailer and removed from the site. For purposes of this estimate, it is assumed that each piece of equipment will require 0.5 hours to load, 1.0 hours to haul to a resale dealer, including unloading, and 0.5 hours to return to the site. Approximately 2 hours will be required to remove each piece of equipment from the site. Estimated costs for equipment removal are shown below.

Cost Item	Hours	Rate	Total
Trucking w/ Tractor and Lowboy Trailer*	8	\$122	\$976
Total Heavy Equipment Removal Cost			\$976

* Note: trucking costs include \$96/hour for truck and driver and \$26/hour for 4-axle low boy trailer.

Total Cost for Removal of Plant Facilities and Heavy Equipment \$332,943

2.2 Site Grading

Site grading involves the reduction of slopes and stockpiled materials to prepare the site for revegetation. The existing terrace benches of the 1988 Reclamation Plan will be re-cut as micro-benches upon which vegetation will be applied and measurements will begin to be taken as a baseline for comparison against the reclamation objectives. It is proposed that existing slopes are to be revegetated after finish grading.

Conventional surface mining methods will be used to re-cut the existing terraced slopes. This estimate assumes that a bulldozer will be used to loosen rock and cut the slope to its final configuration. Drilling and blasting will be used in areas with rock that is too difficult to grade with a bulldozer. A front-end loader will be used to load the loosened rock into haul trucks, which will transport the material to a discharge point near the primary crusher.

Grading quantities were estimated by evaluating recent topographic data for the site. This estimate provides costs that should be expected for grading slopes within the Phase I-E area. It is anticipated that Phase I-E will take approximately 2 years to complete and this estimate is required to provide costs for reclamation activities based on current site conditions plus the anticipated conditions over the following year. Therefore, the costs associated with grading Phase I-E should exceed what is required for this estimate. Estimated grading requirements to establish micro-benches, within Phase I-E, are 394,000 cubic yards of cut.

It is likely that blasting will be necessary to fragment the rock in some areas. Blasting estimates include the cost of drilling and blasting activities necessary to fracture competent rock in the cut face. Blasting at the site is conducted by a licensed blasting contractor. It is estimated that the cost for production blasting at the site will be \$1.50/bank cy. Also, it is anticipated that blasting will be required for approximately 25% of the total grading quantity (98,500 cy).

Cost Item	Bank CY	\$/CY	Total
Blasting	98,500	\$1.50	\$147,750

The calculation of production rates was derived from the methods identified in the Caterpillar Handbook for a D9R bulldozer equipped with a U-blade, a 980 loader, and a 730 articulated haul truck. A summary of the D9R production rates is listed below. Copies of the correction factors and production curves are provided in Attachment 1.

Dozer Efficiency	D9R U Blade
Operator	0.75
Material	0.60
Efficiency	0.83
Grade	1.60
Production (CY/Hour)	1,300
Adjusted Production (CY/Hour)	777
Total Grading Requirement	394,000
Total Hours	507

Costs for equipment are derived from the Caltrans Labor Surcharge and Equipment Rental Rates manual (8/1/08 – 3/31/09). Labor rates are provided by the Department of Industrial Relations Prevailing Wage Determinations for Operating Engineers. The table below represents a cost estimate for slope grading on the site.

No.	Task	Rate	Hours	Total
4	Slope Grading with a D9R	\$234.94	127	\$119,350
4	Operator Cost	\$54.81	127	\$27,843
2	CAT 980 Loader	\$178.54	125	\$44,635
2	Operator Cost	\$54.81	125	\$13,703
6	CAT 730 Articulated Truck	\$106.20	192	\$122,342
6	Operator Cost	\$45.55	192	\$52,474
1	Water Truck	\$43.62	192	\$8,375
1	Operator Cost	\$45.30	192	\$8,698
Total Cost for Slope Grading				\$397,420

This estimate includes scarification of all roads and finish grading of all impact areas. At this time, approximately 113 acres of the site are disturbed and will require finish grading. Included in that area are approximately 5,500 linear feet of existing roads. In addition, 11,225 linear feet of off-site haul road associated with the overland conveyor system is included in this estimate (although this work is also bonded by request of the U.S. Army Corps of Engineers). The width of the roads will require a minimum of 3 passes to scarify.

It is assumed that a CAT D8R Bulldozer, configured with multi-shank ripper, will be used to scarify the roads. Moving at an assumed average rate of 2.2 M.P.H. (1st gear) it would take approximately 4.3 hours to complete this task. Additional time has been added to the estimate to allow for equipment warm up and mobilization.

Equipment costs were derived from the Caltrans Labor Surcharge and Equipment Rental Rates manual (8/1/08-3/31/09). Labor rates are provided by the Department of Industrial Relations Prevailing Wage Determinations for Operating Engineers and Teamsters.

No.	Task	Rate	Hours	Total Cost
1	D8R Bulldozer	\$174.53	6	\$1,047
1	Operator Cost	\$54.81	6	\$329
Total Cost for Scarifying				\$1,376

At this time, approximately 113 acres of the site are disturbed by mining and processing operations. The table below assumes the use of a dozer with an average finish grading rate of one acre per hour. Low production rates are anticipated due to the relatively short distance that a dozer can travel before it will need to back up and change its orientation. A dozer is preferred over a wheel type tractor because its track impressions will resist erosion, retain water and seeds, and therefore, will be more effective at ensuring successful revegetation.

No.	Task	Rate	Hours	Total Cost
1	Grading with a D9R	\$234.94	113	\$26,548
1	Operator Cost	\$54.81	113	\$6,194
1	Water Truck	\$43.62	113	\$4,929
1	Operator Cost	\$45.30	113	\$5,119
Total Cost for Finish Grading				\$42,790

Total Cost for Site Grading

\$589,336

2.3 Revegetation

The reclamation plan requires all areas disturbed by mining on the site to be revegetated. The Revegetation Guidelines, prepared by Martha Blane & Associates, states that if feasible and available, overburden materials will be pushed over the finish graded slopes and allowed to spill down the slope prior to revegetation. An additional **\$90,000** has been added to the total financial assurance cost estimate for this task.

The Revegetation Guidelines state that revegetation activities will consist of collecting locally-adapted seed materials, growing of locally-adapted container plants, hydroseeding, and maintenance and monitoring. Seeds and container-grown plants for the project will be ordered approximately two years prior to the planting date. The following seed mix is suggested for all areas to be revegetated. This area currently comprises of approximately 113 acres and will require hydroseeding. Seed types are indicated in the Revegetation Guidelines for the site. For the purpose of this estimate, seed costs have been provided by S & S Seed Company.

Seed Type	Cost per Lb.	Lbs./Acre	Total 113 Acres
Achnatherum coronatum	\$225	0.25	\$6,356
Adenostoma fasciculatum	\$53	2.00	\$11,978
Artemisia californica	\$44	3.00	\$14,916
Brickellia californica	\$150	0.25	\$4,238
Ceanothus crassifolius	\$150	1.50	\$25,425
Ceanothus oliganthus	\$68	1.50	\$11,526
Cercocarpus betuloides	\$68	4.00	\$30,736
Chaenactis artemisiaefolia	\$150	0.10	\$1,695
Clarkia unguiculata	\$25	0.25	\$706
Croton californicus	\$190	0.25	\$5,368
Encelia farinosa	\$19	3.00	\$6,441
Eriastrum sapphirinum	\$90	0.25	\$2,543
Eriogonum elongatum var. elongatum	\$115	1.00	\$12,995
Eriogonum fasciculatum ssp. Foliolosum	\$6	10.00	\$6,780
Eriophyllum confertiflorum	\$50	3.00	\$16,950
Eschscholzia californica	\$12	2.00	\$2,712
Galium angustifolium	\$135	0.25	\$3,814

Gnaphalium californicum	\$113	0.25	\$3,192
Hazardia squarrosa	\$32	2.00	\$7,232
Heteromeles arbutifolia	\$15	1.00	\$1,695
Heterotheca grandiflora	\$75	0.10	\$848
Isomeris arborea	\$23	4.00	\$10,396
Lotus scoparius	\$32	8.00	\$28,928
Lotus strigosus	\$156	1.00	\$17,628
Lupinus truncatus	\$47	0.50	\$2,656
Malacothrix saxatilis	\$156	0.10	\$1,763
Malosma laurina	\$26	4.00	\$11,752
Marah macrocarpus	\$137	1.00	\$15,481
Mimulus aurantiacus	\$37	2.50	\$10,453
Nassella lepida	\$91	1.00	\$10,283
Penstemon spectabilis	\$39	1.00	\$4,407
Phacelia cicutaria	\$86	1.00	\$9,718
Phacelia minor	\$86	0.50	\$4,859
Phacelia ramosissima	\$86	1.00	\$9,718
Rhamnus californica	\$55	2.00	\$12,430
Rhus ovata	\$32	1.50	\$5,424
Romneya coulteri	\$125	0.10	\$1,413
Salvia apiana	\$58	1.50	\$9,831
Salvia columbariae	\$78	0.50	\$4,407
Salvia mellifera	\$58	3.50	\$22,939
Stephanomeria vergata	\$75	0.10	\$848
Yucca whipplei	\$39	1.50	\$6,611
Total Seed Cost			\$380,091

R.S. Means Site Work and Landscape Cost Data provides a cost for hydroseeding at \$2,134 per acre. The following cost includes all materials and labor required to complete the task.

Total Acres	\$/Acre	Total Cost
113	\$2,134	\$241,142

The project's Revegetation Guidelines state that if the results of the early phases indicate that the use of container-grown plants is successful, then they will be installed within the revegetation areas. Temporary irrigation will also be installed if container-grown plants are used. This estimate assumes that a bubbler or porous pipe irrigation system will be used. Seeded areas will not be irrigated. Costs for container plants have been provided by El Nativo Growers. This estimate assumes that no more than 200 container plants will be required at any one time.

Species	Size	Cost per Plant	Quantity	Total Cost
Ceanothus crassifolius	1 Gal.	\$4.70*	50	\$235
Ceanothus oliganthus	1 Gal.	\$4.70*	36	\$169
Cercocarpus betuloides	1 Gal.	\$3.65	36	\$131
Heteromeles arbutifolia	1 Gal.	\$3.25	16	\$52
Malosma laurina	1 Gal.	\$3.25	36	\$117
Rhamnus californica	1 Gal.	\$3.25	16	\$52
Rhus ovata	1 Gal.	\$3.25	10	\$33
Total Container Plant Cost				\$789

*A conservative cost estimate has been provided based on other Ceanothus species. The crassifolius and oliganthus varieties were not available at the time this estimate was completed.

R.S. Means Site Work and Landscape Cost Data 27th Annual Edition provides the unit cost of planting 1-gallon container plants.

Tree Size	Qty.	Cost Per Tree	Tree Planting Cost
1-gal.	200	\$8.50	\$1,700
Total Tree Planting Cost			\$1,700

R.S. Means Site Work and Landscape Cost Data 27th Annual Edition provides a cost for installing bubbler-type irrigation. This cost includes materials and labor that are needed to install the irrigation system.

No. of Bubblers	Cost Per Plant	Total Cost
200	\$16.60	\$3,320

Total Revegetation Costs

\$717,042

2.4 Reclamation Monitoring and Maintenance

Reclamation monitoring consists of a biologist visiting the reclamation area on an annual basis for a 5 year period. The biologist will conduct an evaluation of the revegetation area to insure that the goals of the revegetation guidelines are achieved. This estimate assumes that a staff biologist will conduct the annual monitoring, which will require 20 hours in the field and 20 hours in the office to complete the annual monitoring report. This estimate also includes a cost for weed control and general maintenance of the revegetated areas, during the 5 year period. Weed control and maintenance estimates were derived from Vulcan's previous revegetation efforts.

Cost Item	Hours	Rate	Total
Annual Monitoring	20	\$100	\$2,000
Annual Monitoring Report Preparation	20	\$100	\$2,000
Annual Weed Control and General Maintenance			\$10,000
Monitoring and Maintenance Costs x 5 years			\$70,000

Total Reclamation Monitoring and Maintenance Costs

\$70,000

3.0 DIRECT COST OF RECLAMATION SUMMARY

Task	Cost
Removal of Equipment, Structures, & Rubbish	\$332,943
Site Grading	\$589,336
Revegetation	\$717,042
Revegetation Monitoring and Maintenance	\$70,000
Total Direct Reclamation Costs	\$1,709,321

4.0 INDIRECT COST OF RECLAMATION

Item	Cost
Supervision Expense @ 4.2%	\$71,791
Profit & Overhead Expense @ 8.4%	\$143,583
Contingencies @ 7%	\$119,652
Mobilization Expense @ 5%	\$85,466
Total Indirect Cost	\$420,492

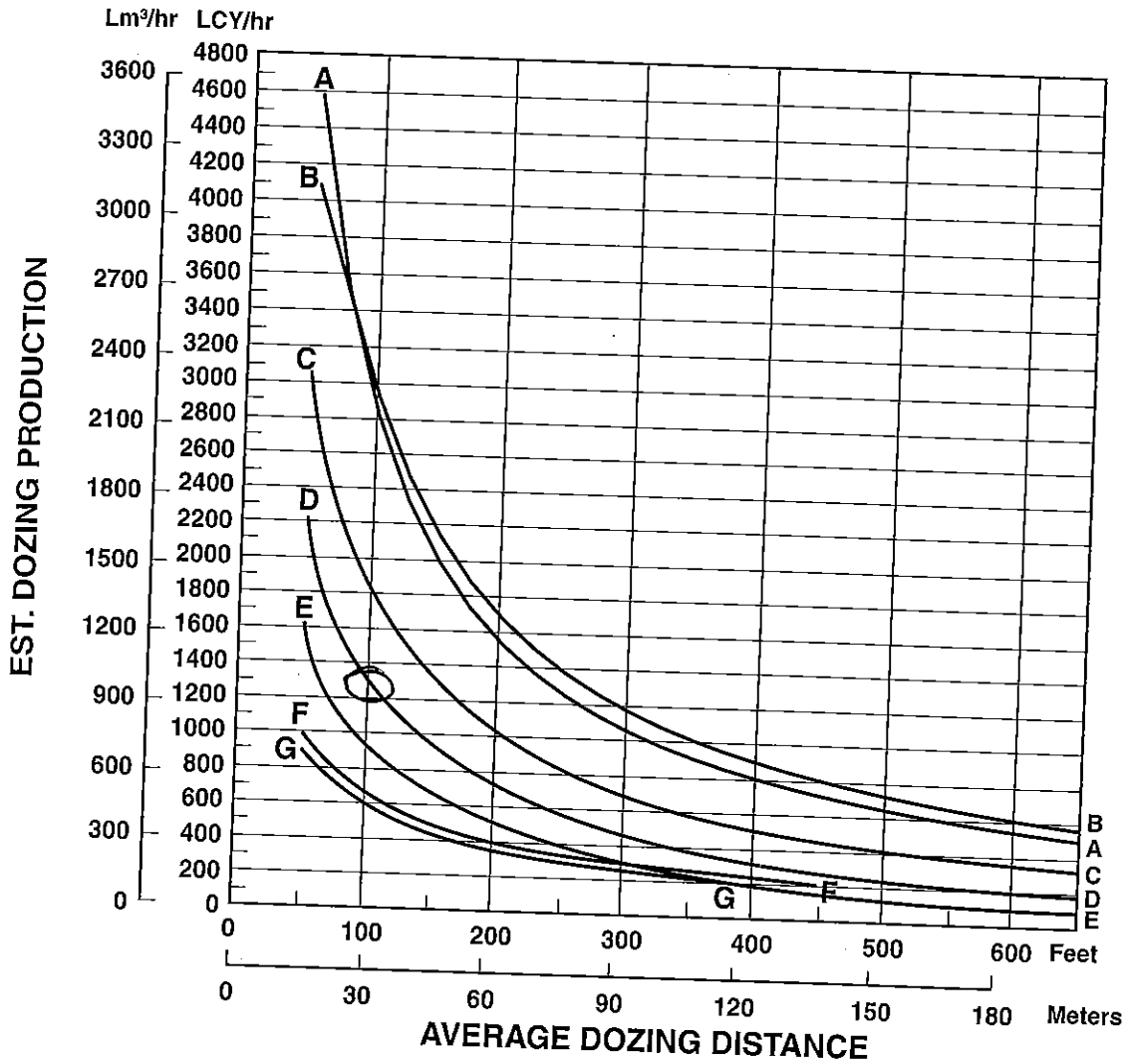
5.0 TOTAL COST OF RECLAMATION

Total Direct Reclamation Costs	\$1,709,321
Total Indirect Cost	\$420,492
Total Direct and Indirect Cost of Reclamation	\$2,129,813
Lead Agency Administrative Costs @ 10%	\$212,981

TOTAL FINANCIAL ASSURANCE REQUIREMENT**\$2,342,794**

ATTACHMENT 1

ESTIMATED DOZING PRODUCTION • Universal Blades • D7G through D11R



KEY

- A — D11R-11U
- B — D11R CD
- C — D10T-10U
- D — D9R/D9T-9U
- E — D8R/D8T-8U
- F — D7R Series II-7U
- G — D7G-7U

NOTE: This chart is based on numerous field studies made under varying job conditions. Refer to correction factors following these charts.

Bulldozers

Job Factors Estimating Production Off-The-Job ● Example Problem

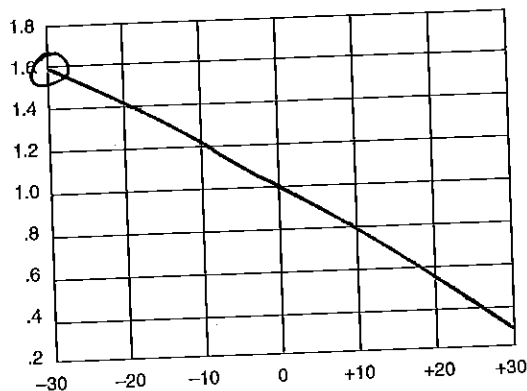
JOB CONDITION CORRECTION FACTORS

	TRACK- TYPE TRACTOR	WHEEL- TYPE TRACTOR
OPERATOR —		
Excellent	1.00	1.00
Average	0.75	0.60
Poor	0.60	0.50
MATERIAL —		
Loose stockpile	1.20	1.20
Hard to cut; frozen — with tilt cylinder	0.80	0.75
without tilt cylinder	0.70	—
Hard to drift; "dead" (dry, non-cohesive material) or very sticky material	0.80	0.80
Rock, ripped or blasted	0.60-0.80	—
SLOT DOZING	1.20	1.20
SIDE BY SIDE DOZING	1.15-1.25	1.15-1.25
VISIBILITY —		
Dust, rain, snow, fog or darkness	0.80	0.70
JOB EFFICIENCY —		
50 min/hr	0.83	0.83
40 min/hr	0.67	0.67
BULLDOZER*		
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.		
GRADES — See following graph.		

*NOTE: Angling blades and cushion blades are not considered production dozing tools. Depending on job conditions, the A-blade and C-blade will average 50-75% of straight blade production.

% Grade vs. Dozing Factor

(-) Downhill
(+) Uphill



ESTIMATING DOZER PRODUCTION OFF-THE-JOB

Example problem:

Determine average hourly production of a D8T/8SU (with tilt cylinder) moving hard-packed clay an average distance of 45 m (150 feet) down a 15% grade, using a slot dozing technique.

Estimated material weight is 1600 kg/Lm³ (2650 lb/LCY). Operator is average. Job efficiency is estimated at 50 min/hr.

Uncorrected Maximum Production — 458 Lm³/h (600 LCY/hr) (example only)

Applicable Correction Factors:

Hard-packed clay is "hard to cut" material -0.80
 Grade correction (from graph) -1.30
 Slot dozing -1.20
 Average operator -0.75
 Job efficiency (50 min/hr) -0.83
 Weight correction (2300/2650) -0.87

$$\begin{aligned} \text{Production} &= \text{Maximum Production} \times \text{Correction Factors} \\ &= (600 \text{ LCY/hr}) (0.80) (1.30) (1.20) \\ &\quad (0.75) (0.83) (0.87) \\ &= 405.5 \text{ LCY/hr} \end{aligned}$$

To obtain production in metric units, the same procedure is used substituting maximum uncorrected production in Lm³.

$$\begin{aligned} &= 458 \text{ Lm}^3/\text{h} \times \text{Factors} \\ &= 309.6 \text{ Lm}^3/\text{h} \end{aligned}$$

MEASURING

Three general bulldozer production methods are:

1. Employing the cut and remove method of time fill to (Production)
2. Weighing Condition movement buckets
3. Measuring Dozer (1) Production (2) Rate (3) Rate
- b. Measuring (1) Time (2) Height (3) Weight

WORKING

VARIABLES

Capacity
Width
Height
Weight

LANDFILL

Capacity
Width
Height
Weight

This list is not

ATTACHMENT 2

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SEED TYPE	COST/LB.
Achnatherum coronatum	225
Adenostoma fasciculatum	53
Artemisia californica	44
Brickellia californica	150
Ceanothus crassifolius	150
Ceanothus oliganthus	150
Cercocarpus betuloides	68
Chaenactis artemisiaefolia	150
Clarkia unguiculata	25
Croton californicus	190
Encelia farinosa	19
Eriastrum sapphirinum	90
Eriogonum elongatum var. elongatum	115
Eriogonum fasciculatum ssp. Foliolosum	6
Eriophyllum confertiflorum	50
Eschscholzia californica	12
Gallium angustifolium	135
Gnaphalium californicum	113
Hazardia squarrosa	32
Heteromeles arbutifolia	15
Heterotheca grandiflora	75
Isomeris arborea	23
Lotus scoparius	32
Lotus strigosus	156
Lupinus truncatus	47
Malacothrix saxatilis	156
Malosma laurina	26
Marah macrocarpus	137
Mimulus aurantiacus	37
Nassella lepida	91
Penstemon spectabilis	34
Phacelia cicutaria	86
Phacelia minor	86
Phacelia ramosissima	86
Rafinesquia californica	
Rhamnus californica	55
Rhus ovata	32
Romneya coulteri	125
Salvia apiana	58
Salvia columbariae	78
Salvia mellifera	68

S&S Seeds Quote #

Bid Date: 10/24/08

PO req'd within 60 days to hold price

ph: 805/684-0436 fax: 805/684-2798

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No. 2019 P. 3

Stephanomeria vergata	75
Yucca whipplei	39

S&S Seeds Quote #

Bid Date: 10/24/08

PO req'd within 60 days to hold price

ph: 805/684-0436 fax: 805/684-2798

ATTN TRAVIS

SPECIES	PRICE/1 GAL.
Ceanothus crassifolius	NA
Ceanothus oliganthus	NA
Cercocarpus betuloides	3.65
Heteromeles arbutifolia	3.25
Malosma laurina	3.25
Rhamnus californica	3.25
Rhus ovata	3.25

QUANTITY DISCOUNTS MAY APPLY FOR SOME ITEMS

EL NATIVO GROWERS, INC
JAMES CAMPBELL

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FAX (626) 969-7299

EMAIL: CAMPBELL_JAMES@ELNATIVOGROWERS.COM

PRICING VALID FOR 30 DAYS

PLUS FREIGHT IF APPLICABLE

SUBJECT TO AVAILABILITY AT TIME OF ORDER

Thursday, October 23, 2008