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007/001 #4
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jbr
environmental consultants, inc.

8160 South Highland Drive, Suite A-4 • Sandy, Utah 84093 • (801) 943-4144 • Fax: (801) 942-1852

August 23, 1994

RECEIVED
AUG 23 1994
DIV. OF OIL, GAS & MINING

Mr. Daron Haddock
Permit Supervisor
Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Re: Request for an Informal Review of the Revised White Oak MRP Reclamation Cost Estimate - White Oak Complex, ACT/007/001, Carbon County

Dear Daron:

To facilitate revision of the bond amount for the above MRP, the attached calculations are being submitted for your informal review. White Oak Mining understands that the MRP must first be amended in order to reduce the reclamation bond estimate. We believe that mutual cooperation in resolving this issue is the most productive approach. It is our intent to present this engineering data to you now, incorporate your comments, and prepare the descriptive Plan Amendment to support them.

Based upon Wayne Western's 1/14/94 written review and our 2/16/94 meeting in Price, several modifications to these bond calculations have been made. Since then the reclamation cost estimate has been increased by nearly $400,000. Issues like asphalt disposal that would be difficult to predict in this changing regulatory climate have been changed back to the method approved in the 8/93 MRP. More references, including UDOT and Utah AML, have been used. Foreman, pickup truck, and a water truck costs for 5 months have been added. Additional reseeding costs were included and all of the indirect costs used by DOGM are part of this revision. Copies of the specfic reference material are also attached as further documentation.

Daron, a working meeting on or about September 8, 1994, to discuss your staff's comments could be very effective and would definitely be appreciated. In the interim, I will be available to answer any questions in person or on the telephone.

Sincerely,

Tim

Tim Thompson, P.E.

cc: Wayne Western, DOGM
Steve Tanner, White Oak
Denise Dragoo, Fabian and Clendenin

1.01 DEMOLITION OF BUILDINGS

The following costs are used in Table 1 - "Building Demolition Costs"

BUILDING DEMOLITION

Ref. Means Heavy Construction Cost Data 1994

Small Buildings or single buildings, no salvage included

020-604-0500	Steel	.22	$/cf
020-604-0600	Concrete	.29	$/cf
020-604-0650	Masonry	.22	$/cf
020-604-0700	Wood	.22	$/cf

FLOOR AND FOUNDATION (to 8" below existing grade)

Use Cat 235 Excavator @ 155.82 $/hr. (cost includes operator)

PRODUCTIVITY = 20'x 20'/hr.x.83 (efficiency) @ 6" thickness

= 332 sf/hr. (ref. Professional Engineer's Estimate)

Cost/Unit = $\frac{155.82 \text{ \$/hr}}{332 \text{ sf/hr.}}$

= 0.47 $/sf

DEMOLISH 10" TUNNEL WALL

PRODUCTIVITY = 15'x 15'/hr x .83 (efficiency)

= 187 sf/hr (ref. Professional Engineers Estimate)

Cost/unit = $\frac{155.82 \text{ \$/hr.}}{187 \text{ sf/hr}}$

= 0.85 $/sf

CONCRETE DEMOLITION

Ref. Means Heavy Construction Cost Data 1994

020-554-2200 Reinforced Concrete - 283 $/cy

GRAND TOTAL DEMOLITION OF BUILDINGS (from Table 1) - $195,173

TABLE 1 BUILDING DEMOLITION COSTS

No.	Bldg. Desc.	Material	Length ft.	Width ft.	Height ft.	Volume cf	Cost/Unit $/cf	Building Cost	Volume cy	Area sf	Cost/Unit $/cy	$/sf	Foundation Cost	Remarks	Total Cost ($)	Bldg. Desc.
S-1	Wellhouse	W	8	8	8	512	0.22	113	0.0	0			0	Grade over Foundation	113	Wellhouse
S-1A	Shed	W,M	25	10	8	2000	0.22	440	0.0	0			0	Grade over Foundation	440	Shed
S-1B	Shop	W,M	10	10	8	800	0.22	176	0.0	0			0	Grade over Foundation	176	Shop
S-2	Shop	W,M,Cf	60	50	12	36000	0.22	7920	0.0	3000		0.47	1410		9330	Shop
S-3	Substation	M	28	10	15	4200	0.22	924	0.0	0			0	Grade over Foundation	924	Substation
S-4	Bathhouse	Tr	55	30	7	11550	0.22	2541	0.0	0			0	No Foundation	2541	Bathhouse
S-5	Shop	M,Cf	100	40	14	56000	0.22	12320	0.0	4000		0.47	1880		14200	Shop
S-6	Shed	W	30	15	13	5850	0.22	1287	0.0	0			0	Grade over Foundation	1287	Shed
S-7	Shed	W	20	18	8	2880	0.22	634	0.0	0			0	Grade over Foundation	634	Shed
S-8	Tank	M		10	18	1414	0.22	311	0.0	0			0	Grade over Foundation	311	Tank
S-9	Scale House	Tr	16	12	7	1344	0.22	296	0.0	0			0	No Foundation	296	Scale House
S-10	Truck Dump	C,S	45	18	22	17820	0.29	5168	0.0	0				Struct incl's Foundn	5168	Truck Dump
S-11	Conveyor	S,C	400	6	4	9600	0.22	2112	8.9	0		283.00	2519		4631	Conveyor
S-12	Transfer	S,Cf	20	10	14	2800	0.22	616	0.0	200		0.47	100		716	Transfer
S-13	Firehouse	W	10	8	8	640	0.22	141	0.0	0			0	Grade over Foundation	141	Firehouse
S-14	Conveyor	S,C	160	10	4	6400	0.22	1408	3.4	0		283.00	962		2370	Conveyor
S-15	Crusher	S,Cf	55	30	30	49500	0.22	10890	1.5	0		283.00	425		11315	Crusher
S-16	Conveyor	S,C	230	8	4	7360	0.22	1619	4.5	0		283.00	1274		2893	Conveyor
S-17	Stacker Tube	S,Cf		15	110	5183	0.22	1140	5.2	0		283.00	1472		2612	Stacker Tube
S-18	Recl Tunnel	C	200	10	8	0		0	0.0	7200		0.85	6120		6120	Recl Tunnel
S-19	Conveyor	S,C	220	10	4	8800	0.22	1936	2.2	0		283.00	623		2559	Conveyor
S-20	Substation	M	36	18	15	9720	0.22	2138	0.0	0			0	Grade over Foundation	2138	Substation
S-21	Loadout	S,C	35	25	30	26250	0.22	5775	1.5	0		283.00	425		6200	Loadout
S-24	Shed	W	20	20	10	4000	0.22	880	0.0	0			0	Grade over Foundation	880	Shed
S-25	Treatmnt Plt	M,C	50	30	16	24000	0.29	6960	0.0	1500		0.47	705		7665	Treatmnt Plt
S-26	Wellhouse	W	10	10	8	800	0.22	176	0.0	0			0	Grade over Foundation	176	Wellhouse
S-27	Bathhouse	M,C	165	80	14	184800	0.22	40656	0.0	13200		0.47	6204		46860	Bathhouse
S-28	Shop	M	40	40	20	32000	0.22	7040	0.0	1600		0.47	752		7792	Shop
S-29	Garage	M	24	20	10	4800	0.22	1056	0.0	480		0.47	100		1156	Garage
S-30	Pumphouse	C	20	20	10	4000	0.29	1160	0.0	400		0.47	100		1260	Pumphouse
S-31	Washbay	M,Cf	30	20	13	7800	0.22	1716	0.0	600		0.47	100		1816	Washbay
S-32	Truck Bin	S	18	18	25	8100	0.22	1782	0.7	0		283.00	190		1972	Truck Bin
S-32	Conveyor	S,C	95	7	4	2660	0.22	585	2.2	0		283.00	623		1208	Conveyor
S-33	Loadout	M,Cf	24	20	20	9600	0.22	2112	0.0	480		0.85	408		2520	Loadout
S-34	Substation	M	16	14	15	3360	0.22	739	0.0	0			0	Grade over Foundation	739	Substation
S-35	Conveyor	S,C	500	14	4	28000	0.22	6160	7.1	0		283.00	2009		8169	Conveyor
S-36	Stacker	S		15	80	3770	0.22	829	5.2	0		283.00	1472		2301	Stacker
S-37	Recl Tunnel	C	280	18	8	0		0	0.0	14560		0.85	12376		12376	Recl Tunnel
S-38	HAC	S	100	7	4	2800	0.22	616	1.1	0		283.00	311		927	HAC
S-39	Conveyor	S,C	70	7	4	1960	0.22	431	1.1	0		283.00	311		743	Conveyor
S-40	Transfer	S,C	25	25	20	12500	0.22	2750	0.0	625		0.47	100		2850	Transfer
S-41	Belina 1 Fan	M,C	65	25	10	16250	0.22	3575	0.0	1625		0.47	764		4339	Belina 1 Fan
S-42	Belina 2 Fan	M,C	50	25	10	12500	0.22	2750	0.0	1250		0.47	588		3338	Belina 2 Fan
S-43	Filter Pond	C	98	22	10	21560	0.29	6252	0.0	0			0	Struct incl's Foundn	6252	Filter Pond
S-44	Substation	M	55	15	15	12375	0.22	2723	0.0	0			0	Grade over Foundation	2723	Substation
	GRAND TOTAL							150853					44320		195173	

MATERIALS: W-Wood, M-Metal, Cf-Concrete Floor, T-Trailer, S-Steel

1.02 DISPOSAL OF BUILDINGS

HAULAGE AND DISPOSAL OF CONSTRUCTION DEBRIS

Construction debris will be sorted and disposed of in an approved manner. Inert material such as concrete in floors, foundations and tunnel walls will be rubbilized and graded over. The building material type and haulage costs described below are used in Table 2 - "Haulage and Disposal of Construction Debris":

Loads to Approved Landfill

Ref. Original MRP, 8/93
Haulage and dump cost = $51/load

Description: Deleterious materials such as wood, insulation, and iron will be hauled to an approved landfill as calculated by the number of these loads and multiplied by $51/load.

Loads of Remelt Steel

Description: All scrap steel is to be sent to a remelt facility. Based upon quoted prices from the "American Metal Market" for scrap iron and steel, the cost to haul is less than the value of the steel. Therefore, no haulage cost is applied to the disposal of scrap iron and steel nor is any salvage value claimed.

GRAND TOTAL DISPOSAL OF BUILDINGS (Valcam & Belina)

Haulage and Disposal of Construction Debris (Table 2)	$ 6,069

TABLE 2 HAULAGE AND DISPOSAL OF CONSTRUCTION DEBRIS

No.	Bldg. Desc.	Material	Loads Remelt Steel	Loads to Landfill	Haulage Cost ($)	Total Cost ($)	Bldg. Desc.
S-1	Wellhouse	W	0	0.5	51	26	Wellhouse
S-1A	Shed	W,M	0	1	51	51	Shed
S-1B	Shop	W,M	0	0.5	51	26	Shop
S-2	Shop	W,M,Cf	2	7	51	357	Shop
S-3	Substation	M	3	1	51	51	Substation
S-4	Bathhouse	Tr	0	5	51	255	Bathhouse
S-5	Shop	M,Cf	12	8	51	408	Shop
S-6	Shed	W	0	1	51	51	Shed
S-7	Shed	W	0	1	51	51	Shed
S-8	Tank	M	0	1	51	51	Tank
S-9	Scale House	Tr	0	2	51	102	Scale House
S-10	Truck Dump	C,S	6	4	51	204	Truck Dump
S-11	Conveyor	S,C	16	6	51	306	Conveyor
S-12	Transfer	S,Cf	5	1	51	51	Transfer
S-13	Firehouse	W	0	1	51	51	Firehouse
S-14	Conveyor	S,C	7	3	51	153	Conveyor
S-15	Crusher	S,Cf	13	5	51	255	Crusher
S-16	Conveyor	S,C	11	3	51	153	Conveyor
S-17	Stacker Tube	S,Cf	5	3	51	153	Stacker Tube
S-18	Recl Tunnel	C	6	2	51	102	Recl Tunnel
S-19	Conveyor	S,C	11	3	51	153	Conveyor
S-20	Substation	M	5	1	51	51	Substation
S-21	Loadout	S,C	14	2	51	102	Loadout
S-24	Shed	W	0	2	51	102	Shed
S-25	Treatmnt Plt	M,C	4	5	51	255	Treatmnt Plt
S-26	Wellhouse	W	0	1	51	51	Wellhouse
S-27	Bathhouse	M,C	0	8	51	408	Bathhouse
S-28	Shop	M	6	5	51	255	Shop
S-29	Garage	M	1	2	51	102	Garage
S-30	Pumphouse	C	2	0		0	Pumphouse
S-31	Washbay	M,Cf	3	2	51	102	Washbay
S-32	Truck Bin	S	6	0		0	Truck Bin
S-32	Conveyor	S,C	5	3	51	153	Conveyor
S-33	Loadout	M,Cf	4	4	51	204	Loadout
S-34	Substation	M	3	1	51	51	Substation
S-35	Conveyor	S,C	22	6	51	306	Conveyor
S-36	Stacker	S	5	1	51	51	Stacker
S-37	Recl Tunnel	C	3	6	51	306	Recl Tunnel
S-38	HAC	S	5	3	51	153	HAC
S-39	Conveyor	S,C	4	3	51	153	Conveyor
S-40	Transfer	S,C	5	2	51	102	Transfer
S-41	Belina 1 Fan	M,C	4	1	51	51	Belina 1 Fan
S-42	Belina 2 Fan	M,C	4	1	51	51	Belina 2 Fan
S-43	Filter Pond	C	0	0		0	Filter Pond
S-44	Substation	M	5	1	51	51	Substation
	GRAND TOTAL		207	119		6069	

MATERIALS: W-Wood, M-Metal, Cf-Concrete Floor, T-Trailer, S-Steel

2.00 FACILITIES DEMOLITION AND DISPOSAL (not including buildings)

2.01 PORTALS

CONCRETE REMOVAL: The quantity of concrete above the final grade which must be demolished and placed into the portal is 42.5 cy.

Ref:	Means Removal (020 554 5200)	$127/cy
	Disposal on Site (020 554 5550)	+ 6.20/cy
	Removal and disposal unit cost	$133.20/cy
		x 42.5 cy
Total Portal Removal and Disposal		$5,661

SEALS

Ref: Louie Amodt - UT AML Double Block Wall - $25/sf

# of Portals = 12
Average Portal Dimensions (including key) - 12' x 16'

Average Seal Area	=	192 sf
Total Seal Area	=	2304 sf
		x 25 $/sf
Total Seal Cost	=	$57,600

BACKFILL PORTALS

Volume of backfill	1555 cy
Dozer unit cost	x .70 $/cy
Total backfill cost	$1,093

FRENCH DRAINS

Total length of drains	4760 ft
2' x 2' w/ 8" drain pipe	x 1.60 $/ft
Total french drains	$7,616

GRAND TOTAL COST

Concrete Removal	5,661
Seals	57,600
Backfill	1,093
French Drains	7,616

GRAND TOTAL PORTALS COST $71,970

2.02 RAILROAD

DESCRIPTION:

The track and ties are pulled from the ground with the excavator. Since access is unobstructed on the East side, good productivity is expected. Loading is accomplished by the track loader with a multi purpose bucket. Haulage is by two 12 cy trucks. The ballast will be dispersed by the excavator and loader against the high wall after track and ties are removed. This is highly productive since the excavator is close enough to cast the material. The loader can easily travel the short distance to dump ballast and do any rough grading that may be necessary. The following equipment is required:

1 CAT 235 D excavator
1 CAT 963 track loader
2 12 cy dump druck

PRODUCTIVITY:

The rate of removal and disposal is conservatively estimated based upon prudent and reasonable professional experience. Contractors who are experienced in this activity further substantiated this estimate.

Given:

Total track length to be removed = 4963 ft.
Length of 90 #/ft rail = 22 ft.
Number of rails to be removed = (4963 ft x 2)/22 ft = 451 rails
Number of ties to be removed = (2250 ties/mi x 4963 ft)/5280=2115 ties

Productivity = 50 ft/hr (4.5 rails/hr and 21 ties/hr.)

Time = 4963 ft/50 ft/hr = 99 hr.
Cost = Time x (excavator + loader + 2 trucks)
= 99 hr x (155.82 + 89.41 + 2 x 81) $/hr.

TOTAL COST = $40,315 or $8.12/ft.

2.03 UNDERGROUND TANKS

DESCRIPTION

The 7 underground storage tanks were removed and disposed of properly in mid 1994 by White Oak.

2.04 POWER DISTRIBUTION

DESCRIPTION

Transformers	4 ea	
Unit cost (020 708 1570)		$ 735/ea
Total transformer costs		$ 2940
Poles	41 ea	
Unit cost		$ 70.15/ea
Total poles		$ 2876
Conductors	5.7 miles	
Unit costs		$ 1102 /mile
Total conductors		$ 6281
TOTAL COST		$ 12,097

2.05 HAUL ROAD CONCRETE GUTTER

Length of gutter (see 8/93 MRP)	6885 ft
Unit cost (UDOT 4/94)	x 2.39/ft
Total Removal and Disposal Cost	$ 16,455

2.06 GUARD RAIL

DESCRIPTION

The CAT 235D excavator will pull the rail off the posts by breaking the bolts with the bucket. Then it will dig out around the post and pull it out of the ground. Disposal of posts and rail will be offsite as was detailed in the original MRP.

Total Length = 10835 ft.
Total Poles = 2167 (on 5' centers)

Rail Removal:

- Break bolts at each post	=	.25 min/post
- Bend 20' rail in half	=	. 5 min/post
- Load rail on truck	=	.5 min/post
	=	1.25 min/post
		x 2167 posts
Total Time =		45.2 hr.

Post Removal:

- Dig 2 holes @ ea. post (.33 min/hole)	=	.66 min/post
- Pull post out of ground and load truck	=	.33 min/post
		.99 min/post
		x 2167 posts
Total Time =		35.8 hr

Time = 45.2 + 35.8 = 81 hr
Cost = 81 hr x 155.82 $/hr = $ 12,622

NOTE: CAT 235 hourly cost includes O & P (see pg R-1) from Blue Book

HAULAGE AND DISPOSAL (offsite)

Ref. MRP 8/93

Haul 110 miles @ $.15/mi.	$16.50/ton
Disposal Fee	$33.00/ton
Total Unit Cost Haul & Dispose	$49.50/ton
Material Weight	x 27 tons
Total Haul & Dispose	$1337.

GRAND TOTAL GUARD RAIL = 12,622 + 1,337 = $13,959

2.07 PAVEMENT

DESCRIPTION

Asphalt removal costs are based upon the average unit bid prices from the Utah Department of Transportation 4/94 (see attached). All asphalt will be hauled to Price, UT and donated to UDOT as a resource for State Highways.

Valcam length	4,060 sy
Haul Road	19,125 sy
Belina	7,050 sy
Total asphalt area (MRP 8/93)	30,235 sy
Removal unit cost (UDOT 4/94)	x 1.73 /sy
Total cost of removal	$ 52,307

Haul & dispose (MRP 8/93)	
area *4" thick/12/3*2.2 t/cy	7,391 tons
Haul 40 miles @ $.15/mile	x 6.00/ton
Total haul	$ 44,346
Total asphalt remove and dispose	$ 96,653

3.0 EARTHWORK

3.01 BELINA EXCAVATION & GRADING

Reference MRP (8/93) for Quantity Calculations.

Vol. to excavate	254,000 cy	Avg. Haul Dist. = 1700ft.
Swell Factor	x 1.25	Avg. Haul Grade = +7%
Vol. to be Hauled	317,500 lcy	

DESCRIPTION: Use a CAT 235D Excavator & CAT 769C End Dump Trucks to haul material for final backfill. Spreading and haul road maintenance will be done by the D8N Dozer.

CAT 235D Excavator Ref. Cat Handbook 23rd Edition

Bucket Capacity	2.75 yd^3	
Cycle time	.33 min	
Cycles/Hr.	182	
Hourly Unit Prod.	500 yd^3/hr.	
Efficiency	.83	(50 min/hr)
Adjusted Prod.	415 yd^3/hr	

Time = 317,500 lcy/415 yd^3/hr = 765 hr.
Cost = 765 hr x 155.82 $/hr = $119,202

CAT 769C Truck Cat handbook pg. 9-6

Capacity	26 yd^3	
Max. Veh. Weight	149,000 lb.	
Avg. Haul Dist	1700 ft.	
Avg. Haul Grade	+7%	} Loaded = 10% Empty -4%
Rolling Resistance	3%	

a. Position Time 0.7 min pg 9-8
b. Dump Time 1.1 min pg 9-8

c. Load time w/ 235D Excavator (2.75 yd^3 bucket)
= 26 yd^3/2.75 yd^3 x .33 min/cycle
= 3.12 min

d. Haul time from graph pg. 9-15
= 2.20 min.

e. Return Time from graph pg. 9-11
maximum downhill speed = 18mph (1584 fpm)

= 1700 ft/1584 ft/min
= 1.07 min.

Total cycle time	= a + b + c + d + e pg. 9-8
	= 0.7 + 1.1 + 3.12 + 2.20 + 1.07
	= 8.19 min./cycle
Cycle/hr	= 7.3
Hourly unit production	= 190 yd^3/hr.
Efficiency	= .83
Adjusted Production	= 158 yd^3/hr.
Production for 3 Units	= 474 yd^3/hr.
Time for 3 Units	= 317,500 lcy ÷ 474 = 670 hr.

Comparison of Excavator Production (415 yd^3/hr) determines the time required to move 317,500 lcy is 765 hr. (see previous page)

Truck cost = 765 hr x 116.31 $/hr. x 3 units
= <u>$266,931</u>

CAT D8N DOZER:

Time = 765 hr.
Cost = 765 hr x 134.96 $/hr
= <u>$103,244</u>

GRAND TOTAL = 119,202 + 266,931 + 103,244 = <u>$489,378</u>
EXCAVATOR + TRUCKS + DOZER

3.02 RELOCATE AND SPREAD VEGETATION SUPPORTING MATERIAL (VSM)

Reference MRP (8/93) for :		QUANTITY - DISTANCE
- VSM to be relocated	= 2097 cy X 1.25	= 2,622 lcy - 800 ft
- VSM to be spread	= 12107 cy x 1.25	= 15,134 lcy - 1700 ft

RELOCATE VSM

Ref. 3.01 - CAT 235 D Adjusted Production = 415 YD^3/HR.
Ref. 3.01 - 3 CAT 769 C Trucks Adjusted Production = 474 yd^3/hr.

Time = 2622 lcy/415 yd^3/hr = 6.3 hr.

Cost = 6.3 hr x 155.82 $/hr	= 982.00	CAT 235D EXCAVATOR
6.3 hr x 116.31 $/hr x 3	= 2198.00	CAT 769C TRUCKS
6.3 hr x 134.96 $/hr	= 850.00	CAT D8N DOZER

TOTAL COST RELOCATE VSM =$4030.00

SPREAD VSM OVER SITE

Ref. 3.01 - CAT 235D Adjusted Production = 415 yd^3/hr.
Ref. 3.01 - 3 CAT 769 C Trucks Adjusted Production = 474 yd^3/hr.

Production Calc. for CAT D8N DOZER pg 1-60 CAT Handbook 23rd Edition

Applicable Correction Factors:

Material - Loose Stockpile	-	1.20
Job Efficiency	-	.83
Grade @ 3:1 slope	-	1.60
Avg. Push Distance	-	200 ft.

Production = 450 lcy/hr (1.20) (.83) (1.60) = 717 lcy/hr.

With this production, the D8N is well ahead of the Excavator production rate. This will allow time for the dozer to regrade the pioneer roads which were required for trucks to dump the VSM.

VSM to be spread = 15,134 lcy

Time = 15,134 lcy/415 lcy/hr = 37 hr.

Cost = 37 hr x 155.82 $/hr	=	5,765
37 hr x 116.31 x 3	=	12,910
37 hr x 134.96 $/hr	=	4,994

TOTAL COST SPREAD VSM = $23,669

GRAND TOTAL VSM COST = $ 4,030 + $23,699
= $27,699 (Relocate + Spread)

3.03 REGRADE DITCH VDD-4 & VDD-5

Reference	Original MRP (8/93)	1400′ x 5cf/ft
		259cy
	swell factor	x 1.25
	volume swelled	324 lcy
Ref Means (022 242 2020) (Dozer)		x1.80 $/lcy
	Cost	$ 583

3.04 BELINA HAUL ROAD ROCK LIFTS

Reference Original MRP (8/93)

Description: Rock lifts are to be formed of material excavated at the Belina site. Large rock pieces uncovered as part of the work at the Belina site will be loaded on a truck, hauled down the road to near final location, and dumped along the inside edge of the road. This creates flat "benches" in this area that will enhance wildlife habitats.

The Backhoe will be used to assist scrapers with excavation at Belina Complex, trucks will haul the 10,000 cy excess from Belina site to haul road. (see 3.05)

Volume of rock needed	6000 cy
Average haul distance	6100 ft
Truck capacity	18 cy
Load time by CAT 235	3.75 min.
Efficiency	0.75

Calculation of Truck Production:

Ref CAT handbook

Max vehicle weight	149,000 lb.
Capacity (Rock)	18 cy
Average haul distance	6,100 ft
Average grade	-6.0 % } Loaded -3% Empty 9%
Rolling resistance	3.0%

a. Position time	0.7 min	
b. dump time	1.1 min	
c. load time	3.75 min	
e. haul time	2.77 min	(pg 9-22)
f. return time	3.45 min	(pg 9-16)
TOTAL CYCLE TIME	11.77 min	

Cat 769C production:

Cycles/hr	5.1
Hourly unit prod	91.2 cy/hr
Efficiency	0.75
Adjusted Production	69 cy/hr
Production for 3 units	207 cy/hr

Truck time	=	6000 cy/207 cy/hr
	=	29 hr
Truck cost	=	29 hr x 116.31 $/hr x 3 units
	=	$10,119
Excavator Cost	=	29 hr x 155.82 $/hr
	=	$ 4,519

GRAND TOTAL COST = 10,119+4,519 = $14,637

3.05 BELINA HAUL ROAD EARTHWORK

Reference MRP (8/93)

Description: Approximately half of the cut is located in Upper fill, Big fill, and Eccles Junction. The excavator will be used to load trucks from these three sites for hauling and dumping along the road. The Excavator will then reshape the material to form the final reclamation contours including pulling up the existing fill on the outside of the road. Add 10,000 cy hauled from Belina Complex (12,500 cy swelled)

Given:	Total Volume	88,300
	Swell Factor	x1.25
	Total Volume Loose	110,375

I.	½ vol. - excavator pull up	55,188
	½ vol. - truck haul	55,187
	Add'l vol. from Belina	12,500
II.	Total Vol. to be hauled	67,187

I. Excavator pulls up existing fill on outside of the road:

Ref. Cat Handbook 23rd Edition Page 4-104

The job condition description: "D-Below Average" ie. hard digging, depth 90% of capability, swing angle 120°. Thus:

Cycle time	.58 min
Bucket capacity	2.75 yd^3
Cycles/hour	103
Hourly Unit Prod.	284 yd^3/hr.
Efficiency	.83
Adjusted Production	236 yd^3/hr.

Time = 55,188 lcy/236 yd^3/hr = 234 hr.
Cost = 234 hr x 155.82 $$/hr. = $36,462 for I.

II. Excavator loads trucks from Belina Complex, Upper Fill, Big Fill, Eccles Junction for hauling and dumping along side the road.

Reference MRP (8/93)

Average Haul Distance 1,100 ft.

CAT 235D Excavator Ref.: 3.01 Belina Excavation

Production	=	415 yd^3/hr
Time	=	55,188 lcy/415 yd^3/hr
	=	133 hr
Cost	=	133 hr x 155.82 $/hr
	=	$20,724 Excavator

CAT 769C Trucks Ref.: 3.01 Belina Excavation

Production = 476 yd^3/hr (3 units)

Time is determined by excavator since it limits the trucks. Therefore:

Time	=	133 hr (from above)
Cost	=	133 hr x 116.31 $/hr x 3
	=	46,408 - 3 trucks
TOTAL COST FOR II.	=	20,724 + 46,408 = $66,682
GRAND TOTAL COST	=	I. + II.
	=	36,462 + 66,682
	=	$103,144

3.06 VALCAM EARTHWORK

Reference MRP (8/93)

Total volume	93,300 cy
Swell factor	1.25
Volume to be hauled	116,625 lcy
Average haul distance	800 ft
Average haul grade	+ 6% (LOADED = 9% EMPTY = -3%)
Rolling resistance	3%
Efficiency	0.83

DESCRIPTION: A CAT 235 D excavator, 3 CAT 769C dump trucks, and a CAT D8N Dozer will be used as described in Sec. 3.01 - Belina Excavation and Grading

CAT 235 D EXCAVATOR Ref: Sec 3.01

Production	=	415 yd^3/hr
Time	=	116,625/415 yd^3/hr
	=	281 hr
Cost	=	281 hr X 155.82 $/hr
	=	$ 43,785

CAT 769C TRUCKS Ref: Sec 3.01

Time	=	281 hr. (limited by Excavator since truck prod. is greater)
Cost	=	281 hr x 116.31 $/hr x 3
	=	$98,049

CAT D8N DOZER

Cost	=	281 hr x 134.96 $/hr
	=	$37,924

GRAND TOTAL = 43,785 + 98,049 + 37,924 = $179,758

3.07 FOREMAN AND WATER TRUCK

A foreman is assumed to be needed during earthmoving activities and some facilities demolition. Note that the Means cost estimates already include supervision costs. The time required for a foreman can be estimated by determing the CAT 235 Excavator's time requirements. Thus, a foreman will be needed 5.0 mos.

Ref Means Heavy Construction Cost Data 1994

Foreman Rate	=	$42.30/hr.
Time	=	5 mos. x 176 hr/mo = 880 hr
Cost	=	$37,224

Ref Blue Book Pickup Truck 3/4 ton 4x4

Total Cost/Hr	=	$ 9.65
Time (hr)	=	x 880
Cost	=	$ 8,492

Total (Foreman & Truck) = 37,224 + 8,492 = $45,716

A water truck will be required to maintain haul roads for the earthmoving tasks. The time that the truck will be needed is also 5.0 months (880 hours).

Ref Blue Book (includes water truck and operator)

Total Cost/Hr	=	$ 85.22
Time (hr)	=	x 880
Cost	=	$ 74,994

GRAND TOTAL - FOREMAN & WATER TRUCK = $120,710

4.00 REVEGETATION

4.01 Belina Complex Riprap Channel and Slope

Total volume riprap needed (MRP 8/93)	4440 cy
Riprap cost per cy (ref. local cost)	$ 15.10 /cy
Haul cost per cy	$ 21.00 /cy
Total cost per cy	$ 36.10 /cy
Total riprap costs - Belina	$ 160,284
Granular Filter vol. needed (MRP 8/93)	2200 cy
Unit cost (ref. local cost)	$ 9.60 /cy
Haul cost per cy	$ 20.80 /cy
Total cost per cy	$ 30.40 /cy
Total filter costs - Belina	$ 66,880
TOTAL RIPRAP CHANNEL AND SLOPE	$ 227,164

4.02 Valcam Riprap Channel

Total volume riprap needed (MRP 8/93)	1100 cy
Riprap cost per cy (ref. local cost)	$ 15.10 /cy
Haul cost per cy	$ 21.00 /cy
Total cost per cy	$ 36.10 /cy
Total riprap costs - Valcam	$ 39,710
Granular Filter vol. needed (MRP 8/93)	800 cy
Unit cost (ref. local cost)	$ 9.60 /cy
Haul cost per cy	$ 20.80 /cy
Total cost per cy	$ 30.40 /cy
Total filter costs - Valcam	$ 24,320
TOTAL RIPRAP CHANNEL - VALCAM	$ 64,030

4.03 Valcam Straw Bale Barrier

Total length of bale barrier	6040 ft
Number of bales of straw	2157 bales
Tons	62 tons
Straw Unit Cost (ref. local cost)	$ 108 /ton
Total straw cost(place & remove)	$ 6696
Stakes (assume $ .50/bale)	$ 1079
TOTAL COST STRAW BALE BARRIER	$ 7775

4.04 Belina Straw Bale Barrier

Total length of bale barrier	6940 ft
Number of bales of straw	2479 bales
Tons	71 tons
Straw Unit Cost (ref. local cost)	$ 108 /ton
Total straw cost(place & remove)	$ 7668
Stakes (assume $ .50/bale)	$ 1239
TOTAL COST STRAW BALE BARRIER	$ 8907

4.05 Riparian Vegetation

Total area planted along streams (MRP 8/93)	1.5 ac
Willows (300 sets/ac @ 5.60 $/set)	$ 1680 /ac
Shrubs (2600 /ac @ 3.60 $/shrub)	$ 9360 /ac
Total cost per acre	$ 11,040
TOTAL RIPARIAN VEGETATION	$ 16,560

4.06 Valcam Revegetation

Total Disturbed area - Valcam (MRP 8/93)	34 ac
Hydroseeding (ref. Means 029 308 4600)	$ 1873 /ac
Total hydroseeding and mulching	$ 63,682
Tree and shrub planting area (MRP 8/93)	4 ac
Trees (300 sets/ac @ 5.60 $/set)	$ 1680 /ac
Shrubs (1200 /ac @ 3.60 $/shrub)	$ 4320 /ac
Total cost per acre	$ 6,000
Total tree and shrub cost	$ 24,000
Fencing costs	$ 4,875
TOTAL VALCAM REVEGETATION	$ 92,557

4.07 Belina Complex Revegetation

Total Disturbed area - Belina (assume re-seeding additional 25% of area to allow for plant loss during years of low precipitation)	28 ac
Hydroseeding and mulching (ref. Means 029 308 4600)	$ 1873 ac
Total hydroseeding and mulching	$ 52,444
Tree and shrub planting area	14 ac
Trees (400 sets/ac @ 5.60 $/set)	$ 2240 /ac
Shrubs (900 /ac @ 3.60 $/shrub)	$ 3240 /ac
Total cost per acre	$ 5480
Total tree and shrub cost	$ 76,720
Fencing costs	$ 4,650
TOTAL BELINA COMPLEX REVEGETATION	$ 133,814

4.08 Belina Haul Road Revegetation

Total Disturbed area - Haul Road (assume re-seeding additional 25% of area to allow for plant loss during years of low precipitation)	15 ac
Hydroseeding and mulching (ref. Means 029 308 4600)	$ 1,873 ac
Total hydroseeding and mulching	$28,095
Tree and shrub planting area	8 ac
Trees (550 sets/ac @ 5.60 $/set)	$ 3,080 /ac
Shrubs (900 /ac @ 3.60 $/shrub)	$ 3,240 /ac
Total cost per acre	$ 6,320
Total tree and shrub cost	$50,560
Fencing costs	$12,000
TOTAL HAUL ROAD REVEGETATION	$90,655

UNIT COST REFERENCE FOR BOND ESTIMATE

EQUIPMENT

Ref: Rental Rate Blue Book, Vol. 1, 1993 Dataquest Inc.

EQUIPMENT	MONTHLY RATE	ADJ. RATE PER HR	OPERATING COST/HR	OVERHEAD & PROFIT (10%)	LABOR COST/HR	TOTAL COST/HR
EXCAVATOR CAT 235D	13,860	78.75	28.95	10.77	37.35	155.82
DOZER CAT D8N	10,875	61.79	26.95	8.87	37.35	134.96
DUMP TRUCK CAT 769C	8,790	49.94	28.20	7.81	30.35	116.31
3/4 TON PICK UP TRUCK	620	3.52	5.25	0.88	-	9.65
TRACK LOADER CAT 963	5,470	31.08	16.25	4.73	37.35	89.41
WATER TRUCK (5000 gal.)	5,250	29.83	20.05	4.99	30.35	85.22

LABOR

Ref: Means Heavy Construction Cost Data, 1994

Trade	Rate/hr. ($)
Equipment Operator	37.35
Truck Driver	30.35
Foreman	42.30

Notes: - Monthly Rates are Divided by 176 hr/mo for hourly rate
- Rates include all burdens, overhead and profit

RECLAMATION COSTS SUMMARY

	ITEM		COST
1.00	BUILDINGS		
	1.01	DEMOLITION	195,200
	1.02	DISPOSAL	6,100
		SUB-TOTAL	201,300
2.00	FACILITIES		
	2.01	PORTALS	72,000
	2.02	RAILROAD	40,300
	2.03	UNDERGROUND TANKS	0
	2.04	POWER DISTRIBUTION	12,100
	2.05	HAUL ROAD GUTTER	16,500
	2.06	GUARD RAIL	14,000
	2.07	PAVEMENT	96,700
		SUB-TOTAL	251,600
3.00	EARTHWORK		
	3.01	BELINA EXCAVATION	489,400
	3.02	VSM SPREAD	27,700
	3.03	REGRADE DITCHES	600
	3.04	HAUL ROAD ROCK LIFTS	14,600
	3.05	HAUL ROAD EARTHWORK	103,100
	3.06	VALCAM EARTHWORK	179,800
	3.07	FOREMAN AND WATER TRUCK	120,700
		SUB-TOTAL	935,900
4.00	REVEGETATION		
	4.01	BELINA RIPRAP	227,200
	4.02	VALCAM RIPRAP	64,000
	4.03	VALCAM STRAW BALE	7,800
	4.04	BELINA STRAW BALE	8,900
	4.05	RIPARIAN VEGETATION	16,600
	4.06	VALCAM REVEGETATION	92,600
	4.07	BELINA REVEGETATION	133,800
	4.08	HAUL RAOD REVEGETATION	90,700
		SUB-TOTAL	641,600
	TOTAL DIRECT COSTS		2,030,400
	MAINTENANCE AND MONITORING (10%)		203,000
	CONTINGENCY (10%)		203,000
	ENGINEERING REDESIGN (5%)		101,500
	MOBILIZATION/DEMOB (2.5%)		50,800
	CONTRACT MANAGEMENT (5%)		101,500
	TOTAL INDIRECT COSTS		660,000
	SUBTOTAL - ALL COSTS		2,690,400
	INFLATION 1.42% X 1.5 YRS		57,300
	GRAND TOTAL RECLAMATION COST		2,747,700

UTAH DEPARTMENT OF TRANSPORTATION
TOTAL QUANTITIES AND AVERAGE UNIT LOW BID PRICES

DATE PRINTED 04/28/94

ITEM NO	UNIT	DESCRIPTION	QUANTITY	AMOUNT	UNIT PRICE
151000010	LUMP	MOBILIZATION	40.00	5728043.20	143201.08
175000000	LUMP	CONTINGENT SUM PAY ITEM	0.00	0.00	0.00
18500000U	HOUR	EQUAL OPPORTUNITY TRAINING	37000.00	29600.00	0.80
199999999			0.00	0.00	0.00
200000000		DIVISION 200 EARTHWORK	0.00	0.00	0.00
200000001			0.00	0.00	0.00
201000010	LUMP	CLEAR AND GRUB	5.00	390849.00	78169.80
201000020	ACRE	CLEAR AND GRUB	54.00	165819.96	3070.74
202000010	PARCEL	REMOVE BUILDING, BASEMENT, AND FOUNDATION - PARCEL #_____.	0.00	0.00	0.00
202000011	PARCEL	REMOVE BUILDING, BASEMENT, AND FOUNDATION - PARCEL#____.	0.00	0.00	0.00
202000012	LIN FT	REMOVE RIPRAP	0.00	0.00	0.00
202000020	SQ YD	REMOVE CONCRETE PAVEMENT	630.00	8190.00	13.00
202000030	SQ YD	REMOVE ASPHALT PAVEMENT	102278.00	176940.94	1.73
202000040	SQ YD	REMOVE CONCRETE SIDEWALK	4271.00	16400.64	3.84
202000050	SQ YD	REMOVE CONCRETE DRIVEWAY	1220.00	4282.20	3.51
202000060	LIN FT	REMOVE CONCRETE CURB	1903.00	5366.46	2.82
202000070	LIN FT	REMOVE CONCRETE CURB AND GUTTER	12685.00	30317.15	2.39
202000080	LIN FT	REMOVE BITUMINOUS CURB	160.00	480.00	3.00
202000090	LIN FT	REMOVE RAISED ISLAND	0.00	0.00	0.00
202000100	EACH	REMOVE BRIDGE	10.00	312100.00	31210.00
202000110	EACH	REMOVE BOX CULVERT	9.00	43879.95	4875.55
202000120	EACH	REMOVE MANHOLE	6.00	4410.00	735.00
202000130	EACH	REMOVE CATCH BASIN	34.00	7709.50	226.75
202000140	EACH	REMOVE CATTLE GUARD	5.00	4350.00	870.00
202000150	EACH	REMOVE SEPTIC TANK	1.00	12700.00	12700.00
202000160	EACH	REMOVE UNDERGROUND TANK	0.00	0.00	0.00
202000170	LIN FT	REMOVE GUARDRAIL	15810.00	34149.60	2.16
202000180	LIN FT	REMOVE FENCE	91254.00	55664.94	0.61
202000190	LIN FT	REMOVE RAILROAD TRACK	5810.00	23240.00	4.00
202000200	EACH	REMOVE TREE	226.00	46128.86	204.11
202000210	EACH	REMOVE CONCRETE HEADWALL	141.00	16275.63	115.43
202000220	EACH	REMOVE SIGN	231.00	14850.99	64.29
202000225	EACH	REMOVE DELINEATORS	0.00	0.00	0.00
202000230	EACH	REMOVE UTILITY POLE	2.00	500.00	250.00
202000240	LIN FT	REMOVE PIPE CULVERT	7303.00	47469.50	6.50
202000300	LIN FT	REMOVE CONCRETE ROLLED GUTTER	0.00	0.00	0.00
203000010	LIN FT	OBLITERATE ROAD	3050.00	4575.00	1.50
204S00010	TON	SHOULDER DRESSING	0.00	0.00	0.00
204000010	M GAL	DUST CONTROL AND WATERING	103724.00	959447.00	9.25
20400240S	CU YD	FREE DRAINING GRANULAR MATERIAL	0.00	0.00	0.00
205000010	EACH	ABANDON PIPE CULVERT	0.00	0.00	0.00
210000010	CU YD	ROADWAY EXCAVATION	194533.00	5283689.76	2.72
210000020	CU YD	ROADWAY EXCAVATION (PLAN QUANTITY)	0.00	0.00	0.00
220000010	CU YD	BORROW	84194.00	326672.72	3.88
220000020	TON	BORROW	162450.00	365512.50	2.25
220000030	CU YD	GRANULAR BORROW	144240.00	503397.60	3.49

020 550 | Site Demolition

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1994 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
554	2200	Reinforced	B-38	9.50	4.211	C.Y.		90	130	220	283	554
	2300	With hand held air equipment, bituminous	B-39	1,900	.025	S.F.		.51	.08	.59	.89	
	2320	Concrete to 6" thick, no reinforcing		1,200	.040			.80	.12	.92	1.40	
	2340	Mesh reinforced		830	.058			1.16	.18	1.34	2.03	
	2360	Rod reinforced		765	.063			1.26	.19	1.45	2.19	
	2400	Curbs, concrete, plain	B-6	325	.074	L.F.		1.51	.61	2.12	3.05	
	2500	Reinforced		220	.109			2.23	.91	3.14	4.49	
	2600	Granite curbs		355	.068			1.38	.56	1.94	2.79	
	2700	Bituminous curbs		830	.029			.59	.24	.83	1.19	
	2900	Pipe removal, concrete, no excavation, 12" diameter		175	.137			2.81	1.14	3.95	5.65	
	2930	15" diameter		150	.160			3.28	1.33	4.61	6.55	
	2960	24" diameter		120	.200			4.09	1.66	5.75	8.25	
	3000	36" diameter		90	.267			5.45	2.22	7.67	11	
	3200	Steel, welded connections, 4" diameter		160	.150			3.07	1.25	4.32	6.15	
	3300	10" diameter		80	.300			6.15	2.50	8.65	12.35	
	3500	Railroad track removal, ties and track	B-14	110	.436			8.75	1.82	10.57	15.80	
	3600	Ballast		500	.096	C.Y.		1.93	.40	2.33	3.47	
	3700	Remove and re-install ties & track using new bolts & spikes		50	.960	L.F.		19.25	3.99	23.24	35	
	3800	Turnouts using new bolts and spikes		1	48	Ea.		965	200	1,165	1,750	
	4000	Sidewalk removal, bituminous, 2-1/2" thick	B-6	325	.074	S.Y.		1.51	.61	2.12	3.05	
	4050	Brick, set in mortar		185	.130			2.66	1.08	3.74	5.35	
	4100	Concrete, plain		160	.150			3.07	1.25	4.32	6.15	
	4200	Mesh reinforced		150	.160			3.28	1.33	4.61	6.55	
	5000	Slab on grade removal, plain	B-5	45	1.422	C.Y.		30.50	20.50	51	70.50	
	5100	Mesh reinforcing		33	1.939			41.50	28.50	70	96	
	5200	Rod reinforcing		25	2.560			55	37.50	92.50	127	
	5500	For congested sites or small quantities, add up to								200%	200%	
	5550	For disposal on site, add	B-11A	232	.069			1.50	3.53	5.03	6.20	
	5600	To 5 miles, add	B-34D	76	.105			2.07	6.50	8.57	10.35	

020 600 | Building Demolition

604	0010	BUILDING DEMOLITION Large urban projects, incl. disposal, steel	B-8	21,500	.003	C.F.		.06	.10	.16	.21	604
	0050	Concrete		15,300	.004			.09	.14	.23	.29	
	0080	Masonry		20,100	.003			.07	.10	.17	.21	
	0100	Mixture of types, average		20,100	.003			.07	.10	.17	.21	
	0500	Small bldgs, or single bldgs, no salvage included, steel	B-3	14,800	.003			.07	.11	.18	.22	
	0600	Concrete		11,300	.004			.09	.14	.23	.29	
	0650	Masonry		14,800	.003			.07	.11	.18	.22	
	0700	Wood		14,800	.003			.07	.11	.18	.22	
	1000	Single family, one story house, wood, minimum				Ea.				2,000	2,200	
	1020	Maximum								3,400	3,740	
	1200	Two family, two story house, wood, minimum								2,275	2,500	
	1220	Maximum								5,100	5,610	
	1300	Three family, three story house, wood, minimum								3,300	3,630	
	1320	Maximum								6,500	7,150	
608	0010	DISPOSAL ONLY Urban buildings with salvage value allowed										608
	0020	Including loading and 5 mile haul to dump										
	0200	Steel frame	B-3	430	.112	C.Y.		2.28	3.68	5.96	7.60	
	0300	Concrete frame		365	.132			2.69	4.33	7.02	8.95	
	0400	Masonry construction		445	.108			2.21	3.55	5.76	7.35	
	0500	Wood frame		247	.194			3.98	6.40	10.38	13.25	
612	0010	DUMP CHARGES Typical urban city, fees only										612
	0100	Building construction materials				C.Y.					35	
	0200	Demolition lumber, trees, brush									37	
	0300	Rubbish only									30	

Ref. Means Heavy Const. Cost Data 1994

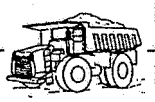
020 700 | Selective Demolition

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1994 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P
708	0100	Rigid galvanized steel, 1/2" to 1" diameter	1 Elec	242	.033	L.F.		.91		.91	1.37
	0120	1-1/4" to 2"		200	.040			1.10		1.10	1.65
	0140	2" to 4"		151	.053			1.46		1.46	2.19
	0160	4" to 6"		57	.140			3.86		3.86	5.80
	0200	Electric metallic tubing (EMT) 1/2" to 1"		394	.020			.56		.56	.84
	0220	1-1/4" to 1-1/2"		326	.025			.67		.67	1.01
	0240	2" to 3"		236	.034			.93		.93	1.40
	0260	3-1/2" to 4"		95	.084			2.32		2.32	3.48
	0271	Armored cable (BX)	2 Elec	1,200	.013			.37		.37	.55
	0351	Non-metallic sheathed cable (Romex)		1,500	.011			.29		.29	.44
	0401	Wiremold raceway		430	.037			1.02		1.02	1.54
	0501	Channels, steel, including fittings and hangers		500	.032			.88		.88	1.32
	0601	Copper bus duct incl. hangers, 225 amp		135	.119			3.26		3.26	4.90
	0605	1000 amp		60	.267			7.35		7.35	11.05
	0609	3000 amp		20	.800			22		22	33
	1300	Transformer, dry type, 1 ph, incl. removal of									
	1320	supports, wire & pipe terminations									
	1340	1 KVA	1 Elec	7.70	1.039	Ea.		28.50		28.50	43
	1420	75 KVA	"	1.25	6.400	"		176		176	265
	1440	3 Phase to 600V, primary									
	1460	3 KVA	1 Elec	3.85	2.078	Ea.		57		57	86
	1520	75 KVA		1.35	5.926			163		163	245
	1550	300 KVA		.71	11.268			310		310	465
	1570	750 KVA		.45	17.778			490		490	735
	1800	Wire, THW-THWN-THHN, removed from									
	1810	in place conduit, to 15' high									
	1830	#14	1 Elec	65	.123	C.L.F.		3.38		3.38	5.10
	1840	#12		55	.145			4		4	6
	1850	#10		45.50	.176			4.84		4.84	7.25
	1860	#8		40.40	.198			5.45		5.45	8.20
	1870	#6		32.60	.245			6.75		6.75	10.15
	1880	#4		26.50	.302			8.30		8.30	12.50
	1890	#3		25	.320			8.80		8.80	13.25
	1900	#2		22.30	.359			9.85		9.85	14.85
	1910	1/0		16.60	.482			13.25		13.25	19.95
	1920	2/0		14.60	.548			15.05		15.05	22.50
	1930	3/0		12.50	.640			17.60		17.60	26.50
	1940	4/0		11	.727			20		20	30
	1950	250 MCM		10	.800			22		22	33
	1960	300 MCM		9.50	.842			23		23	35
	1970	350 MCM		9	.889			24.50		24.50	37
	1980	400 MCM		8.50	.941			26		26	39
	1990	500 MCM		8.10	.988			27		27	41
	2000	Interior fluorescent fixtures, incl. supports									
	2010	& whips, to 15' high									
	2100	Recessed drop-in 2' x 2', 2 lamp	2 Elec	35	.457	Ea.		12.55		12.55	18.90
	2120	2' x 4', 2 lamp		33	.485			13.35		13.35	20
	2140	2' x 4', 4 lamp		30	.533			14.65		14.65	22
	2160	4' x 4', 4 lamp		20	.800			22		22	33
	2180	Surface mount, acrylic lens & hinged frame									
	2200	1' x 4', 2 lamp	2 Elec	44	.364	Ea.		10		10	15.05
	2220	2' x 2', 2 lamp		44	.364			10		10	15.05
	2260	2' x 4', 4 lamp		33	.485			13.35		13.35	20
	2280	4' x 4', 4 lamp		23	.696			19.15		19.15	29
	2300	Strip fixtures, surface mount									
	2320	4' long, 1 lamp	2 Elec	53	.302	Ea.		8.30		8.30	12.50

See the Reference Section for reference number information, Crew Listings and City Cost Indexes

022 200 | Excav./Backfill/Compact.

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1994 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
258	3050	18" deep	B-54	750	.011	L.F.		.25	.25	.50	.65	258
	3100	24" deep		700	.011			.27	.27	.54	.70	
	3200	Compaction with vibratory plate, add								50%	50%	
	9100	For clay or till, add up to								150%	150%	
262	0010	**FILL** Spread dumped material, by dozer, no compaction	B-10B	1,000	.012	C.Y.		.27	.82	1.09	1.32	262
	0100	By hand	1 Clab	12	.667	"		12.65		12.65	20	
	0150	Spread fill, from stockpile with 2-1/2 C.Y. F.E. loader										
	0170	130 H.P. 300' haul	B-10P	600	.020	C.Y.		.45	1.31	1.76	2.14	
	0190	With dozer 300 H.P. 300' haul	B-10M	600	.020	"		.45	1.66	2.11	2.53	
	0400	For compaction of embankment, see div. 022-226										
	0500	Gravel fill, compacted, under floor slabs, 4" deep	B-37	10,000	.005	S.F.	.10	.10	.01	.21	.27	
	0600	6"deep		8,600	.006		.15	.11	.02	.28	.37	
	0700	9" deep		7,200	.007		.25	.13	.02	.40	.51	
	0800	12" deep		6,000	.008		.35	.16	.02	.53	.66	
	1000	Alternate pricing method, 4" deep		120	.400	C.Y.	7.50	8.05	1.13	16.68	22	
	1100	6" deep		160	.300		7.50	6	.85	14.35	18.70	
	1200	9" deep		200	.240		7.50	4.82	.68	13	16.60	
	1300	12" deep		220	.218		7.50	4.38	.62	12.50	15.85	
	1500	For fill under exterior paving, see division 022-308										
266	0011	**HAULING** Excavated or borrow material, highway haulers (R022-240)										266
	0012	*bank measure, no loading included*										
	0020	6 C.Y. dump truck, 1/4 mile round trip, 5.0 loads/hr.	B-34A	240	.033	C.Y.		.66	1.35	2.01	2.50	
	0030	1/2 mile round trip, 4.1 loads/hr.		197	.041			.80	1.65	2.45	3.04	
	0040	1 mile round trip, 3.3 loads/hr.		160	.050			.99	2.03	3.02	3.75	
	0100	2 mile round trip, 2.6 loads/hr.		125	.064			1.26	2.60	3.86	4.80	
	0150	3 mile round trip, 2.1 loads/hr.		100	.080			1.58	3.25	4.83	6	
	0200	4 mile round trip, 1.8 loads/hr.		85	.094			1.85	3.82	5.67	7.05	
*	0310	12 C.Y. dump truck, 1/4 mile round trip 3.7 loads/hr.	B-34B	356	.022			.44	1.12	1.56	1.91	
	0320	1/2 mile round trip, 3.2 loads/hr.		308	.026			.51	1.29	1.80	2.21	
	0330	1 mile round trip 2.7 loads/hr.		260	.031			.61	1.53	2.14	2.62	
	0400	2 mile round trip, 2.2 loads/hr.		210	.038			.75	1.90	2.65	3.25	
	0450	3 mile round trip, 1.9 loads/hr.		180	.044			.88	2.21	3.09	3.79	
	0500	4 mile round trip, 1.6 loads/hr.		150	.053			1.05	2.66	3.71	4.54	
	0540	5 mile round trip, 1 load/hr.		98	.082			1.61	4.07	5.68	6.95	
	0550	10 mile round trip, 0.75 load/hr.		49	.163			3.22	8.15	11.37	13.90	
	0560	20 mile round trip, 0.5 load/hr.		32	.250			4.93	12.45	17.38	21.50	
	0600	16.5 C.Y. dump trailer, 1 mile round trip, 2.6 loads/hr.	B-34C	340	.024			.46	1.45	1.91	2.31	
	0700	2 mile round trip, 2.1 loads/hr.		275	.029			.57	1.79	2.36	2.85	
	1000	3 mile round trip, 1.8 loads/hr.		235	.034			.67	2.10	2.77	3.34	
	1100	4 mile round trip, 1.6 loads/hr.		210	.038			.75	2.35	3.10	3.75	
	1110	5 mile round trip, 1 load/hr.		132	.061			1.19	3.74	4.93	5.95	
	1120	10 mile round trip, .75 load/hr.		100	.080			1.58	4.94	6.52	7.90	
	1130	20 mile round trip, .5 load/hr.		66	.121			2.39	7.50	9.89	11.95	
	1150	20 C.Y. dump trailer, 1 mile round trip, 2.5 loads/hr.	B-34D	400	.020			.39	1.24	1.63	1.97	
	1200	2 mile round trip, 2 loads/hr.		320	.025			.49	1.55	2.04	2.46	
	1220	3 mile round trip, 1.7 loads/hr.		270	.030			.58	1.83	2.41	2.92	
	1240	4 mile round trip, 1.5 loads/hr.		240	.033			.66	2.06	2.72	3.28	
	1245	5 mile round trip, 1.1 load/hr.		172	.047			.92	2.88	3.80	4.57	
	1250	10 mile round trip, .85 load/hr.		136	.059			1.16	3.64	4.80	5.80	
	1255	20 mile round trip, .6 load/hr.		96	.083			1.64	5.15	6.79	8.20	
	1300	Hauling in medium traffic, add								20%	20%	
	1400	Heavy traffic, add								30%	30%	
	1600	Grading at dump, or embankment if required, by dozer	B-10B	1,000	.012			.27	.82	1.09	1.32	
	1800	Spotter at fill or cut, if required	1 Clab	8	1	Hr.		19		19	30	
	2000	Off highway haulers										



029 300 | Lawns & Grasses

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1994 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
308	0200	Hydro or air seeding, with mulch & fertil.	B-81	80	.300	M.S.F.	25.50	6.30	6.90	38.70	45.50	308
	0400	Birdsfoot trefoil, .45#/M.S.F., push spreader	A-1	10	.800		13.95	15.20	5.85	35	46	
	0500	Tractor spreader	B-66	52	.154		13.95	3.60	3.51	21.06	24.50	
	0600	Hydro or air seeding,with mulch & fertil.	B-81	80	.300		28.50	6.30	6.90	41.70	49	
	0800	Bluegrass, 4#/M.S.F., common, push spreader	A-1	10	.800		5.05	15.20	5.85	26.10	36	
	0900	Tractor spreader	B-66	52	.154		5.05	3.60	3.51	12.16	14.90	
	1000	Hydro or air seeding, with mulch & fertil.	B-81	80	.300		19.15	6.30	6.90	32.35	38.50	
	1100	Baron, push spreader	A-1	10	.800		10.60	15.20	5.85	31.65	42	
	1200	Tractor spreader	B-66	52	.154		10.60	3.60	3.51	17.71	21	
	1300	Hydro or air seeding, with mulch & fertil.	B-81	80	.300		25.50	6.30	6.90	38.70	45.50	
	1500	Clover, 0.67#/M.S.F., white, push spreader	A-1	10	.800		2.50	15.20	5.85	23.55	33	
	1600	Tractor spreader	B-66	52	.154		2.50	3.60	3.51	9.61	12.10	
	1700	Hydro or air seeding, with mulch and fertil.	B-81	80	.300		16.65	6.30	6.90	29.85	35.50	
	1800	Ladino, push spreader	A-1	10	.800		4.23	15.20	5.85	25.28	35	
	1900	Tractor spreader	B-66	52	.154		4.23	3.60	3.51	11.34	14	
	2000	Hydro or air seeding, with mulch and fertil.	B-81	80	.300		18.20	6.30	6.90	31.40	37.50	
	2200	Fescue 5.5#/M.S.F., tall, push spreader	A-1	10	.800		7.35	15.20	5.85	28.40	38.50	
	2300	Tractor spreader	B-66	52	.154		7.35	3.60	3.51	14.46	17.40	
	2400	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		22.50	6.30	6.90	35.70	42	
	2500	Chewing, push spreader	A-1	10	.800		8.55	15.20	5.85	29.60	40	
	2600	Tractor spreader	B-66	52	.154		8.55	3.60	3.51	15.66	18.75	
	2700	Hydro or air seeding, with mulch and fertil.	B-81	80	.300		23.50	6.30	6.90	36.70	43	
	2900	Crown vetch, 4#/M.S.F., push spreader	A-1	10	.800		38.50	15.20	5.85	59.55	73	
	3000	Tractor spreader	B-66	52	.154		38.50	3.60	3.51	45.61	52	
	3100	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		53	6.30	6.90	66.20	75.50	
	3300	Rye, 10#/M.S.F., annual, push spreader	A-1	10	.800		4.83	15.20	5.85	25.88	35.50	
	3400	Tractor spreader	B-66	52	.154		4.83	3.60	3.51	11.94	14.65	
	3500	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		18.25	6.30	6.90	31.45	37.50	
	3600	Fine textured, push spreader	A-1	10	.800		13.95	15.20	5.85	35	46	
	3700	Tractor spreader	B-66	52	.154		13.95	3.60	3.51	21.06	24.50	
	3800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		28.50	6.30	6.90	41.70	49	
	4000	Shade mix, 6#/M.S.F., push spreader	A-1	10	.800		10.30	15.20	5.85	31.35	42	
	4100	Tractor spreader	B-66	52	.154		10.30	3.60	3.51	17.41	20.50	
	4200	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		25.50	6.30	6.90	38.70	45.50	
	4400	Slope mix, 6#/M.S.F., push spreader	A-1	10	.800		8.65	15.20	5.85	29.70	40	
	4500	Tractor spreader	B-66	52	.154		8.65	3.60	3.51	15.76	18.85	
	4600	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		23.50	6.30	6.90	36.70	43	
	4800	Turf mix, 4#/M.S.F., push spreader	A-1	10	.800		8.50	15.20	5.85	29.55	39.50	
	4900	Tractor spreader	B-66	52	.154		8.50	3.60	3.51	15.61	18.65	
	5000	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		23.50	6.30	6.90	36.70	43	
	5200	Utility mix, 7#/M.S.F., push spreader	A-1	10	.800		10.45	15.20	5.85	31.50	42	
	5300	Tractor spreader	B-66	52	.154		10.50	3.60	3.51	17.61	21	
	5400	Hydro or air seeidng, with mulch and fertilizer	B-81	80	.300		25.50	6.30	6.90	38.70	45.50	
	5600	Wildflower, .10#/M.S.F., push spreader	A-1	10	.800		4.29	15.20	5.85	25.34	35	
	5700	Tractor spreader	B-66	52	.154		4.29	3.60	3.51	11.40	14.10	
	5800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		18.25	6.30	6.90	31.45	37.50	
	7000	Apply fertilizer, 800 lb./acre	B-64	5.60	2.857	Ton	213	55	45.50	313.50	370	
	7050	Apply limestone, 800 lb./acre	"	5.60	2.857	"	58	55	45.50	158.50	199	
	7100	Apply mulch, see div. 029-516										
316	0010	SODDING, 1" deep, bluegrass sod, on level ground, over 8 M.S.F.	B-63	8	5	M.S.F.	155	99.50	12	266.50	340	316
	0200	4 M.S.F.		7	5.714		164	114	13.70	291.70	375	
	0300	1000 S.F.		6	6.667		180	133	16	329	425	
	0500	Sloped ground, over 8 M.S.F.		6	6.667		164	133	16	313	405	
	0600	4 M.S.F.		5	8		175	159	19.20	353.20	465	
	0700	1000 S.F.		4	10		189	199	24	412	550	

Installing Contractor's Overhead & Profit

Below are the **average** installing contractor's percentage mark-ups applied to base labor rates to arrive at typical billing rates.

Column A: Labor rates are based on union wages averaged for 30 major U.S. cities. Base rates including fringe benefits are listed hourly and daily. These figures are the sum of the wage rate and employer-paid fringe benefits such as vacation pay, employer-paid health and welfare costs, pension costs, plus appropriate training and industry advancement funds costs.

Column B: Workers' Compensation rates are the national average of state rates established for each trade.

Column C: Column C lists average fixed overhead figures for all trades. Included are Federal and State Unemployment costs set at 7.3%; Social Security Taxes (FICA) set at 7.65%; Builder's Risk Insurance costs set at 0.34%; and Public Liability costs set at 1.55%. All the percentages except those for Social Security Taxes vary from state to state as well as from company to company.

Columns D and E: Percentages in Columns D and E are based on the presumption that the installing contractor has annual billing of $500,000 and up. Overhead percentages may increase with smaller annual billing. The overhead percentages for any given contractor may vary greatly and depend on a number of factors, such as the contractor's annual volume, engineering and logistical support costs, and staff requirements. The figures for overhead and profit will also vary depending on the type of job, the job location, and the prevailing economic conditions. All factors should be examined very carefully for each job.

Column F: Column F lists the total of Columns B, C, D, and E.

Column G: Column G is Column A (hourly base labor rate) multiplied by the percentage in Column F (O&P percentage).

Column H: Column H is the total of Column A (hourly base labor rate) plus Column G (Total O&P).

Column I: Column I is Column H multiplied by eight hours.

		A		B	C	D	E	F	G	H	I
		Base Rate Incl. Fringes		Work-ers' Comp. Ins.	Average Fixed Over-head	Over-head	Profit	Total Overhead & Profit		Rate with O & P	
Abbr.	Trade	Hourly	Daily					%	Amount	Hourly	Daily
Skwk	Skilled Workers Average (35 trades)	$24.65	$197.20	19.0%	16.8%	13.0%	10.0%	58.8%	$14.50	$39.15	$313.20
	Helpers Average (5 trades)	18.60	148.80	20.0		11.0		57.8	10.75	29.35	234.80
	Foreman Average, Inside ($.50 over trade)	25.15	201.20	19.0		13.0		58.8	14.75	39.90	319.20
	Foreman Average, Outside ($2.00 over trade)	26.65	213.20	19.0		13.0		58.8	15.65	42.30	338.40
Clab	Common Building Laborers	19.00	152.00	20.6		11.0		58.4	11.10	30.10	240.80
Asbe	Asbestos Workers	26.90	215.20	18.1		16.0		60.9	16.40	43.30	346.40
Boil	Boilermakers	28.05	224.40	11.3		16.0		54.1	15.20	43.25	346.00
Bric	Bricklayers	24.55	196.40	18.2		11.0		56.0	13.75	38.30	306.40
Brhe	Bricklayer Helpers	19.50	156.00	18.2		11.0		56.0	10.90	30.40	243.20
Carp	Carpenters	23.80	190.40	20.6		11.0		58.4	13.90	37.70	301.60
Cefi	Cement Finishers	23.25	186.00	12.0		11.0		49.8	11.60	34.85	278.80
Elec	Electricians	27.50	220.00	7.6		16.0		50.4	13.85	41.35	330.80
Elev	Elevator Constructors	28.15	225.20	9.0		16.0		51.8	14.60	42.75	342.00
Eqhv	Equipment Operators, Crane or Shovel	25.40	203.20	12.6		14.0		53.4	13.55	38.95	311.60
Eqmd	Equipment Operators, Medium Equipment	24.35	194.80	12.6		14.0		53.4	13.00	37.35	298.80
Eqlt	Equipment Operators, Light Equipment	23.40	187.20	12.6		14.0		53.4	12.50	35.90	287.20
Eqol	Equipment Operators, Oilers	20.75	166.00	12.6		14.0		53.4	11.10	31.85	254.80
Eqmm	Equipment Operators, Master Mechanics	25.95	207.60	12.6		14.0		53.4	13.85	39.80	318.40
Glaz	Glaziers	23.80	190.40	15.4		11.0		53.2	12.65	36.45	291.60
Lath	Lathers	23.70	189.60	13.3		11.0		51.1	12.10	35.80	286.40
Marb	Marble Setters	24.65	197.20	18.2		11.0		56.0	13.80	38.45	307.60
Mill	Millwrights	25.10	200.80	12.6		11.0		50.4	12.65	37.75	302.00
Mstz	Mosaic and Terrazzo Workers	24.20	193.60	10.4		11.0		48.2	11.65	35.85	286.80
Pord	Painters, Ordinary	22.20	177.60	15.8		11.0		53.6	11.90	34.10	272.80
Psst	Painters, Structural Steel	23.10	184.80	60.9		11.0		98.7	22.80	45.90	367.20
Pape	Paper Hangers	22.40	179.20	15.8		11.0		53.6	12.00	34.40	275.20
Pile	Pile Drivers	23.95	191.60	31.5		16.0		74.3	17.80	41.75	334.00
Plas	Plasterers	23.30	186.40	16.6		11.0		54.4	12.70	36.00	288.00
Plah	Plasterer Helpers	19.75	158.00	16.6		11.0		54.4	10.75	30.50	244.00
Plum	Plumbers	28.30	226.40	9.6		16.0		52.4	14.85	43.15	345.20
Rodm	Rodmen (Reinforcing)	26.40	211.20	36.2		14.0		77.0	20.35	46.75	374.00
Rofc	Roofers, Composition	21.55	172.40	34.2		11.0		72.0	15.50	37.05	296.40
Rots	Roofers, Tile and Slate	21.60	172.80	34.2		11.0		72.0	15.55	37.15	297.20
Rohe	Roofer Helpers (Composition)	15.35	122.80	34.2		11.0		72.0	11.05	26.40	211.20
Shee	Sheet Metal Workers	27.35	218.80	13.2		16.0		56.0	15.30	42.65	341.20
Spri	Sprinkler Installers	30.35	242.80	9.9		16.0		52.7	16.00	46.35	370.80
Stpi	Steamfitters or Pipefitters	28.30	226.40	9.6		16.0		52.4	14.85	43.15	345.20
Ston	Stone Masons	24.70	197.60	18.2		11.0		56.0	13.85	38.55	308.40
Sswk	Structural Steel Workers	26.50	212.00	42.7		14.0		83.5	22.15	48.65	389.20
Tilf	Tile Layers (Floor)	24.00	192.00	10.4		11.0		48.2	11.55	35.55	284.40
Tilh	Tile Layer Helpers	19.25	154.00	10.4		11.0		48.2	9.30	28.55	228.40
Trlt	Truck Drivers, Light	19.40	155.20	16.3		11.0		54.1	10.50	29.90	239.20
Trhv	Truck Drivers, Heavy	19.70	157.60	16.3		11.0		54.1	10.65	30.35	242.80
Sswl	Welders, Structural Steel	26.50	212.00	42.7		14.0		83.5	22.15	48.65	389.20
Wrck	*Wrecking	19.00	152.00	42.5		11.0		80.3	15.25	34.25	274.00

*Not included in Averages.

Native Shrub Costs

Supplier	#1 Cans	Bare Root
Porter Lane Nursery Tim Sullivan 298-2613	$2.75 ea	Not available
Progressive Plants Sherry 942-7333	$3.00	Not available
Lone Peak State Forest Nursery Scott 571-0900	$0.45	$0.30

E X C A V A T I N G

CRAWLER MOUNTED HYDRAULIC EXCAVATORS

(Bucket included in rate.)

Model (Yr.Disc.)	Bucket Capacity	Operating Weight	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Diesel Powered, Continued								
CASE								
125B (1992)	1.630 CY	24.8 MT	134.0	$ 5,730.00	$ 1,605.00	$ 400.00	$ 60.00	$ 15.05
170B (1989)	1.000 CY	31.4 MT	212.0	5,565.00	1,560.00	390.00	59.00	18.65
170C (1992)	1.620 CY	32.8 MT	201.0	6,820.00	1,910.00	480.00	72.00	19.05
220B (1992)	2.000 CY	43.3 MT	238.0	10,090.00	2,825.00	705.00	105.00	25.15
688 (1992)	.620 CY	13.4 MT	86.7	3,975.00	1,115.00	280.00	42.00	8.90
880D (1989)	.480 CY	13.7 MT	114.0	3,725.00	1,045.00	260.00	39.00	9.90
888 (1992)	.750 CY	16.2 MT	128.0	4,685.00	1,310.00	330.00	50.00	11.65
1080B (1989)	1.000 CY	20.0 MT	153.0	4,195.00	1,175.00	295.00	44.00	13.90
1088 (1992)	.950 CY	20.5 MT	128.0	4,735.00	1,325.00	330.00	50.00	13.25
9010	.500 CY	12.1 MT	87.0	4,440.00	1,245.00	310.00	47.00	9.20
9020	.640 CY	15.4 MT	130.0	4,890.00	1,370.00	345.00	52.00	11.65
9030	1.120 CY	19.7 MT	103.0	5,090.00	1,425.00	355.00	53.00	12.35
9040	1.160 CY	24.1 MT	166.0	6,745.00	1,890.00	475.00	71.00	17.20
9050	1.200 CY	31.2 MT	223.0	7,975.00	2,235.00	560.00	84.00	20.80
9060	1.850 CY	43.8 MT	276.0	12,725.00	3,565.00	890.00	135.00	28.95
CK62 (1992)	5.980 CY	6.2 MT	59.0	2,715.00	760.00	190.00	29.00	6.05
CATERPILLAR								
205 LC (1991)	.680 CY	12.9 MT	71.0	4,050.00	1,135.00	285.00	43.00	8.50
211 LC (1991)	.680 CY	15.2 MT	94.0	5,055.00	1,415.00	355.00	53.00	10.70
213 LC (1989)	.320 CY	17.3 MT	102.0	5,185.00	1,450.00	365.00	55.00	11.50
213B LC (1991)	.910 CY	18.1 MT	110.0	6,015.00	1,685.00	420.00	63.00	12.35
215B LC (1988)	1.000 CY	18.0 MT	105.0	5,545.00	1,555.00	390.00	59.00	12.10
215B SA (1988)	1.000 CY	18.3 MT	105.0	6,015.00	1,685.00	420.00	63.00	12.35
215C LC (1990)	1.000 CY	20.0 MT	115.0	5,435.00	1,520.00	380.00	57.00	13.55
215D LC (1992)	.500 CY	20.1 MT	125.0	6,050.00	1,695.00	425.00	64.00	14.45
219 (1989)	1.000 CY	21.6 MT	130.0	5,760.00	1,615.00	405.00	61.00	14.75
219 LC (1989)	1.000 CY	22.5 MT	130.0	5,955.00	1,670.00	420.00	63.00	14.95
219D (1992)	.500 CY	21.7 MT	140.0	6,495.00	1,820.00	455.00	68.00	15.55
219D LC (1992)	.500 CY	22.6 MT	140.0	6,740.00	1,885.00	470.00	71.00	15.80
225B (1989)	.750 CY	24.2 MT	145.0	6,840.00	1,915.00	480.00	72.00	17.00
225B LC (1989)	.750 CY	26.8 MT	145.0	7,060.00	1,975.00	495.00	74.00	17.25
225D (1991)	1.250 CY	25.8 MT	165.0	7,670.00	2,150.00	540.00	81.00	18.25
225D LC (1992)	1.250 CY	26.6 MT	165.0	8,010.00	2,245.00	560.00	84.00	18.45
229 (1989)	1.500 CY	31.5 MT	180.0	8,050.00	2,255.00	565.00	85.00	19.95
231D	2.000 CY	35.2 MT	200.0	9,745.00	2,730.00	685.00	105.00	21.80
231D LC	1.750 CY	35.4 MT	200.0	9,995.00	2,800.00	700.00	105.00	22.05
235B (1988)	1.500 CY	40.7 MT	215.0	11,795.00	3,305.00	825.00	125.00	26.50
235C (1992)	2.000 CY	44.0 MT	250.0	13,495.00	3,780.00	945.00	140.00	28.80
* 235D	2.130 CY	47.0 MT	250.0	13,860.00	3,880.00	970.00	145.00	28.95
235D LC	2.130 CY	49.2 MT	250.0	14,065.00	3,940.00	985.00	150.00	29.15
E240C	1.250 CY	22.9 MT	148.0	6,635.00	1,860.00	465.00	70.00	15.80

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TRUCKS

ON-HIGHWAY REAR DUMPS

(Highway type rear dump equipment presents a broad variance in list price for similar load rated capacities. Engine, axle, and transmission combinations can significantly vary the rate. Costs listed here reflect an average purchase price and are presented only for comparative purposes.)

Axle Config.	Maximum GVW	Struck Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr
Gasoline Powered								
4X2	20,000 lbs	4 CY	210.0	$ 1,045.00	$ 295.00	$ 74.00	$ 11.00	$ 12.65
4X2	25,000 lbs	5–6 CY	210.0	1,070.00	300.00	75.00	11.00	12.70
Diesel Powered								
4X2	20,000 lbs	4 CY	170.0	1,210.00	340.00	85.00	13.00	7.50
4X2	25,000 lbs	5–6 CY	180.0	1,155.00	325.00	81.00	12.00	7.70
4X2	30,000 lbs	7–8 CY	210.0	1,200.00	335.00	84.00	13.00	9.00
4X4	30,000 lbs	7–8 CY	170.0	1,975.00	555.00	140.00	21.00	9.15
6X4	40,000 lbs	8–10 CY	235.0	2,390.00	670.00	170.00	26.00	12.55
6X4	50,000 lbs	10–12 CY	255.0	2,390.00	670.00	170.00	26.00	13.10
6X4	70,000 lbs	12–18 CY	325.0	3,745.00	1,050.00	265.00	40.00	17.90

MECHANICAL DRIVE REAR DUMPS

Model (Yr.Disc.)	Rated Payload	Body Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr
Diesel Powered								
CATERPILLAR								
* 769C	31.8 MT	22.8–30.7 CY	450.0	$ 8,790.00	$ 2,460.00	$ 615.00	$ 92.00	$ 28.20
773B	45.4 MT	34.0–44.6 CY	650.0	11,460.00	3,210.00	805.00	120.00	37.40
777B	77.1 MT	47.5–67.1 CY	870.0	16,110.00	4,510.00	1,130.00	170.00	51.75
DRESSER								
140M	31.7 MT	21.4–30.0 CY	485.0	9,080.00	2,540.00	635.00	95.00	29.95
140M DRY DISC BRAKE	31.7 MT	21.4-30.0 CY	485.0	8,720.00	2,440.00	610.00	92.00	29.10
210M	49.9 MT	31.1–44.0 CY	675.0	11,715.00	3,280.00	820.00	125.00	38.80
325M (1991)	77.1 MT	47.3–67.1 CY	876.0	15,620.00	4,375.00	1,095.00	165.00	52.40
330M	86.2 MT	47.1–69.3 CY	925.0	15,935.00	4,460.00	1,115.00	165.00	53.15
385M (1989)	90.7 MT	47.8–76.6 CY	982.0	17,450.00	4,885.00	1,220.00	185.00	60.70
510M (1989)	120.7 MT	71.0–100.0 CY	1,279.0	23,695.00	6,635.00	1,660.00	250.00	80.35

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STANDARD CRAWLER DOZERS

(Includes dozer and ROPS.)

Model (Yr.Disc.)	Dozer	Transmission	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Diesel Powered, Continued								
CATERPILLAR, Continued								
D7H (1990)	Straight	Powershift	215.0	$ 8,005.00	$ 2,240.00	$ 560.00	$ 84.00	$ 19.85
D7H (1990)	U Blade	Powershift	215.0	7,930.00	2,220.00	555.00	83.00	19.75
D7H DS (1990)	Angle	Powershift	215.0	8,185.00	2,290.00	575.00	86.00	20.05
D7H DS (1990)	Semi-U	Powershift	215.0	8,290.00	2,320.00	580.00	87.00	20.15
D7H DS (1990)	Straight	Powershift	215.0	8,255.00	2,310.00	580.00	87.00	20.10
D7H DS (1990)	U Blade	Powershift	215.0	8,175.00	2,290.00	575.00	86.00	20.00
D7H DS SERIES II	Angle	Powershift	215.0	9,205.00	2,575.00	645.00	97.00	20.70
D7H DS SERIES II	Semi-U	Powershift	215.0	9,305.00	2,605.00	650.00	98.00	20.80
D7H DS SERIES II	Straight	Powershift	215.0	9,275.00	2,595.00	650.00	98.00	20.75
D7H DS SERIES II	U Blade	Powershift	215.0	9,355.00	2,620.00	655.00	98.00	20.85
D7H SERIES II	Angle	Powershift	215.0	8,925.00	2,500.00	625.00	94.00	20.40
D7H SERIES II	Semi-U	Powershift	215.0	9,030.00	2,530.00	635.00	95.00	20.50
D7H SERIES II	Straight	Powershift	215.0	8,995.00	2,520.00	630.00	95.00	20.45
D7H SERIES II	U Blade	Powershift	215.0	9,075.00	2,540.00	635.00	95.00	20.55
D8L (1992)	Angle	Powershift	335.0	11,985.00	3,355.00	840.00	125.00	30.10
D8L (1992)	Semi-U	Powershift	335.0	12,000.00	3,360.00	840.00	125.00	30.15
D8N	Angle	Powershift	285.0	10,835.00	3,035.00	760.00	115.00	26.90
* D8N	Semi-U	Powershift	285.0	10,875.00	3,045.00	760.00	115.00	26.95
D8N	U Blade	Powershift	285.0	10,955.00	3,065.00	765.00	115.00	27.10
D9N	Semi-U	Powershift	370.0	12,335.00	3,455.00	865.00	130.00	36.00
D9N	U Blade	Powershift	370.0	12,435.00	3,480.00	870.00	130.00	36.20
D10N	Semi-U	Powershift	520.0	16,475.00	4,615.00	1,155.00	175.00	48.25
D10N	Semi-U Abrasion Bld	Powershift	520.0	16,570.00	4,640.00	1,160.00	175.00	48.45
D10N	U Blade	Powershift	520.0	16,520.00	4,625.00	1,155.00	175.00	48.35
D11N	Semi-U	Powershift	770.0	27,270.00	7,635.00	1,910.00	285.00	73.85
D11N	Semi-U Abrasion Bld	Powershift	770.0	27,435.00	7,680.00	1,920.00	290.00	74.15
D11N	U Blade	Powershift	770.0	27,495.00	7,700.00	1,925.00	290.00	74.30
DEERE								
400G	Power Angle Tilt	Hi-Lo Reverse	60.0	2,265.00	635.00	160.00	24.00	7.10
450G	6405 Inside Hyd	Powershift	70.0	2,495.00	700.00	175.00	26.00	7.75
450G	6405 Inside Hyd	Powershift	70.0	2,435.00	680.00	170.00	26.00	7.70
550G	6405 Inside Hyd	Powershift	80.0	2,885.00	810.00	205.00	31.00	8.55
550G	Hydraulic	Powershift	80.0	2,820.00	790.00	200.00	30.00	8.45
650G	6405 Inside Hyd	Powershift	90.0	3,110.00	870.00	220.00	33.00	9.20
750B	6505 All Hyd	Hydrostatic	120.0	4,455.00	1,245.00	310.00	47.00	11.85
750B	6520 Hyd Angle Tilt	Hydrostatic	120.0	4,315.00	1,210.00	305.00	46.00	11.70
750B	6525 Straight w/Tilt	Hydrostatic	120.0	4,285.00	1,200.00	300.00	45.00	11.65
750B	Angle w/Manual Tilt	Hydrostatic	120.0	4,330.00	1,210.00	305.00	46.00	11.70
750B LT	All Hydraulic	Hydrostatic	140.0	4,920.00	1,380.00	345.00	52.00	13.15
750B LT	Angle	Hydrostatic	140.0	4,750.00	1,330.00	335.00	50.00	12.95
750B LT	Straight	Hydrostatic	140.0	4,675.00	1,310.00	330.00	50.00	12.90
850B	6540 Hyd Angle Tilt	Hydrostatic	165.0	5,360.00	1,500.00	375.00	56.00	14.60
850B	6545 Hydraulic Tilt	Hydrostatic	165.0	5,285.00	1,480.00	370.00	56.00	14.50
850B LT	Angle	Hydrostatic	165.0	5,745.00	1,610.00	405.00	61.00	15.05
850B LT	Straight	Hydrostatic	165.0	5,670.00	1,590.00	400.00	60.00	14.95

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TRUCKS

OFF-HIGHWAY WATER TANKER TRUCKS

Tank Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr
Diesel Powered						
5,000 gal	175.0	$ 5,250.00	$ 1,475.00	$ 370.00	$ 56.00	$ 20.05
6,000 gal	330.0	9,540.00	2,670.00	670.00	100.00	37.05
7,000 gal	330.0	9,570.00	2,680.00	670.00	100.00	37.10
8,000 gal	450.0	14,685.00	4,110.00	1,030.00	155.00	54.50
10,000 gal	450.0	14,775.00	4,135.00	1,035.00	155.00	54.70
12,000 gal	550.0	19,210.00	5,380.00	1,345.00	200.00	69.80
14,000 gal	550.0	19,265.00	5,395.00	1,350.00	205.00	69.90

ON-HIGHWAY LIGHT DUTY TRUCKS

Cab Type	Axle Config.	Ton Rating	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr
Gasoline Powered								
Conventional	4X2	1/2	130.0	$ 455.00	$ 125.00	$ 31.00	$ 5.00	$ 4.75
Crew	4X2	1/2	130.0	520.00	145.00	36.00	5.00	4.95
Conventional	4X4	1/2	130.0	570.00	160.00	40.00	6.00	5.10
Crew	4X4	1/2	130.0	610.00	170.00	43.00	6.00	5.25
Conventional	4X2	3/4	130.0	555.00	155.00	39.00	6.00	5.05
Crew	4X2	3/4	130.0	580.00	160.00	40.00	6.00	5.15
Conventional	4X4	3/4	130.0	620.00	175.00	44.00	7.00	5.25
Crew	4X4	3/4	180.0	650.00	180.00	45.00	7.00	6.55
Conventional	4X2	1	180.0	595.00	165.00	41.00	6.00	6.40
Crew	4X2	1	180.0	635.00	180.00	45.00	7.00	6.50
Conventional	4X4	1	180.0	680.00	190.00	48.00	7.00	6.65
Crew	4X4	1	180.0	715.00	200.00	50.00	8.00	6.75
Diesel Powered								
Conventional	4X2	1/2	75.0	560.00	155.00	39.00	6.00	2.00
Conventional	4X4	1/2	130.0	675.00	190.00	48.00	7.00	2.80
Conventional	4X2	3/4	75.0	660.00	185.00	46.00	7.00	2.10
Crew	4X2	3/4	130.0	685.00	190.00	48.00	7.00	2.80
Conventional	4X4	3/4	130.0	725.00	205.00	51.00	8.00	2.85
Crew	4X4	3/4	130.0	755.00	210.00	53.00	8.00	2.90
Conventional	4X2	1	130.0	705.00	195.00	49.00	7.00	2.80
Crew	4X2	1	130.0	740.00	205.00	51.00	8.00	2.90

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