0003

jbr environmental consultants, inc.

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APR 27 1995
DIV OF OIL, GAS & MINING

April 26, 1995

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

Re: White Oak Mine Complex; Permit No. ACT/007/001; Application for Permit Change

Dear Mr. Haddock:

On behalf of White Oak Mining and Construction Co., Inc., the attached documents are being transmitted as an Application for Permit Change. It is intended to reduce the current bond amount by optimizing reclamation methods.

Enclosed are four pages of the MRP that have the "redline/strikeout" text revision, 19 pages of bond calculations (Appendix R3), and reference pages from Means, Blue Book, etc. Also included are the two DOGM "Application for Permit Change" forms. Note that the reclamation cost was calculated in 1995 dollars and has been escalated by an inflation factor of 2.01% for 1999 dollars.

I hereby certify that this submittal has been prepared by me or under my direct supervision, and that I am a duly registered professional engineer in the State of Utah. Information, data and conclusions contained within this submittal are to the best of my knowledge true and correct. Some data and conclusions contained herein have been taken directly from previous permit submittals as prepared by the applicant and are assumed correct. Such data and conclusions have been used at times in preparing conclusions for this submittal.

Sincerely,

Tim

Tim Thompson, P.E.

REGISTERED PROFESSIONAL ENGINEER
NO. 175440
RONALD T. THOMPSON
STATE OF UT

Ronald T. Thompson

cc/enc: Denise Dragoo
Steve Tanner
Mark Wayment

Form DOGM - C1 (Last Revised 6/93) File Folder # 3

APPLICATION FOR PERMIT CHANGE

Title of Change:
REDUCTION OF 1994 MRP RECLAMATION BOND
REF. MRP VOL. 1 OF 1

Permit Number: ACT /007 / 001
Mine: WHITE OAK MCC
Permittee: WHITE OAK

Description, include reason for change and timing required to implement:
OPTIMIZATION AND COST REDUCTION OF MRP BOND CALCULATIONS

☐ Yes	☒ No	1. Change in the size of the Permit Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	☒ No	2. Change in the size of the Disturbed Area? _____ acres ☐ increase ☐ decrease.
☐ Yes	☒ No	3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
☐ Yes	☒ No	4. Will permit change include operations in hydrologic basins other than currently approved?
☒ Yes	☐ No	5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes	☒ No	6. Does permit change require or include public notice publication?
☐ Yes	☒ No	7. Permit change as a result of a Violation? Violation #
☐ Yes	☒ No	8. Permit change as a result of a Division Order? D.O.#
☐ Yes	☒ No	9. Permit change as a result of other laws or regulations? Explain:
☐ Yes	☒ No	10. Does permit change require or include ownership, control, right-of-entry, or compliance information?
☐ Yes	☒ No	11. Does the permit change affect the surface landowner or change the post mining land use?
☐ Yes	☒ No	12. Does permit change require or include collection and reporting of any baseline information?
☐ Yes	☒ No	13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes	☒ No	14. Does permit change require or include soil removal, storage or placement?
☐ Yes	☒ No	15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
☐ Yes	☒ No	16. Does permit change require or include construction, modification, or removal of surface facilities?
☐ Yes	☒ No	17. Does permit change require or include water monitoring, sediment or drainage control measures?
☐ Yes	☒ No	18. Does permit change require or include certified designs, maps, or calculations?
☐ Yes	☒ No	19. Does permit change require or include underground design or mine sequence and timing?
☐ Yes	☒ No	20. Does permit change require or include subsidence control or monitoring?
☒ Yes	☐ No	21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan?
☐ Yes	☒ No	22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
☐ Yes	☒ No	23. Is this permit change coal exploration activity ☐ inside ☐ outside of the permit area?

☐ Attach 3 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

4-19-95

Signed - Name - Position - Date

Subscribed and sworn to before me this _____ day of _____, 19_____

NOTARY PUBLIC
Julie C. McKenzie
215 South State, #22th Flr
Salt Lake City, Utah 84111
My Commission Expires
June 22, 1997

My Commission Expires:
Attest: STATE OF UTAH
COUNTY OF

Received by Oil, Gas & Mining
RECEIVED
APR 27 1995
DIV OF OIL, GAS & MINING

ASSIGNED PERMIT CHANGE NUMBER

Form DOGM - C2 (Last Revised 6/93) File Folder # 3

Application for Permit Change
Detailed Schedule of Changes to the Permit

Title of Change:

REDUCTION OF 1994 MRP RECLAMATION BOND

REF. MRP VOL. 1 OF 1

Permit Number: ACT / 007 / 001

Mine: WHITE OAK MCC

Permittee: WHITE OAK

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	APPENDIX R3 RECLAMATION COST ESTIMATE
☐ ADD	☒ REPLACE	☐ REMOVE	RECLAMATION PLAN. PAGES R-3, 11, 36, 37
☐ ADD	☒ REPLACE	☐ REMOVE	TABLE R4 RECLAMATION COST SUMMARY
☐ ADD	☐ REPLACE	☐ REMOVE	
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Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

- Areas occupied by support facilities will not be reclaimed until the conclusion of mining activities.

- Prior to final reclamation, the Operator, land owner and other appropriate regulatory agencies will have reviewed the disturbed areas and agreed upon a mutually acceptable Reclamation Plan. This will allow land owner(s) and appropriate agencies the opportunity to review the Reclamation Plan. At some point in time, should the land owner(s) desire to change the postmining land use to be other than full reclamation, the alternate postmining land use, landowners written request, and their letter of understanding will be submitted for approval. Once that alternate postmining land use is approved, revised drawings and cross sections will be submitted for approval. Information related to current lease agreements obtained from land owners or surface managers is available at the offices of White Oak Mining & Construction Co., Inc.

In general, reclamation of the White Oak mining operation includes:

White Oak Loadout Facility

The removal of all surface facilities, concrete demolition to 18" below final grade, the restoration of the culverted stream emanating from the hills to the east of the facility, the regrading and shaping of the Loadout Facility, and the grading and recontouring of sedimentation ponds. Sediment Pond backfill material will consist of clean fill material which will be tested to ensure that only non acid-toxic materials are used.

White Oak Haul Road

Reclamation of the White Oak Haul Road includes the removal of the ashpalted roadway, culverts and concrete channel linings and the restoration (including reshaping and grading) of hillslopes between Eccles Canyon and the White Oak Complex. Reclamation will also include the removal of existing culverts and the restoration of natural drainage channels at 1) the bottom of the haul road at the junction with Eccles canyon and 2) at the "Big Fill".

White Oak Complex

The removal of all surface facilities, concrete demolition to 18" below final grade, the restoration of 1) the main channel (culverted) stream entering the fill area west of the facility near the power station and 2) the side channel entering the fill area from the north near the offices and shop facilities. In addition, reclamation will include the removal of the fill pad, regrading and shaping of all disturbed areas, and the grading and recontouring of Sedimentation Pond No. 004A. Sediment pond backfill material will consist of clean fill material which will be tested to ensure that only non acid-toxic materials are used.

Reclamation design details provided as part of this submittal indicate mine disturbance boundaries which will be honored during the reclamation phase of the mining operation.

HISTORICAL OVERVIEW

Surface facilities located within the Permit Area are generally divided into one of three time periods, those facilities constructed pre-law, those constructed post law but prior to topsoil requirements and those constructed post-law with topsoil requirements. The General Office Area, Utah No. 2 mine site and VALCAM Loadout Facility (now referred to as the Loadout Facility), the White Oak No. 1 and No. 2 mine

facilities with the exception of non-White Oak railroad lines and concrete foundations buried 18" below final grade, 2) the restoration of the land surface to a configuration which conforms as much as practical and/or possible to the undisturbed natural topography, 3) the installation of runoff control channels and/or erosion protection devices, and 4) the restoration and/or augmentation of vegetation. The following discussion identifies planned reclamation activities and concerns including demolition and cleanup, reclamation contouring, runoff conveyance control, and vegetation.

Demolition and Cleanup

All mining related structures located within disturbed areas will be demolished, salvaged or otherwise removed with the exception of concrete foundations buried 18" below final grade, all mine portals will be properly sealed, and the area cleaned up, regraded and restored to meet reclamation requirements as identified herein. All asphalt will either be hauled to a State approved disposal facility or reprocessed and donated to UDOT for use as a resource for State highways. Reclamation costs have been calculated based upon the assumption that all asphalt will be hauled to an appropriate disposal facility. The concrete will be scarified and crushed with heavy equipment and utilized to backfill the portals, used ~~as aggregate for lean concrete to backfill the portals~~ or placed as fill against the toe of the backslope in the first lift placed during reclamation. Specifics related to planned demolition and cleanup activities for each major category are hereafter described.

Disposal Facilities

Should a disposal facility be required during reclamation to aid in the demolition and cleanup phase, it will be designed using current prudent engineering practices and will meet the regulations set forth by the Division. The actual location for this type of facility (should it be needed) will be determined during reclamation so as to insure that the most advantageous location can be utilized. Location will take into account AOC concerns, stability of existing foundations and or abutments, weak zones and groundwater effects upon the facility. Such a facility will be approved by the Division prior the implementation.

Mine Openings

All mine openings will be sealed with block stoppings, and backfilled with ~~either lean concrete or~~ competent material, at a depth of not less than 25 feet inby (inside) the portal mouth, or original faceup or in the case of the White Oak No. 2 Manway, sufficient stable cover and outby (outside) from the stopping will be back filled to the surface. All portals at the Loadout Facility have caved tight near the 25 foot area, were considered dangerous, and were barricaded (backfilled) as per MSHA instruction. In addition to current backfilling, each opening will be recontoured at the time of reclamation to the approximate original contour as shown on the reclamation design drawings.

Roads

Any road not to be retained for postmining land use or is no longer needed for mining and reclamation operations will be immediately closed to public travel, whereafter all culverts will be removed and disturbed surfaces recontoured and revegetated as per this Reclamation Plan.

White Oak Loadout Facility. The existing paved road at the Loadout Facility connecting the highway with the railroad tracks by the coal stockout tube will be stripped of its oil surface and disposed of

4. All aspects of reclamation will be monitored according to the schedule previously discussed.
5. Road must remain during first year of reclamation to facilitate the removal of all surface facility and or the delivery of equipment and supplies required for reclamation.
6. Recontouring efforts will begin at the lower end of the White Oak Haul Road and proceed upgradient to allow for the importation of rock and fill material from the excavation of the White Oak Complex.
7. The construction of runoff control channels will proceed as reclamation of the road progresses upgradient.
8. Because of limited access once reclamation has been completed, the White Oak Haul Road will be revegetated in segments. Revegetation will follow localized resurfacing efforts.
9. Scalped or scraped White Oak Complex materials may require stockpiling for later use. Storage location options include the upper and/or lower pad areas. The potential VSM harvested during construction of the Whisky Creek Channel will be placed upon adjacent newly configured slopes or along the Haul Road.
10. Final regrading, recontouring and revegetation of access roadways may be delayed upon the completion of all other reclamation activities in order to provide continued access to the property should maintenance be required prior to bond release.

White Oak Loadout Facility

Surface reclamation of the Loadout Facility all occur with relative ease due to the general nature of the facility and property access. Reclamation activities will begin with the removal and salvage of all surface facility located on the site with the exception of two railroad lines not associated with the Loadout Facility and an access roadway to the railroad and concrete foundations buried 18" below final grade. During year 1 it is planned that all surface facility will be removed with the exception of those facility discussed. Sediment Ponds 001A, 002A and 003A will be removed during the final phases of recontouring whereafter alternative sediment control measures will be implemented according to best technology currently available at the time of reclamation. The sediment ponds will be removed as part of the recontouring effort since 1) the ponds are too high to receive reclaimed area surface runoff water, 2) natural runoff characteristics (including premining railroad culvert locations) will not allow for concentration of flows to existing sediment pond locations, and 3) if left, a significant area would require redisturbance upon final pond reclamation thereby destroying several years of vegetative growth.

As indicated as a footnote to Table R-3 there is a possibility that the Loadout Facility will be required as a holding or storage area for reclamation materials including such items as machinery or channel riprap. If requested by the reclamation contractor, restoration of the surface of the Loadout Facility area will be postponed until it is no longer needed. Surface drainage facility capable of diverting runoff waters away from disturbed areas as well as those required to capture and treat disturbed area waters will be maintained throughout this period. Recontouring of the Loadout Facility will be begin as soon as it is no longer needed for reclamation activities or storage.

General Office Area

No reclamation is planned for the General Office Area consistent with its planned post mining land use.

White Oak Haul Road

Reclamation of the White Oak Haul Road will begin during year 2. The road will remain open during year 1 to allow the removal of surface facility associated with the White Oak Complex. At the beginning of year 2 or 3, the culvert in Eccles Canyon will be removed thereby requiring future access to the White Oak Complex area via Boardinghouse Canyon. Reclamation of the road must begin at the bottom and work to the top because fill materials being used will be generated from fill currently at the mine site.

Timing and sequence of reclamation operations will be coincident with those occurring at the White Oak Complex as shown in Table R-3.

White Oak Complex

Surface reclamation of the White Oak Complex will begin in year 1 with the removal and salvage of all surface facility located on the site with the exception of concrete foundations buried 18" below final grand and the possible exception of the well located near the bottom of Sediment Pond 004A and associated power supply lines. The Reclamation Plan included herein will potentially use the well to supply water for an irrigation system to be installed along the White Oak Haul Road to aid in the re-establishment of vegetation. Water which could be used for revegetation purposes could include the well, water directly from Whisky Creek, or water found within Sediment Pond 004A (as long as the pond remains and as long as water quality is acceptable for irrigation purposes). Sediment Pond 004A will likely be removed during the initial phases of reclamation since it is located upon fill material to be used along the haul road as well as the White Oak Complex. Because the sediment pond must be removed in order to reclaim the mine site, a variance from Section 763.100 must be granted. Upon removal, the sedimentation pond site will be regraded and revegetated in accordance to this plan.

Reclamation to begin in year 2 will consist of the initial phases of fill removal and the construction of runoff control channels. It may be possible that excavation could proceed on both ends of the Whisky Creek reclamation channel simultaneously thereby expediting channel construction. At any rate, it is anticipated that existing culvert C-40-42 will remain in place until completion of all reclamation channel work whereafter the culvert will be removed and the area recontoured and revegetated. Because of limited construction seasons and the fact that removal of fill an proceed only as fast as fill can be utilized on the White Oak Haul Road, it is anticipated that channel construction and recontouring may require an approximate two to three year time period as shown in Table R-3.

At this point in time it is projected that backfilling efforts will initially be concentrated within the south western portions of the disturbed mine area including the topsoil stockpile, electrical power substation, and the upper mine portal pad areas (as well as along the White Oak Haul Road). As removal of the coal loadout pad proceeds, backfilling and regrading of the upper pad in the area of the mine shop and southeast storage yard will be completed if the areas are not needed for the storage of channel riprap or other reclamation materials. When recontoured, these areas will be revegetated and protected against erosion through the use of alternative erosion control devices in a timely manner subsequent to final grading. It is planned that all existing undisturbed area bypass ditches will remain in place as throughout the reclamation construction period. These ditches will help reduce the amount of surface runoff water which will traverse the area thereby reducing the potential for damage to newly reclaimed hillsides.

Regrading and recontouring of remaining access roads will be completed at the termination of reclamation and subsequent to a determination that revegetation and erosion control activities have been successful. The delay in reclamation of access roadways is necessary to prevent additional disturbance should additional work be required at the mine site prior to bond release.

RECLAMATION COSTS

Reclamation cost estimates have been developed for major tasks including the removal of buildings, the removal of facility, earthwork, and revegetation. A summary breakdown of estimated costs developed for each category is included within Table R-4. Methods used to determine costs are identified along with calculation details in Appendix R3.

1.01 DEMOLITION OF BUILDINGS

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

BUILDING DEMOLITION

Ref. Means Heavy Construction Cost Data 1995
Large projects, includes disposal (up to 20 miles), no salvage included.

020-604-0010	Steel	.21	$/cf
020-604-0050	Concrete	.29	$/cf
020-604-0080	Masonry	.23	$/cf
020-604-0100	Mixture, avg.	.23	$/cf

FLOOR, FOUNDATION & TUNNEL WALLS (Broken to 18" below existing grade)

Use Cat 235D Excavator @ 247.67 $/hr. (cost inc. operator & B170 hydraulic hammer)

PRODUCTIVITY - Ref Cat Performance Handbook - Hammer production pg. 4-98 (Ed. 24)
Concrete compressive strength - less than 20,000 psi
Key F - Massive formation
Productivity = 240 cy/hr / 8 hr/shift = 30 cy/hr
Efficiency = 30cy/hr x .5 = 15 cy/hr (or 410 sf/hr @ 1' thickness)
Cost/Unit = 247.67 $/hr / 410 sf/hr = 0.60 $/sf

CONCRETE DEMOLITION

Ref. Means Heavy Construction Cost Data 1995
020-554-2200 Reinforced Concrete - 283 $/cy

GRAND TOTAL (from Table 1) - $ 207,864

1.02 HAULAGE AND DISPOSAL OF CONSTRUCTION DEBRIS

Loads to Landfill = 119 *(from Table 2)*
Dump fee = 35 $/ton
Concrete and masonry to be buried in place to 18" below final grade
1 cy construction debris = 0.8 ton (*wood, insulation, corrugated siding,glass, tile etc.)*
Distance from White Oak to landfill = 70 miles
1 truck load = 16 cy (13 tons)
Truck load cost = 70 miles x 13 ton x .15 $/ton-mile = $137
Scrap iron and steel will be sent to the remelt facility for $0 salvage value and $0 transport cost.

Calculations:

Transport cost = 119 loads x 137 $/load = $16,300
Disposal cost = 119 loads x 16 cy/load x 0.8 ton/cy x 35 $/ton = $53,300

GRAND TOTAL DISPOSAL COST $69,600

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	$/sf	Foundatio Cost	Remarks	Total Cost ($)	Bldg. Desc.
S-1	Wellhouse	W	8	8	8	512	0.23	118	0.0	0			0	Grade over Foundati	118	Wellhouse
S-1A	Shed	W,M	25	10	8	2000	0.23	460	0.0	0			0	Grade over Foundati	460	Shed
S-1B	Shop	W,M	10	10	8	800	0.23	184	0.0	0			0	Grade over Foundati	184	Shop
S-2	Shop	W,M,Cf	60	50	12	36000	0.23	8280	0.0	3000	0.60		1800		10080	Shop
S-3	Substation	M	28	10	15	4200	0.21	882	0.0	0			0	Grade over Foundati	882	Substation
S-4	Bathhouse	Tr	55	30	7	11550	0.23	2657	0.0	0			0	No Foundation	2657	Bathhouse
S-5	Shop	M,Cf	100	40	14	56000	0.21	11760	0.0	4000	0.60		2400		14160	Shop
S-6	Shed	W	30	15	13	5850	0.23	1346	0.0	0			0	Grade over Foundati	1346	Shed
S-7	Shed	W	20	18	8	2880	0.23	662	0.0	0			0	Grade over Foundati	662	Shed
S-8	Tank	M		10	18	1414	0.23	325	0.0	0			0	Grade over Foundati	325	Tank
S-9	Scale House	Tr	16	12	7	1344	0.23	309	0.0	0			0	No Foundation	309	Scale Hous
S-10	Truck Dump	C,S	45	18	22	17820	0.23	4099	0.0	0				Struct incl's Foundn	4099	Truck Dum
S-11	Conveyor	S,C	400	6	4	9600	0.23	2208	8.9	0	283.00		2519		4727	Conveyor
S-12	Transfer	S,Cf	20	10	14	2800	0.23	644	0.0	200	0.60		100		744	Transfer
S-13	Firehouse	W	10	8	8	640	0.23	147	0.0	0			0	Grade over Foundati	147	Firehouse
S-14	Conveyor	S,C	160	10	4	6400	0.23	1472	3.4	0	283.00		962		2434	Conveyor
S-15	Crusher	S,Cf	55	30	30	49500	0.23	11385	1.5	0	283.00		425		11810	Crusher
S-16	Conveyor	S,C	230	8	4	7360	0.23	1693	4.5	0	283.00		1274		2966	Conveyor
S-17	Stacker Tub	S,Cf		15	110	5183	0.23	1192	5.2	0	283.00		1472		2664	Stacker Tub
S-18	Recl Tunnel	C	200	10	8	0		0	0.0	7200	0.60		4320		4320	Recl Tunnel
S-19	Conveyor	S,C	220	10	4	8800	0.23	2024	2.2	0	283.00		623		2647	Conveyor
S-20	Substation	M	36	18	15	9720	0.23	2236	0.0	0			0	Grade over Foundati	2236	Substation
S-21	Loadout	S,C	35	25	30	26250	0.23	6038	1.5	0	283.00		425		6462	Loadout
S-24	Shed	W	20	20	10	4000	0.23	920	0.0	0			0	Grade over Foundati	920	Shed
S-25	Treatmnt Plt	M,C	50	30	16	24000	0.29	6960	0.0	1500	0.60		900		7860	Treatmnt Pl
S-26	Wellhouse	W	10	10	8	800	0.23	184	0.0	0			0	Grade over Foundati	184	Wellhouse
S-27	Bathhouse	C,M	165	80	14	184800	0.29	53592	0.0	13200	0.60		7920		61512	Bathhouse
S-28	Shop	M	40	40	20	32000	0.23	7360	0.0	1600	0.60		960		8320	Shop
S-29	Garage	M	24	20	10	4800	0.23	1104	0.0	480	0.60		100		1204	Garage
S-30	Pumphouse	C	20	20	10	4000	0.29	1160	0.0	400	0.60		100		1260	Pumphouse
S-31	Washbay	M,Cf	30	20	13	7800	0.23	1794	0.0	600	0.60		100		1894	Washbay
S-32	Truck Bin	S	18	18	25	8100	0.23	1863	0.7	0	283.00		190		2053	Truck Bin
S-32	Conveyor	S,C	95	7	4	2660	0.23	612	2.2	0	283.00		623		1234	Conveyor
S-33	Loadout	M,Cf	24	20	20	9600	0.23	2208	0.0	480	0.60		288		2496	Loadout
S-34	Substation	M	16	14	15	3360	0.23	773	0.0	0			0	Grade over Foundati	773	Substation
S-35	Conveyor	S,C	500	14	4	28000	0.23	6440	7.1	0	283.00		2009		8449	Conveyor
S-36	Stacker	S		15	80	3770	0.23	867	5.2	0	283.00		1472		2339	Stacker
S-37	Recl Tunnel	C	280	18	8	0		0	0.0	14560	0.60		8736		8736	Recl Tunnel
S-38	HAC	S	100	7	4	2800	0.23	644	1.1	0	283.00		311		955	HAC
S-39	Conveyor	S,C	70	7	4	1960	0.23	451	1.1	0	283.00		311		762	Conveyor
S-40	Transfer	S,C	25	25	20	12500	0.23	2875	0.0	625	0.60		100		2975	Transfer
S-41	Belina 1 Fan	M,C	65	25	10	16250	0.23	3803	0.0	1625	0.60		975		4778	Belina 1 Fa
S-42	Belina 2 Fan	M,C	50	25	10	12500	0.23	2875	0.0	1250	0.60		750		3625	Belina 2 Fa
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	0.23	2846	0.0	0			0	Grade over Foundati	2846	Substation
GRAND TOTAL								165702					42162		207864	

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

TABLE 2 HAULAGE AND DISPOSAL OF CONSTRUCTION DEBRIS

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

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)	$ 131/cy
		Disposal on Site (020 554 5550)	+ 6.40/cy
		Removal and disposal unit cost	$ 137.40/cy
			x 42.5 cy
Total Portal Removal and Disposal			$ 5,840

SEALS

Ref: Louie Amodt (UT AML) Double Block Wall & French Drain - $ 5,000/portal

# of Portals	12
Unit Cost	x 5,000 $/portal
Total Seal Cost	$60,000

BACKFILL PORTALS

Volume of backfill	1,555 cy
Dozer unit cost	x .70 $/cy
Total backfill cost	$1,093

TOTAL COST

Concrete Removal	5,840
Seals	60,000
Backfill	+1,093
GRAND TOTAL PORTALS COST	$ 66,933

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 (159.81 + 109.23 + 2 x 83.83) $/hr.

TOTAL COST = $43,233 or $8.71/ft.

2.03 UNDERGROUND TANKS

DESCRIPTION

Total tanks to be removed	7 ea
Removal unit cost (020 880 0120)	$ 445/ea
Sludge removal (020 880 0310)	$ 105/ea
Haul & Dispose (020 880 1026)	$ 660/ea
Total unit cost	$ 1,210/ea
TOTAL COST	$ 8,470

2.04 POWER DISTRIBUTION

DESCRIPTION

Transformers	4 ea
Unit cost (020 708 1570)	$ 765/ea
Total transformer costs	$ 3,060
Poles	41 ea
Unit cost	$ 70.15/ea
Total poles	$ 2,876

Conductors	5.7 miles
Unit costs	$ 1,102 /mile
Total conductors	$ 6,281
TOTAL COST	$ 12,217

2.05 HAUL ROAD CONCRETE GUTTER

Length of gutter (see 9/94 MRP)	6,885 ft
Unit cost (UDOT 4/94)	x 2.39/ft
Total Removal and Disposal Cost	$ 16,455

Productivity using UDOT - 65 ft/hr

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 9/94 MRP.

Total Length = 10,835 ft.
Total Poles = 2,167 (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 159.81 $/hr = $ 12,945

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

HAULAGE AND DISPOSAL (offsite)

Ref. MRP 9/94	
Haul 70 miles @ $.15/ton-mi.	$ 10.50/ton
Disposal Fee	$ 33.00/ton
Total Unit Cost Haul & Dispose	$ 43.50/ton
Material Weight	x 27 tons
Total Haul & Dispose	$1,175.

GRAND TOTAL GUARD RAIL = 12,945 + 1,175 = $14,120

2.07 PAVEMENT

DESCRIPTION

Asphalt removal costs are calculated using productivity rates from the Cat Handbook and costs from Rental Rate Blue Book. The removal sequence begins with ripping the asphalt with a D8N dozer; removal and loading are completed with a Cat 235 excavator (see calculations below). All asphalt will either be hauled to a State approved disposal facility or donated to UDOT as a resource for State Highways.

Haul road length	10,835 ft.
Haul road width	26 ft.
Total asphalt area	31,301 cy
Total asphalt volume (@ 6" thick)	5,217 cy
Total cost of ripping, removal, loading	$ 31,644
Haul & dispose (5,217 cy x 2.2 tons/cy)	11,477 tons
Haul cost ($0.15/t-mi. x 40mi)	x 6.00 $/ton
Total Haulage and Disposal	$ 68,864
Total asphalt removal and disposal	$ 100,508

Calculations:

Ripping: Ref. Cat Handbook 25th Edition, pg. 1-72

Use Cat D8N with multi shank, short tip configuration
Pocket spacing 3.6'
Shank gauge 7.2' (3 tips)
4 passes required to rip 26' width of road
Road length 10,835' x 4 passes = 43,340' (travel distance)
Average speed - 2 mph x 88 fpm/mph = 176 fpm
Efficiency = .66 Adjusted speed = 116 fpm

Time	= 43,340 ft. / 116 fpm = 374 minutes (6.25 hr)
Cost	= (6.25 hr x 138.82 $/hr) = $ 867.63 D8N
Ripper rent and teeth	+ $ 1,850
Total Ripping Cost =	$ 2,718

Removal and Loading: Ref. Cat Handbook 25th Edition

Bucket volume	= width x draw x thickness
	= 69" x 72" x 6"
	= .64 cy
Cycle time	= .70 minutes (page 4-99)
Cycles/hour	= 86
Unit production	= 55 lcy/hr
Efficiency	= .65
Adjusted production	= 36 lcy/hr
Volume of Asphalt	= 10,835' x 26' x .5' (length x width x thickness)
	= 5,217 x 1.25 (swell factor)
	= 6,521 lcy
Time	= 6,521 lcy/36 lcy/hr = 181 hr
Cost	= 181 hr x 159.81 $/hr
Removal & loading	= $28,926 for Cat 235D

3.0 EARTHWORK

3.01 WHITE OAK COMPLEX EXCAVATION & GRADING

Reference MRP (9/94) 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 25th 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 159.81 $/hr = $122,255

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 123.76 $/hr. x 3 units
	= $284,029

CAT D8N DOZER:

Time	= 765 hr.
Cost	= 765 hr x 138.82 $/hr
	= $106,197

GRAND TOTAL = 122,255 + 284,029 + 106,197 = $ 512,481
EXCAVATOR + TRUCKS + DOZER

3.02 RELOCATE AND SPREAD VEGETATION SUPPORTING MATERIAL (VSM)

Reference	MRP (9/94) 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 159.81 $/hr	= 1,007.00	CAT 235D EXCAVATOR
6.3 hr x 123.76 $/hr x 3	= 2,339.00	CAT 769CTRUCKS
6.3 hr x 138.82 $/hr	= 875.00	CAT D8N DOZER

TOTAL COST RELOCATE VSM =$ 4,221.00

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 25th 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 159.81 $/hr	=	5,913
		37 hr x 123.76 x 3	=	13,737
		37 hr x 138.82 $/hr	=	5,136
		TOTAL COST SPREAD VSM	=	$24,786
GRAND TOTAL VSM COST			=	$ 4,221 + $ 24,786
			=	$29,007 (Relocate + Spread)

3.03 REGRADE DITCH VDD-4 & VDD-5

Reference	MRP (9/94)	1400' x 5 cf/ft
		259cy
	swell factor	x 1.25
	volume swelled	324 lcy
Ref Means (022 242 2020) (Dozer)		x1.85 $/lcy
	Cost	$ 599

3.04 WHITE OAK COMPLEX HAUL ROAD ROCK LIFTS

Reference MRP (9/94)

Description: Rock lifts are to be formed of material excavated at the Complex site. Large rock pieces uncovered as part of the work at the Complex 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 the Complex, trucks will haul the 10,000 cy excess from the Complex site to the 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 123.76 $/hr x 3 units
	=	$10,767
Excavator Cost	=	29 hr x 159.81 $/hr
	=	$ 4,634

GRAND TOTAL COST = 10,767 + 4,634 = $ 15,401

3.05 WHITE OAK COMPLEX HAUL ROAD EARTHWORK

Reference MRP (9/94)

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 White Oak 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 25th 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 159.81 $$/hr. = $ 37,396 for I.

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

Reference MRP (9/94)

Average Haul Distance 1,100 ft.

CAT 235D Excavator Ref.: 3.01 White Oak Complex Excavation

Production	=	415 yd^3/hr
Time	=	55,188 lcy/415 yd^3/hr
	=	133 hr
Cost	=	133 hr x 159.81 $/hr
	=	$21,255 Excavator

CAT 769C Trucks Ref.: 3.01 White Oak Complex 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 123.76 $/hr x 3
	=	49,380 - 3 trucks

TOTAL COST FOR II. = 21,255 + 49,380 = $ 70,635

GRAND TOTAL COST = I. + II.

= 37,396 + 70,635

= $108,031

3.06 LOADOUT EARTHWORK

Reference MRP (9/94)

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 - White Oak 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 159.81 $/hr
	=	$44,907

CAT 769C TRUCKS Ref: Sec 3.01

Time	=	281 hr. (limited by Excavator since truck prod. is greater)
Cost	=	281 hr x 123.76 $/hr x 3
	=	$ 104,330

CAT D8N DOZER

Cost	=	281 hr x 138.82 $/hr
	=	$39,008

GRAND TOTAL = 44,907 + 104,330 +39,008= $188,245

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 1995

Foreman Rate	=	$43.65/hr.
Time	=	5 mos. x 176 hr/mo = 880 hr
Cost	=	$38,412

Ref Blue Book Pickup Truck 3/4 ton 4x4

Total Cost/Hr	=	$ 9.66
Time (hr)	=	x 880
Cost	=	$ 8,501

Total (Foreman & Truck) = 38,412 + 8,501 = $46,913

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	=	$ 83.83
Time (hr)	=	x 880
Cost	=	$ 73,770

GRAND TOTAL - FOREMAN & WATER TRUCK = $120,683

4.00 REVEGETATION

4.01 White Oak Complex Riprap Channel and Slope

Total volume riprap needed (MRP 9/94)	4440 cy
Riprap cost (4440 cy x 16.06 $/cy)	$ 71,306
Machine placement cost (4440 cy/44 cy/hr x 159.81 $/hr)	$ 16,126
Total riprap costs	$ 87,432
Total volume granular filter needed (MRP 9/94)	2200 cy
Granular filter cost (2200 cy x 16.06 $/cy)	$ 35,332
Machine placement cost (2200 cy /44 cy/hr x 159.81 $/hr)	$ 7,991
Total filter costs	$ 43,323
GRAND TOTAL RIPRAP AND GRANULAR FILTER	$ 130,755

4.02 Loadout Riprap Channel

Total volume riprap needed (MRP 9/94)	1100 cy
Riprap cost (1100 CY x 16.06 $/cy)	$ 17,666
Machine placement cost (1100 cy/44 cy/hr x 159.81 $/hr)	$ 3,995
Total riprap costs	$ 21,661
Granular Filter needed (MRP 9/94)	800 cy
Granular filter cost (800 cy x 16.06 $/cy)	$ 12,848
Machine placement cost (800 cy/44 cy/hr x 159.81 $/hr)	$ 2,906
Total filter costs	$ 15,754
GRAND TOTAL RIPRAP AND GRANULAR FILTER	$ 37,415

Calculations for Sections 4.01 and 4.02

DESCRIPTION: Riprap for the White Oak Complex and Loadout will be produced from the sandstone/limestone face-up area. Drilling and blasting will be designed to produce rock at a 18" maximum size. The Cat 963 Track loader will push and load the rock into the jaw crusher for primary crushing and riprap production. The granular filter will then be produced by a cone crusher. Trucks will deliver the product to the CAT 235D Excavator for placement.

Quantities Required:

	RipRap (cy)	Granular Filter(cy)
White Oak Complex	4440	2200
Loadout	+1100	+ 800
	5540	3000
Excess 10%	+ 554	+ 300
	6100	3300

Total Cubic Yards = 6100 + 3300 = 9400 cy
Total Tonnage = 9400 cy x 2.2 tons/cy = 20,700 tons

Bulk drilling and blasting cost = 3.65 $/cy (ref. Means 022 234 0300)
= 9400 cy x 3.65 $/cy =
= $34,310

RipRap

Jaw Crusher - 24" x 36" (ref: Rental Rate Blue Book)

Production = 140 tph

Time = 20,700 Tons/140 tph = 148 hr.

Cost:

Rental (1 month)	$ 3,340
Operating Cost (148 hr x 6.35 $/hr)	$ 940
Labor (1 x 148 hr x 31.50 $/hr)	$ 4,662
Hopper & power plant rental (lot)	$ 6,400
	$15,342

Granular Filter

Cone crusher (ref: Rental Rate Blue Book)

Production = 60 tph

Time = 3000 cy x 2.2 ton/cy ÷ 60 tph = 110 hr.

Cost:

Rental (1 month)	$ 5,965
Operating Cost (110 hr x 11.20 $/hr)	$ 1,232
Labor (1 x 110 hr x 31.50 $/hr)	$ 3,465
Hopper & power plant rental (lot)	$ 4,200
	$14,862

Ancillary Equipment (ref: Rental Rate Blue Book)

Track Loader Cat 963 (1 month incl. operator)	$16,166
Dump Truck Cat 769 C (1 month incl. operator)	$18,316
Portable screening plant (5' x 10') rental	$ 2,520
Screening plant (148 hr x 10.15 $/hr) Operating cost	$ 1,502
	$38,504

Machine Placement Reference: Cat Handbook 25th Edition

Description: Riprap and granular filter will be produced at the White Oak Complex as previously described. A Cat 235D Excavator will then place the material in the channels and on slopes for erosion protection.

Bucket Capacity	2.75 yd^3
Cycle Time	.50 min
Tram Time	1.66 min (300ft ÷3fps - avg.)

Bucket fill factor	70%
Hourly unit production	53 yd^3/hr
Efficiency	.83
Adjusted Production	44 yd^3/hr

GRAND TOTAL

Drilling & blasting	$ 34,310
Jaw Crusher	$ 15,342
Cone Crusher	$ 14,862
Ancillary equipment	$ 38,504
Machine placement	$ 34,141
	$137,159 or 16.06 $/cy

4.03 Loadout Straw Bale Barrier

Total length of bale barrier	6,040 ft
Number of bales of straw	2,157 bales
Tons	62 tons
Straw Unit Cost (ref. local cost)	$ 108 /ton
Total straw cost	$ 6,696
Stakes (assume $ .50/bale)	$ 1,079
TOTAL COST STRAW BALE BARRIER	$ 7,775

4.04 White Oak Complex Straw Bale Barrier

Total length of bale barrier	6,940 ft
Number of bales of straw	2,479 bales
Tons	71 tons
Straw Unit Cost (ref. local cost)	$ 108 /ton
Total straw cost	$ 7,668
Stakes (assume $ .50/bale)	$ 1,239
TOTAL COST STRAW BALE BARRIER	$ 8,907

4.05 Riparian Vegetation

Total area planted along streams (MRP 9/94)	1.5 ac
Willows (300 sets/ac @ 5.60 $/set)	$ 1,680 /ac
Shrubs (2600 /ac @ 3.60 $/shrub)	$ 9,360 /ac
Total cost per acre	$ 11,040
TOTAL RIPARIAN VEGETATION	$ 16,560

4.06 Loadout Revegetation

Total Disturbed area (MRP 9/94)	34 ac
Hydroseeding (ref. Means 029 308 4600)	$ 1,895 /ac
Total hydroseeding and mulching	$ 64,430
Tree and shrub planting area (MRP 9/94)	4 ac
Trees (300 sets/ac @ 5.60 $/set)	$ 1,680 /ac
Shrubs (1200 /ac @ 3.60 $/shrub)	$ 4,320 /ac
Total cost per acre	$ 6,000
Total tree and shrub cost	$ 24,000
Fencing costs	$ 4,875
TOTAL LOADOUT REVEGETATION	$ 93,305

4.07 White Oak Complex Revegetation

Total Disturbed area (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)	$ 1,895 ac
Total hydroseeding and mulching	$ 53,060
Tree and shrub planting area	14 ac
Trees (400 sets/ac @ 5.60 $/set)	$ 2,240 /ac
Shrubs (900 /ac @ 3.60 $/shrub)	$ 3,240 /ac
Total cost per acre	$ 5,480
Total tree and shrub cost	$ 76,720
Fencing costs	$ 4,650
TOTAL WHITE OAK COMPLEX REVEGETATION	$134,430

4.08 White Oak Complex 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)	$ 1,895 ac
Total hydroseeding and mulching	$ 28,425
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
Temporary Irrigation (ref. 9/94 MRP w/ HDPE Pipe)	
Mainline (6500') + Laterals (5 x 1300') @ 0.40 $/ft =	$ 5,200
Valves, tees, etc.	$ 2,100
Labor (200 manhours @ 38.70 $/hr)	$ 7,740
TOTAL HAUL ROAD REVEGETATION	$106,025

UNIT COST REFERENCE FOR BOND ESTIMATE

EQUIPMENT

Ref: Rental Rate Blue Book, Vol. 1, 1994 Dataquest Inc.

EQUIPMENT	MONTHLY RATE	ADJ. RATE PER HR	OPERATING COST/HR	OVERHEAD & PROFIT (10%)	LABOR COST/HR	TOTAL COST/HR
EXCAVATOR CAT 235D	14,010	79.60	30.50	11.01	38.70	159.81
DOZER CAT D8N	10,950	62.22	28.80	9.10	38.70	138.82
DUMP TRUCK CAT 769C	9,350	53.13	30.75	8.39	31.50	123.76
3/4 TON PICK UP TRUCK	630	3.58	5.20	0.88	-	9.66
TRACK LOADER CAT 963	8,125	46.16	17.95	6.41	38.70	109.23
WATER TRUCK (5000 gal.)	4,800	27.27	20.30	4.76	31.50	83.83

LABOR

Ref: Means Heavy Construction Cost Data, 1995

Trade	Rate/hr. ($)
Equipment Operator	38.70
Truck Driver	31.50
Foreman	43.65

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	207,900
	1.02	DISPOSAL	69,600
		SUB-TOTAL	277,500
2.00	FACILITIES		
	2.01	PORTALS	66,900
	2.02	RAILROAD	43,200
	2.03	UNDERGROUND TANKS	8,500
	2.04	POWER DISTRIBUTION	12,200
	2.05	HAUL ROAD GUTTER	16,500
	2.06	GUARD RAIL	14,100
	2.07	PAVEMENT	100,500
		SUB-TOTAL	261,900
3.00	EARTHWORK		
	3.01	WHITE OAK COMPLEX EXCAVATION	512,500
	3.02	VSM SPREAD	29,000
	3.03	REGRADE DITCHES	600
	3.04	HAUL ROAD ROCK LIFTS	15,400
	3.05	HAUL ROAD EARTHWORK	108,000
	3.06	LOADOUT EARTHWORK	188,200
	3.07	FOREMAN AND WATER TRUCK	120,700
		SUB-TOTAL	974,400
4.00	REVEGETATION		
	4.01	WHITE OAK COMPLEX RIPRAP	130,800
	4.02	LOADOUT RIPRAP	37,400
	4.03	LOADOUT STRAW BALE	7,800
	4.04	WHITE OAK COMPLEX STRAW BALE	8,900
	4.05	RIPARIAN VEGETATION	16,600
	4.06	LOADOUT REVEGETATION	93,300
	4.07	WHITE OAK COMPLEX REVEGETATION	134,400
	4.08	HAUL RAOD REVEGETATION	106,000
		SUB-TOTAL	535,200
	TOTAL DIRECT COSTS		2,049,000
	MAINTENANCE AND MONITORING (10%)		204,900
	CONTINGENCY (10%)		204,900
	ENGINEERING REDESIGN (5%)		102,500
	MOBILIZATION/DEMOB (2.5%)		51,200
	CONTRACT MANAGEMENT (5%)		102,500
	TOTAL INDIRECT COSTS		666,000
	SUBTOTAL ALL COSTS		2,715,000
	INFLATION 2.01% X 4 YR		225,000
	TOTAL RECLAMATION COST (1999 dollars)		2,940,000

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								
CATERPILLAR, Continued								
213B LC (1992)	.910 CY	18.1 MT	110.0	$ 5,695.00	$ 1,595.00	$ 400.00	$ 60.00	$ 13.00
215C LC (1990)	1.000 CY	20.0 MT	115.0	5,530.00	1,550.00	390.00	59.00	14.50
215D LC (1992)	.500 CY	20.1 MT	125.0	6,175.00	1,730.00	435.00	65.00	15.45
219 (1989)	1.000 CY	21.6 MT	130.0	5,885.00	1,650.00	415.00	62.00	15.75
219 LC (1989)	1.000 CY	22.5 MT	130.0	6,085.00	1,705.00	425.00	64.00	16.00
219D (1992)	.500 CY	21.7 MT	140.0	6,660.00	1,865.00	465.00	70.00	16.60
219D LC (1992)	.500 CY	22.6 MT	140.0	6,900.00	1,930.00	485.00	73.00	16.85
225B (1989)	.750 CY	24.2 MT	145.0	6,975.00	1,955.00	490.00	74.00	18.15
225B LC (1989)	.750 CY	26.8 MT	145.0	7,200.00	2,015.00	505.00	76.00	18.40
225D (1992)	1.250 CY	25.8 MT	165.0	7,720.00	2,160.00	540.00	81.00	19.20
225D LC (1992)	1.250 CY	26.6 MT	165.0	8,115.00	2,270.00	570.00	86.00	19.65
229 (1991)	1.500 CY	31.5 MT	180.0	8,265.00	2,315.00	580.00	87.00	20.95
231D (1994)	2.000 CY	35.2 MT	200.0	9,745.00	2,730.00	685.00	105.00	23.05
231D LC (1994)	1.750 CY	35.4 MT	200.0	9,985.00	2,795.00	700.00	105.00	23.30
235C (1992)	2.000 CY	44.0 MT	250.0	13,550.00	3,795.00	950.00	145.00	30.70
235D (1994)	2.130 CY	47.0 MT	250.0	14,010.00	3,925.00	980.00	145.00	30.50
235D LC (1994)	2.130 CY	49.2 MT	250.0	14,210.00	3,980.00	995.00	150.00	30.75
E240 (1990)	1.250 CY	23.0 MT	148.0	6,295.00	1,765.00	440.00	66.00	16.90
E240B (1992)	1.000 CY	23.0 MT	148.0	6,660.00	1,865.00	465.00	70.00	16.95
E240C	1.250 CY	22.9 MT	148.0	7,245.00	2,030.00	510.00	77.00	17.05
EL240 (1990)	23.500 CY	23.6 MT	148.0	6,505.00	1,820.00	455.00	68.00	17.15
EL240B (1992)	1.000 CY	23.0 MT	148.0	6,885.00	1,930.00	485.00	73.00	17.20
EL240C	1.250 CY	23.5 MT	148.0	7,510.00	2,105.00	525.00	79.00	17.35
245B (1990)	3.125 CY	65.1 MT	360.0	16,985.00	4,755.00	1,190.00	180.00	46.05
245B SERIES II (1992)	3.125 CY	65.1 MT	360.0	18,040.00	5,050.00	1,265.00	190.00	46.30
245D (1993)	2.620 CY	66.9 MT	385.0	18,635.00	5,220.00	1,305.00	195.00	50.10
E300 (1989)	1.500 CY	30.5 MT	187.0	7,820.00	2,190.00	550.00	83.00	21.15
E300B (1992)	1.250 CY	30.5 MT	207.0	8,800.00	2,465.00	615.00	92.00	22.40
EL300 (1989)	1.500 CY	31.6 MT	187.0	8,105.00	2,270.00	570.00	86.00	21.50
EL300B (1992)	1.250 CY	31.6 MT	207.0	9,110.00	2,550.00	640.00	96.00	22.75
311	.680 CY	11.3 MT	79.0	3,645.00	1,020.00	255.00	38.00	8.40
312	.680 CY	12.3 MT	84.0	4,080.00	1,140.00	285.00	43.00	9.40
320	1.000 CY	19.7 MT	128.0	6,190.00	1,735.00	435.00	65.00	15.10
320L	1.000 CY	21.0 MT	128.0	6,410.00	1,795.00	450.00	68.00	15.35
325	1.440 CY	26.0 MT	168.0	8,385.00	2,350.00	590.00	89.00	19.65
325L	1.440 CY	27.0 MT	168.0	8,635.00	2,420.00	605.00	91.00	19.95
330	1.830 CY	32.8 MT	222.0	9,690.00	2,715.00	680.00	100.00	23.45
330L	1.830 CY	34.2 MT	222.0	10,210.00	2,860.00	715.00	105.00	24.40
350	3.500 CY	49.4 MT	286.0	15,290.00	4,280.00	1,070.00	160.00	33.30
350L	3.000 CY	50.5 MT	286.0	15,680.00	4,390.00	1,100.00	165.00	33.70
375	5.250 CY	89.0 MT	428.0	22,625.00	6,335.00	1,585.00	240.00	56.10
375L	4.250 CY	85.2 MT	428.0	23,145.00	6,480.00	1,620.00	245.00	56.70
DAEWOO								
DH040 (1990)	.250 CY	4.7 MT	44.0	2,310.00	645.00	160.00	24.00	4.70
DH130 (1992)	.687 CY	12.9 MT	79.0	3,795.00	1,065.00	265.00	40.00	9.25
DH130-2	.710 CY	13.3 MT	89.0	4,165.00	1,165.00	290.00	44.00	9.70

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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								
D8L (1993)	Semi-U	Powershift	335	$ 11,460.00	$ 3,210.00	$ 805.00	$ 120.00	$ 32.05
D8N	Angle	Powershift	285	10,910.00	3,055.00	765.00	115.00	28.70
D8N	Semi-U	Powershift	285	10,950.00	3,065.00	765.00	115.00	28.80
D8N	U Blade	Powershift	285	11,025.00	3,085.00	770.00	115.00	28.90
D9N	Semi-U	Powershift	370	13,995.00	3,920.00	980.00	145.00	39.15
D9N	U Blade	Powershift	370	14,100.00	3,950.00	990.00	150.00	39.30
D10N	Semi-U	Powershift	520	18,555.00	5,195.00	1,300.00	195.00	51.75
D10N	Semi-U Abrasion Bld	Powershift	520	18,660.00	5,225.00	1,305.00	195.00	51.90
D10N	U Blade	Powershift	520	18,605.00	5,210.00	1,305.00	195.00	51.80
D11N	Semi-U	Powershift	770	30,790.00	8,620.00	2,155.00	325.00	79.55
D11N	Semi-U Abrasion Bld	Powershift	770	30,970.00	8,670.00	2,170.00	325.00	79.85
D11N	U Blade	Powershift	770	31,035.00	8,690.00	2,175.00	325.00	79.95
DEERE								
400G	Power Angle Tilt	Direct Drive	60	2,335.00	655.00	165.00	25.00	7.55
450G	6405 Inside Hyd(96")	Powershift	70	2,700.00	755.00	190.00	29.00	8.40
550G	6405 Inside Hyd(96")	Powershift	80	3,105.00	870.00	220.00	33.00	9.25
550G	Hydraulic	Powershift	80	3,120.00	875.00	220.00	33.00	9.30
650G	6405 Inside Hyd	Powershift	90	3,345.00	935.00	235.00	35.00	10.00
750B (1994)	6505 All Hyd	Hydrostatic	120	4,435.00	1,240.00	310.00	47.00	12.55
750B (1994)	6520 Hyd Angle Tilt	Hydrostatic	120	4,305.00	1,205.00	300.00	45.00	12.40
750B (1994)	6525 Straight w/Tilt	Hydrostatic	120	4,275.00	1,195.00	300.00	45.00	12.35
750B (1994)	Angle w/Manual Tilt	Hydrostatic	120	4,315.00	1,210.00	305.00	46.00	12.40
750B LT	All Hydraulic	Hydrostatic	140	5,385.00	1,510.00	380.00	57.00	14.60
750B LT	Angle	Hydrostatic	140	5,225.00	1,465.00	365.00	55.00	14.40
750B LT	Straight	Hydrostatic	140	5,150.00	1,440.00	360.00	54.00	14.30
850B	6540 Hyd Angle Tilt	Hydrostatic	165	5,365.00	1,500.00	375.00	56.00	15.70
850B	6545 Hydraulic Tilt	Hydrostatic	165	5,295.00	1,485.00	370.00	56.00	15.60
850B LT	Angle	Hydrostatic	165	5,780.00	1,620.00	405.00	61.00	16.20
850B LT	Straight	Hydrostatic	165	5,710.00	1,600.00	400.00	60.00	16.10
DRESSER								
TD7G	Angle w/Tilt	Powershift	70	2,905.00	815.00	205.00	31.00	8.65
TD7G	Angle w/Wide Track	Powershift	70	2,930.00	820.00	205.00	31.00	8.70
TD7H	Angle	Powershift	70	3,030.00	850.00	215.00	32.00	8.70
TD7H	Wide Angle	Powershift	70	3,055.00	855.00	215.00	32.00	8.75
TD8G	Angle w/Hyd Tilt	Powershift	80	3,500.00	980.00	245.00	37.00	9.75
TD8H	Angle	Powershift	80	3,285.00	920.00	230.00	35.00	9.45
TD8H	Wide Angle	Powershift	80	3,315.00	930.00	235.00	35.00	9.45
TD9H	Angle	Powershift	90	3,495.00	980.00	245.00	37.00	10.10
TD9H	Wide Angle	Powershift	90	3,525.00	985.00	245.00	37.00	10.15
TD12 (1991)	Angle w/Tilt	Powershift	110	4,290.00	1,200.00	300.00	45.00	12.20
TD12 (1991)	Straight w/Tilt	Powershift	110	4,155.00	1,165.00	290.00	44.00	12.05
TD12C	Angle	Powershift	125	4,970.00	1,390.00	350.00	53.00	13.45
TD12C	Semi-U	Powershift	125	4,845.00	1,355.00	340.00	51.00	13.30

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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	$ 1,025.00	$ 285.00	$ 71.00	$ 11.00	$ 12.30
4X2	25,000 lbs	5–6 CY	210.0	1,140.00	320.00	80.00	12.00	12.50
Diesel Powered								
4X2	20,000 lbs	4 CY	170.0	1,230.00	345.00	86.00	13.00	8.10
4X2	25,000 lbs	5–6 CY	180.0	1,425.00	400.00	100.00	15.00	8.70
4X2	30,000 lbs	7–8 CY	210.0	1,590.00	445.00	110.00	17.00	10.35
4X4	30,000 lbs	7–8 CY	170.0	2,090.00	585.00	145.00	22.00	10.00
6X4	40,000 lbs	8–10 CY	235.0	2,250.00	630.00	160.00	24.00	13.10
6X4	50,000 lbs	10–12 CY	255.0	2,865.00	800.00	200.00	30.00	14.90
6X4	70,000 lbs	12–18 CY	325.0	3,385.00	950.00	240.00	36.00	18.45

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	$ 9,350.00	$ 2,620.00	$ 655.00	$ 98.00	$ 30.75
771C	40.0 MT	35.5 CY	474.0	10,035.00	2,810.00	705.00	105.00	32.55
773B	45.4 MT	34.0–44.6 CY	650.0	12,405.00	3,475.00	870.00	130.00	41.25
775B	60.0 MT	51.4 CY	682.0	13,235.00	3,705.00	925.00	140.00	43.60
777B (1992)	77.1 MT	47.5–67.1 CY	870.0	15,720.00	4,400.00	1,100.00	165.00	54.45
777C	77.1 MT	47.6–67.4 CY	870.0	17,955.00	5,025.00	1,255.00	190.00	58.30
785 (1993)	136.1 MT	96 CY	1,290.0	2,905.00	815.00	205.00	31.00	36.45
DART								
2085	77.1 MT	77.0–100.0 CY	800.0	14,300.00	4,005.00	1,000.00	150.00	49.80
3100	90.7 MT	51.0–75.0 CY	1,050.0	16,520.00	4,625.00	1,155.00	175.00	59.05
3120	108.9 MT	59.0–90.0 CY	1,200.0	18,210.00	5,100.00	1,275.00	190.00	65.20

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T R U C K S

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	$ 490.00	$ 135.00	$ 34.00	$ 5.00	$ 4.80
Crew	4X2	1/2	130.0	535.00	150.00	38.00	6.00	4.90
Conventional	4X4	1/2	130.0	585.00	165.00	41.00	6.00	5.05
Crew	4X4	1/2	130.0	625.00	175.00	44.00	7.00	5.20
Conventional	4X2	3/4	130.0	570.00	160.00	40.00	6.00	5.00
Crew	4X2	3/4	130.0	595.00	165.00	41.00	6.00	5.10
Conventional	4X4	3/4	130.0	630.00	175.00	44.00	7.00	5.20
Crew	4X4	3/4	180.0	665.00	185.00	46.00	7.00	6.50
Conventional	4X2	1	180.0	590.00	165.00	41.00	6.00	6.25
Crew	4X2	1	180.0	650.00	180.00	45.00	7.00	6.45
Conventional	4X4	1	180.0	675.00	190.00	48.00	7.00	6.50
Crew	4X4	1	180.0	755.00	210.00	53.00	8.00	6.75
Diesel Powered								
Conventional	4X2	1/2	75.0	575.00	160.00	40.00	6.00	2.10
Conventional	4X4	1/2	130.0	690.00	195.00	49.00	7.00	3.00
Conventional	4X2	3/4	75.0	675.00	190.00	48.00	7.00	2.25
Crew	4X2	3/4	130.0	700.00	195.00	49.00	7.00	3.00
Conventional	4X4	3/4	130.0	740.00	205.00	51.00	8.00	3.05
Crew	4X4	3/4	130.0	775.00	215.00	54.00	8.00	3.10
Conventional	4X2	1	130.0	720.00	200.00	50.00	8.00	3.05
Crew	4X2	1	130.0	775.00	210.00	53.00	8.00	3.10
Conventional	4X4	1	130.0	800.00	225.00	56.00	8.00	3.15

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STANDARD CRAWLER LOADERS

(Includes General Purpose bucket and ROPS.)

Model (Yr.Disc.)	Transmission	Bucket Capacity	Maximum HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Diesel Powered								
CASE								
455C (1993)	Powershift	1.00 CY	63.0	$ 2,530.00	$ 735.00	$ 185.00	$ 28.00	$ 6.90
855D (1991)	Powershift/TC	1.50 CY	82.0	3,250.00	910.00	230.00	35.00	8.45
855E (1993)	Powershift	1.50 CY	89.0	3,390.00	950.00	240.00	36.00	8.70
1155E (1993)	Powershift/TC	2.00 CY	118.0	4,395.00	1,230.00	310.00	47.00	10.90
CATERPILLAR								
931C (1991)	Powershift	1.05 CY	67.0	2,440.00	685.00	170.00	26.00	6.95
931C SERIES II (1994)	Powershift	1.08 CY	70.0	2,770.00	775.00	195.00	29.00	7.25
935C (1991)	Powershift	1.30 CY	78.0	2,900.00	810.00	205.00	31.00	7.90
935C SERIES II (1994)	Powershift	1.30 CY	80.0	3,165.00	885.00	220.00	33.00	8.05
943 (1993)	Hydrostatic	1.50 CY	80.0	4,435.00	1,240.00	310.00	47.00	9.40
953 (1993)	Hydrostatic	2.00 CY	110.0	5,590.00	1,595.00	400.00	60.00	11.80
953B	Hydrostatic	2.25 CY	120.0	6,170.00	1,730.00	435.00	65.00	12.50
963	Hydrostatic	2.60 CY	150.0	8,125.00	2,275.00	570.00	86.00	17.95
973	Hydrostatic	3.75 CY	210.0	12,015.00	3,365.00	840.00	125.00	25.05
DEERE								
455G	Powershift	1.25 CY	70.0	2,960.00	830.00	210.00	32.00	7.45
555G	Powershift	1.50 CY	90.0	3,735.00	1,045.00	260.00	39.00	9.05
655B	Hydrostatic	2.00 CY	120.0	5,050.00	1,415.00	355.00	53.00	11.55
755B	Hydrostatic	2.25 CY	140.0	6,090.00	1,705.00	425.00	64.00	15.30
DRESSER								
100G	Powershift	1.13 CY	70.0	3,105.00	870.00	220.00	33.00	7.65
125G	Powershift	1.38 CY	80.0	3,915.00	1,095.00	275.00	41.00	8.85
175C	Powershift	2.00 CY	140.0	5,995.00	1,680.00	420.00	63.00	15.15
200	Hydrostatic	2.60 CY	165.0	7,785.00	2,180.00	545.00	82.00	18.30
250E (1991)	Powershift	3.25 CY	215.0	7,675.00	2,150.00	540.00	81.00	21.05
FIATALLIS								
FL5B (1993)	Powershift	1.30 CY	70.0	2,970.00	830.00	210.00	32.00	7.55
FL7B (1993)	Powershift/TC	1.50 CY	85.0	3,700.00	1,035.00	260.00	39.00	8.85
FL10E (1993)	Powershift/TC	2.00 CY	127.0	5,440.00	1,525.00	380.00	57.00	12.35
FL14E (1993)	Powershift	2.75 CY	168.0	7,520.00	2,105.00	525.00	79.00	18.25
FL20 (1991)	Powershift	3.50 CY	227.0	10,790.00	3,020.00	755.00	115.00	25.60
HYDRA-MAC								
COMMANDER	Hydrostatic	.33 CY	33.0	1,265.00	355.00	89.00	13.00	4.30

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TRUCKS

ON-HIGHWAY WATER TANKERS

Tank Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Gasoline Powered						
1,500 gal	175.0	$ 1,310.00	$ 365.00	$ 91.00	$ 14.00	$ 10.95
2,000 gal	175.0	1,375.00	385.00	96.00	14.00	11.05
2,500 gal	175.0	1,425.00	400.00	100.00	15.00	11.10
3,000 gal	210.0	1,510.00	425.00	105.00	16.00	13.65
3,500 gal	225.0	1,570.00	440.00	110.00	17.00	14.40
Diesel Powered						
2,500 gal	150.0	1,510.00	425.00	105.00	16.00	7.00
3,000 gal	190.0	1,875.00	525.00	130.00	20.00	8.50
3,500 gal	250.0	2,235.00	625.00	155.00	23.00	11.40
4,000 gal	250.0	3,135.00	880.00	220.00	33.00	12.50

OFF-HIGHWAY WATER TANKER TRUCKS

(Rates include off-highway prime mover complete with a semi-trailer water tanker, hydraulic drive centrifugal pump and rear spraybar.)

Tank Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Diesel Powered						
5,000 gal	175.0	$ 4,800.00	$ 1,345.00	$ 335.00	$ 50.00	$ 20.30
6,000 gal	330.0	7,730.00	2,165.00	540.00	81.00	35.35
7,000 gal	330.0	7,845.00	2,195.00	550.00	83.00	35.60
8,000 gal	450.0	12,050.00	3,375.00	845.00	125.00	52.05
10,000 gal	450.0	12,120.00	3,395.00	850.00	130.00	52.20
12,000 gal	550.0	14,695.00	4,115.00	1,030.00	155.00	64.00
14,000 gal	550.0	14,880.00	4,165.00	1,040.00	155.00	64.40

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CONE CRUSHERS

(With drive - Less power plant and electricity costs.)

Cone Type	Size	Req. HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Electric Powered, Continued							
Fine	54"	200	$ 5,015.00	$ 1,685.00	$ 420.00	$ 63.00	$ 11.25
Standard	54"	200	5,965.00	1,670.00	420.00	63.00	11.20
Standard	60"	250	7,900.00	2,210.00	555.00	83.00	13.65
Fine	66"	300	8,860.00	2,760.00	690.00	105.00	18.75
Standard	66"	300	8,810.00	2,745.00	685.00	105.00	18.65

SINGLE IMPELLER IMPACT BREAKERS

(With countershaft drive - Less power plant and electricity costs.)

Type	Size	Req. HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Electric Powered							
Single	30" X 20"	125–150	$ 3,500.00	$ 700.00	$ 175.00	$ 26.00	$ 4.80
Single	36" X 33"	150–200	3,360.00	1,080.00	270.00	41.00	6.45
Single	38" X 50"	250–350	3,385.00	1,090.00	275.00	41.00	6.40
Single	43" X 36"	250–300	4,470.00	1,250.00	315.00	47.00	7.25
Single	43" X 40"	250–300	5,135.00	1,440.00	360.00	54.00	8.05
Single	53" X 48"	300–400	7,945.00	2,225.00	555.00	83.00	12.75
Single	63" X 60"	500–600	15,615.00	4,370.00	1,095.00	165.00	25.05

DOUBLE IMPELLER IMPACT BREAKERS

(With countershaft drive - Less power plant and electricity costs.)

Type	Size	Req. HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Electric Powered							
Double	22" X 22"	80–140	$ 3,370.00	$ 945.00	$ 235.00	$ 35.00	$ 6.00
Double	30" X 42"	120–200	4,410.00	1,235.00	310.00	47.00	8.15
Double	36" X 45"	200–300	5,250.00	1,750.00	440.00	66.00	10.40
Double	43" X 50" Light Duty	300–400	8,550.00	2,700.00	675.00	100.00	16.60
Double	43" X 50" (H.D.)	300–400	11,545.00	3,260.00	815.00	120.00	18.95

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JAW CRUSHERS

(With drive - Less hopper, power plant and electricity costs.)

Size	Req. HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Electric Powered, Continued						
10" X 36"	75	$ 2,140.00	$ 600.00	$ 150.00	$ 23.00	$ 4.50
12" X 36"	60	2,315.00	650.00	165.00	25.00	4.80
12" X 42"	90	3,445.00	965.00	240.00	36.00	7.90
12" X 48"	100	3,680.00	1,030.00	260.00	39.00	8.25
15" X 24"	50	1,800.00	505.00	125.00	19.00	3.45
15" X 36"	75	2,405.00	675.00	170.00	26.00	4.90
16" X 36"	90	2,890.00	810.00	205.00	31.00	5.75
16" X 48"	150	5,315.00	1,490.00	375.00	56.00	10.75
18" X 30"	60	2,365.00	660.00	165.00	25.00	4.85
22" X 36"	125	2,865.00	800.00	200.00	30.00	5.65
22" X 48"	175	4,995.00	1,400.00	350.00	53.00	10.05
24" X 36"	110	3,340.00	935.00	235.00	35.00	6.35
25" X 42"	165	4,605.00	1,290.00	325.00	49.00	9.45
27" X 42"	175	4,655.00	1,305.00	325.00	49.00	9.55
30" X 42"	175	4,730.00	1,325.00	330.00	50.00	9.65
32" X 42"	165	5,475.00	1,535.00	385.00	58.00	10.70
36" X 42"	175	5,450.00	1,525.00	380.00	57.00	10.60
36" X 48"	250	7,295.00	2,045.00	510.00	77.00	13.35
40" X 48"	275	8,180.00	2,290.00	575.00	86.00	14.40
42" X 48"	275	8,415.00	2,355.00	590.00	89.00	14.70
48" X 60"	400	13,565.00	3,800.00	950.00	145.00	21.85
54" X 60"	400	14,445.00	4,045.00	1,010.00	150.00	23.55

ROLL CRUSHERS

(Rates do not include hopper, power plant or electricity costs.)

Roll Type	Size	Req. HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Electric Powered							
Double	24" X 16"	50	$ 1,460.00	$ 410.00	$ 105.00	$ 16.00	$ 2.60
Double	24" X 20"	50–85	1,775.00	495.00	125.00	19.00	3.00
Double	30" X 18"	75–100	1,885.00	530.00	135.00	20.00	3.15
Triple	30" X 18"	150–250	2,625.00	735.00	185.00	28.00	4.05
Double	30" X 25"	100–200	2,090.00	585.00	145.00	22.00	3.40
Triple	30" X 25"	200–350	3,145.00	880.00	220.00	33.00	5.70
Double	30" X 36"	200–250	2,960.00	830.00	210.00	32.00	5.50
Double	40" X 26"	250–400	2,925.00	820.00	205.00	31.00	5.40
Double	40" X 30"	200–300	3,450.00	965.00	240.00	36.00	6.05
Triple	40" X 30"	300	4,725.00	1,325.00	330.00	50.00	7.55
Double	40" X 36"	250–375	3,660.00	1,025.00	255.00	38.00	6.30
Double	41" X 32"	200–300	3,515.00	985.00	245.00	37.00	6.15
Double	41" X 36"	250–400	4,395.00	1,230.00	310.00	47.00	7.15

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ELEVATING STACKERS

(Operating costs for electric powered models do not include electricity costs.)

Conveyor Size	Capacity	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Diesel Powered							
18" X 90'	170 tph	38.0	$ 2,490.00	$ 695.00	$ 175.00	$ 26.00	$ 7.15
18" X 100'	170 tph	38.0	2,565.00	720.00	180.00	27.00	7.25
18" X 120'	170 tph	38.0	2,780.00	780.00	195.00	29.00	7.55
18" X 150'	170 tph	38.0	3,120.00	875.00	220.00	33.00	8.00
24" X 90'	330 tph	38.0	2,710.00	760.00	190.00	29.00	7.95
24" X 100'	330 tph	38.0	3,355.00	940.00	235.00	35.00	8.85
24" X 120'	330 tph	38.0	3,680.00	1,030.00	260.00	39.00	9.30
24" X 150'	330 tph	38.0	3,975.00	1,115.00	280.00	42.00	9.70
30" X 90'	630 tph	38.0	2,940.00	825.00	205.00	31.00	8.25
30" X 100'	630 tph	48.0	3,520.00	985.00	245.00	37.00	9.50
30" X 120'	630 tph	48.0	3,945.00	1,105.00	275.00	41.00	10.10
30" X 150'	630 tph	58.0	4,285.00	1,200.00	300.00	45.00	11.05
36" X 90'	1,000 tph	58.0	3,445.00	965.00	240.00	36.00	10.55
36" X 100'	1,000 tph	58.0	4,155.00	1,165.00	290.00	44.00	11.55
36" X 120'	1,000 tph	73.0	4,425.00	1,240.00	310.00	47.00	12.60
36" X 150'	1,000 tph	117.0	4,820.00	1,350.00	340.00	51.00	15.15

SINGLE DECK PORTABLE SCREENING PLANTS

(Operating costs for electric powered models do not include electricity costs.)

Conveyor Size	Screen Size	HP	Monthly	Weekly	Daily	Hourly	Estimated Operating Cost/Hr.
Gasoline Powered							
18" X 40'	3' X 6'	28.0	$ 2,100.00	$ 590.00	$ 150.00	$ 23.00	$ 6.65
18" X 40'	5' X 10'	28.0	2,235.00	625.00	155.00	23.00	6.80
18" X 60'	3' X 6'	28.0	2,295.00	645.00	160.00	24.00	6.90
18" X 60'	5' X 10'	28.0	2,425.00	680.00	170.00	26.00	7.05
24" X 40'	3' X 6'	37.0	2,175.00	610.00	155.00	23.00	7.50
24" X 40'	5' X 10'	37.0	2,310.00	645.00	160.00	24.00	7.70
24" X 60'	3' X 6'	37.0	2,260.00	635.00	160.00	24.00	7.60
24" X 60'	5' X 10'	37.0	2,395.00	670.00	170.00	26.00	7.80
30" X 40'	3' X 6'	62.0	2,265.00	635.00	160.00	24.00	9.85
30" X 40'	5' X 10'	62.0	2,435.00	680.00	170.00	26.00	10.05
30" X 60'	3' X 6'	62.0	2,385.00	670.00	170.00	26.00	10.00
30" X 60'	5' X 10'	62.0	2,520.00	705.00	175.00	26.00	10.15
36" X 40'	3' X 6'	62.0	2,355.00	660.00	165.00	25.00	9.95
36" X 40'	5' X 10'	62.0	2,480.00	695.00	175.00	26.00	10.10
36" X 60'	3' X 6'	62.0	2,540.00	710.00	180.00	27.00	10.15
36" X 60'	5' X 10'	62.0	2,670.00	750.00	190.00	29.00	10.35
42" X 50'	4' X 8'	84.0	3,395.00	950.00	240.00	36.00	14.15
42" X 50'	5' X 10'	84.0	3,445.00	965.00	240.00	36.00	14.20
42" X 50'	5' X 16'	84.0	4,020.00	1,125.00	280.00	42.00	14.90

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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

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
185000000	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
201000015	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	[illegible]278.00	116940.94	1.73
202000040	SQ YD	REMOVE CONCRETE SIDEWALK	4271.00	16400.64	3.84
202000050	SQ YD	REMOVE CONCRETE DRIVEWAY	1270.00	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	[illegible]	55064.94	0.61
202000190	LIN FT	REMOVE RAILROAD TRACK	[illegible]810.00	24240.00	4.00
202000200	EACH	REMOVE TREE	226.00	46128.86	204.11
202000210	EACH	REMOVE CONCRETE BOARDER	141.00	16275.63	115.43
202000220	EACH	REMOVE SIGN	81.00	11850.99	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	[illegible]24.00	959447.00	9.25
204002403	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	[illegible]583.00	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	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P
2200	Reinforced	B-38	9.50	4.211	C.Y.		92	134	226	292
2300	With hand held air equipment, bituminous	B-39	1,900	.025	S.F.		.52	.08	.60	.91
2320	Concrete to 6" thick, no reinforcing		1,200	.040			.82	.13	.95	1.44
2340	Mesh reinforced		830	.058			1.19	.18	1.37	2.08
2360	Rod reinforced		765	.063			1.29	.20	1.49	2.26
2400	Curbs, concrete, plain	B-6	325	.074	L.F.		1.55	.63	2.18	3.14
2500	Reinforced		220	.109			2.29	.93	3.22	4.63
2600	Granite curbs		355	.068			1.42	.58	2	2.87
2700	Bituminous curbs		830	.029			.61	.25	.86	1.22
2900	Pipe removal, concrete, no excavation, 12" diameter		175	.137			2.88	1.18	4.06	5.80
2930	15" diameter		150	.160			3.36	1.37	4.73	6.80
2960	24" diameter		120	.200			4.20	1.71	5.91	8.50
3000	36" diameter		90	.267			5.60	2.29	7.89	11.30
3200	Steel, welded connections, 4" diameter		160	.150			3.15	1.29	4.44	6.35
3300	10" diameter		80	.300			6.30	2.57	8.87	12.75
3500	Railroad track removal, ties and track	B-14	110	.436			8.95	1.87	10.82	16.25
3600	Ballast		500	.096	C.Y.		1.97	.41	2.38	3.57
3700	Remove and re-install ties & track using new bolts & spikes		50	.960	L.F.		19.70	4.11	23.81	35.50
3800	Turnouts using new bolts and spikes		1	48	Ea.		985	205	1,190	1,775
4000	Sidewalk removal, bituminous, 2-1/2" thick	B-6	325	.074	S.Y.		1.55	.63	2.18	3.14
4050	Brick, set in mortar		185	.130			2.72	1.11	3.83	5.50
4100	Concrete, plain, 4"		160	.150			3.15	1.29	4.44	6.35
4200	Mesh reinforced		150	.160			3.36	1.37	4.73	6.80
5000	Slab on grade removal, plain	B-5	45	1.422	C.Y.		31.50	21.50	53	72.50
5100	Mesh reinforcing		33	1.939			42.50	29	71.50	99
5200	Rod reinforcing		25	2.560			56.50	38.50	95	131
5500	For congested sites or small quantities, add up to								200%	200%
5550	For disposal on site, add	B-11A	232	.069			1.54	3.64	5.18	6.40
5600	To 5 miles, add	B-34D	76	.105			2.14	6.70	8.84	10.70

020 600 | Building Demolition

0010	BUILDING DEMOLITION Large urban projects, incl. 20 Mi. haul									
0012	Not including dump fee, steel	B-8	21,500	.003	C.F.		.06	.10	.16	.21
0050	Concrete		15,300	.004			.09	.14	.23	.29
0080	Masonry		20,100	.003			.07	.11	.18	.23
0100	Mixture of types, average		20,100	.003			.07	.11	.18	.23
0500	Small bldgs, or single bldgs, no salvage included, steel	B-3	14,800	.003			.07	.11	.18	.23
0600	Concrete		11,300	.004			.09	.14	.23	.30
0650	Masonry		14,800	.003			.07	.11	.18	.23
0700	Wood		14,800	.003			.07	.11	.18	.23
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
0010	DISPOSAL ONLY Urban buildings with salvage value allowed									
0020	Including loading and 5 mile haul to dump									
0200	Steel frame	B-3	430	.112	C.Y.		2.35	3.79	6.14	7.85
0300	Concrete frame		365	.132			2.76	4.47	7.23	9.25
0400	Masonry construction		445	.108			2.27	3.67	5.94	7.60
0500	Wood frame		247	.194			4.08	6.60	10.68	13.65
0010	DUMP CHARGES Typical urban city, fees only									
0100	Building construction materials				C.Y.					35

020 700 | Selective Demolition

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
708	0010	ELECTRICAL DEMOLITION										708
	0020	Conduit to 15' high, including fittings & hangers										
	0100	Rigid galvanized steel, 1/2" to 1" diameter	1 Elec	242	.033	L.F.		.94		.94	1.42	
	0120	1-1/4" to 2"		200	.040			1.14		1.14	1.72	
	0140	2" to 4"		151	.053			1.51		1.51	2.28	
	0160	4" to 6"		57	.140			4		4	6.05	
	0200	Electric metallic tubing (EMT) 1/2" to 1"		394	.020			.58		.58	.87	
	0220	1-1/4" to 1-1/2"		326	.025			.70		.70	1.05	
	0240	2" to 3"		236	.034			.97		.97	1.46	
	0260	3-1/2" to 4"		95	.084			2.40		2.40	3.62	
	0271	Armored cable (BX)	2 Elec	1,200	.013			.38		.38	.57	
	0351	Non-metallic sheathed cable (Romex)		1,500	.011			.30		.30	.46	
	0401	Wiremold raceway		430	.037			1.06		1.06	1.60	
	0501	Channels, steel, including fittings and hangers		500	.032			.91		.91	1.37	
	0601	Copper bus duct incl. hangers and supports, 225 amp		135	.119			3.38		3.38	5.10	
	0605	1000 amp		60	.267			7.60		7.60	11.45	
	0609	3000 amp		20	.800			23		23	34.50	
	1300	Transformer, dry type, 1 ph, incl. removal of										
	1320	supports, wire & pipe terminations										
	1340	1 KVA	1 Elec	7.70	1.039	Ea.		29.50		29.50	44.50	
	1420	75 KVA	"	1.25	6.400	"		182		182	275	
	1440	3 Phase to 600V, primary										
	1460	3 KVA	1 Elec	3.85	2.078	Ea.		59		59	89.50	
	1520	75 KVA		1.35	5.926			169		169	255	
	1550	300 KVA		.71	11.268			320		320	485	
	1570	750 KVA		.45	17.778			505		505	765	
	1800	Wire, THW-THWN-THHN, removed from										
	1810	in place conduit, to 15' high										
	1830	#14	1 Elec	65	.123	C.L.F.		3.51		3.51	5.30	
	1840	#12		55	.145			4.15		4.15	6.25	
	1850	#10		45.50	.176			5		5	7.55	
	1860	#8		40.40	.198			5.65		5.65	8.50	
	1870	#6		32.60	.245			7		7	10.55	
	1880	#4		26.50	.302			8.60		8.60	12.95	
	1890	#3		25	.321			9.10		9.10	13.75	
	1900	#2		22.30	.359			10.20		10.20	15.40	
	1910	1/0		16.60	.482			13.75		13.75	20.50	
	1920	2/0		14.60	.548			15.60		15.60	23.50	
	1930	3/0		12.50	.641			18.25		18.25	27.50	
	1940	4/0		11	.727			20.50		20.50	31	
	1950	250 MCM		10	.800			23		23	34.50	
	1960	300 MCM		9.50	.842			24		24	36	
	1970	350 MCM		9	.889			25.50		25.50	38	
	1980	400 MCM		8.50	.941			27		27	40.50	
	1990	500 MCM		8.10	.988			28		28	42.50	
	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.		13.05		13.05	19.65	
	2120	2' x 4', 2 lamp		33	.485			13.80		13.80	21	
	2140	2' x 4', 4 lamp		30	.533			15.20		15.20	23	
	2160	4' x 4', 4 lamp		20	.800			23		23	34.50	
	2180	Surface mount, acrylic lens & hinged frame										
	2200	1' x 4', 2 lamp	2 Elec	44	.364	Ea.		10.35		10.35	15.60	
	2220	2' x 2', 2 lamp		44	.364			10.35		10.35	15.60	
	2260	2' x 4', 4 lamp		33	.485			13.80		13.80	21	
	2280	4' x 4', 4 lamp		23	.696			19.85		19.85	30	

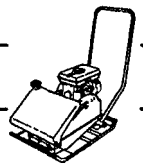
See the Reference Section for reference number information, Crew Listings and City Cost Indexes

020 750 | Concrete Removal

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P
758	3120	Soft old mortar	A-1	160	.050	L.F.		.97	.38	1.35	1.96
	3140	Hard mortar	"	140	.057	"		1.11	.43	1.54	2.24
	4000	Fireplace, brick, 30" x 24" opening									
	4020	Soft old mortar	A-1	2	4	Ea.		77.50	30	107.50	157
	4040	Hard mortar		1.25	6.400			124	48	172	251
	4100	Stone, soft old mortar		1.50	5.333			103	40	143	209
	4120	Hard mortar		1	8			155	60	215	315
	5000	Veneers, brick, soft old mortar		140	.057	S.F.		1.11	.43	1.54	2.24
	5020	Hard mortar		125	.064			1.24	.48	1.72	2.51
	5100	Granite and marble, 2" thick		180	.044			.86	.33	1.19	1.75
	5120	4" thick		170	.047			.91	.35	1.26	1.85
	5140	Stone, 4" thick		180	.044			.86	.33	1.19	1.75
	5160	8" thick		175	.046			.89	.34	1.23	1.79
	5400	Alternate pricing method, stone, 4" thick		60	.133	C.F.		2.59	1	3.59	5.25
	5420	8" thick		85	.094	"		1.83	.71	2.54	3.69
880	0010	REMOVAL OF UNDERGROUND STORAGE TANKS (R020-880)									
	0011	Petroleum storage tanks, non-leaking									
	0100	Excavate & load onto trailer									
	0110	3000 gal. to 5000 gal. tank	B-14	5	9.600	Ea.		197	41	238	355
	0120	6000 gal to 8000 gal tank		4	12			246	51.50	297.50	445
	0130	9000 gal to 12000 tank		3	16			330	68.50	398.50	595
	0190	Known leaking tank add								100%	100%
	0200	Remove sludge, water and remaining product from bottom									
	0201	of tank with vacuum truck									
	0300	3000 gal to 5000 gal tank	A-13	10	.800	Ea.		19.30	49.50	68.80	84
	0310	6000 gal to 8000 gal tank		8	1			24	62	86	105
	0320	9000 gal to 12000 gal tank		6	1.333			32	82.50	114.50	141
	0390	Dispose of sludge off-site, average				Gal.					2.35
	0400	Insert solid carbon dioxide "dry ice" to produce inert gas									
	0401	For cleaning & transporting tanks (1.5 lbs./100 gal. capacity)	1 Clab	500	.016	Lb.	.80	.31		1.11	1.39
	1020	Haul tank to certified salvage dump, 100 miles round trip									
	1023	3000 gal. to 5000 gal. tank				Ea.				500	550
	1026	6000 gal. to 8000 gal. tank								600	660
	1029	9,000 gal. to 12,000 gal. tank								800	880
	1100	Disposal of contaminated soil to landfill									
	1110	Minimum				C.Y.					138
	1111	Maximum				"					290
	1120	Disposal of contaminated soil to									
	1121	bituminous concrete batch plant									
	1130	Minimum				C.Y.					45
	1131	Maximum				"					90
	2010	Decontamination of soil on site including poly tarp on top & bottom									
	2011	Soil containment berm, and chemical treatment									
	2020	Minimum	B-11C	100	.160	C.Y.	5.25	3.56	2.06	10.87	13.60
	2021	Maximum	"	100	.160		6.50	3.56	2.06	12.12	14.95
	2050	Disposal of decontaminated soil, minimum									53
	2055	Maximum									90

022 200 | Excav./Backfill/Compact.

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
226	6020	3 passes	B-10D	2,000	.006	C.Y.		.14	.48	.62	.75	226
	6030	4 passes		1,500	.008			.19	.64	.83	.99	
	6050	12" lifts, 2 passes		6,000	.002			.05	.16	.21	.25	
	6060	3 passes		4,000	.003			.07	.24	.31	.37	
	6070	4 passes		3,000	.004			.09	.32	.41	.49	
	6200	Vibrating roller, 6" lifts, 2 passes	B-10C	2,600	.005			.11	.36	.47	.57	
	6210	3 passes		1,735	.007			.16	.55	.71	.85	
	6220	4 passes		1,300	.009			.21	.73	.94	1.13	
	6250	12" lifts, 2 passes		5,200	.002			.05	.18	.23	.28	
	6260	3 passes		3,465	.003			.08	.27	.35	.43	
	6270	4 passes		2,600	.005			.11	.36	.47	.57	
	7000	Walk behind, vibrating plate 18" wide, 6" lifts, 2 passes	A-1	280	.029			.55	.22	.77	1.12	
	7020	3 passes		185	.043			.84	.33	1.17	1.70	
	7040	4 passes		140	.057			1.11	.43	1.54	2.24	
	7200	12" lifts, 2 passes		560	.014			.28	.11	.39	.56	
	7220	3 passes		375	.021			.41	.16	.57	.84	
	7240	4 passes		280	.029			.55	.22	.77	1.12	
	7500	Vibrating roller 24" wide, 6" lifts, 2 passes	B-10A	420	.029			.66	.20	.86	1.25	
	7520	3 passes		280	.043			1	.30	1.30	1.88	
	7540	4 passes		210	.057			1.33	.40	1.73	2.50	
	7600	12" lifts, 2 passes		840	.014			.33	.10	.43	.63	
	7620	3 passes		560	.021			.50	.15	.65	.94	
	7640	4 passes		420	.029			.66	.20	.86	1.25	
	8000	Rammer tamper, 6" to 11", 4" lifts, 2 passes	A-1	130	.062			1.19	.46	1.65	2.41	
	8050	3 passes		97	.082			1.60	.62	2.22	3.23	
	8100	4 passes		65	.123			2.39	.93	3.32	4.83	
	8200	8" lifts, 2 passes		260	.031			.60	.23	.83	1.20	
	8250	3 passes		195	.041			.80	.31	1.11	1.61	
	8300	4 passes		130	.062			1.19	.46	1.65	2.41	
	8400	13" to 18", 4" lifts, 2 passes		390	.021			.40	.15	.55	.80	
	8450	3 passes		290	.028			.54	.21	.75	1.08	
	8500	4 passes		195	.041			.80	.31	1.11	1.61	
	8600	8" lifts, 2 passes		780	.010			.20	.08	.28	.40	
	8650	3 passes		585	.014			.27	.10	.37	.53	
	8700	4 passes		390	.021			.40	.15	.55	.80	
230	0010	**DRILLING ONLY** 2" hole for rock bolts, average	B-47	395	.061	LF.		1.32	1.42	2.74	3.63	230
	0800	2-1/2" hole for pre-splitting, average		540	.044			.96	1.04	2	2.65	
	1600	Quarry operations, 2-1/2" to 3-1/2" diameter		715	.034			.73	.78	1.51	2	
	1610	6" diameter drill holes	B-47A	1,350	.018			.41	.33	.74	1	
234	0010	**DRILLING AND BLASTING** Only, rock, open face, under 1500 C.Y.	B-47	225	.107	C.Y.	1.40	2.31	2.49	6.20	7.90	234
	0100	Over 1500 C.Y.	"	300	.080		1.40	1.73	1.87	5	6.35	
	0300	Bulk drilling and blasting, can vary greatly, average									3.65	
	0500	Pits, average									18.75	
	1300	Deep hole method, up to 1500 C.Y.	B-47	50	.480		1.40	10.40	11.20	23	30	
	1400	Over 1500 C.Y.		66	.364		1.40	7.85	8.50	17.75	23.50	
	1900	Restricted areas, up to 1500 C.Y.		13	1.846		1.40	40	43	84.40	112	
	2000	Over 1500 C.Y.		20	1.200		1.40	26	28	55.40	73.50	
	2200	Trenches, up to 1500 C.Y.		22	1.091		1.40	23.50	25.50	50.40	66.50	
	2300	Over 1500 C.Y.		26	.923		1.40	20	21.50	42.90	56.50	
	2500	Pier holes, up to 1500 C.Y.		22	1.091		1.40	23.50	25.50	50.40	66.50	
	2600	Over 1500 C.Y.		31	.774		1.40	16.75	18.10	36.25	48	
	2800	Boulders under 1/2 C.Y., loaded on truck, no hauling	B-10O	80	.150			3.48	6.10	9.58	12.10	
	2900	Drilled, blasted and loaded on truck, no hauling	B-47	30	.800		1.40	17.30	18.70	37.40	49.50	
	3100	Jackhammer operators with foreman compressor, air tools	B-9	1	40	Day		790	152	942	1,450	
	3300	Track drill, compressor, operator and foreman	B-47	1	24	"		520	560	1,080	1,425	



022 200 | Excav./Backfill/Compact.

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
238	4400	Clamshell in sheeting or cofferdam, minimum	B-12H	160	.100	C.Y.		2.38	3.44	5.82	7.45	238
	4450	Maximum	"	60	.267			6.35	9.20	15.55	19.85	
	8000	For hauling excavated material, see div. 022-266										
242	0010	EXCAVATING, BULK, DOZER Open site (R022-240)										242
	2000	75 H.P., 50' haul, sand & gravel	B-10L	460	.026	C.Y.		.61	.61	1.22	1.61	
	2020	Common earth		400	.030			.70	.70	1.40	1.85	
	2040	Clay		250	.048			1.12	1.12	2.24	2.96	
	2200	150' haul, sand & gravel		230	.052			1.21	1.22	2.43	3.22	
	2220	Common earth		200	.060			1.39	1.40	2.79	3.71	
	2240	Clay		125	.096			2.23	2.24	4.47	5.95	
	2400	300' haul, sand & gravel		120	.100			2.32	2.33	4.65	6.20	
	2420	Common earth		100	.120			2.79	2.80	5.59	7.40	
	2440	Clay		65	.185			4.29	4.31	8.60	11.40	
	3000	105 H.P., 50' haul, sand & gravel	B-10W	700	.017			.40	.59	.99	1.27	
	3020	Common earth		610	.020			.46	.68	1.14	1.46	
	3040	Clay		385	.031			.72	1.08	1.80	2.32	
	3200	150' haul, sand & gravel		310	.039			.90	1.34	2.24	2.87	
	3220	Common earth		270	.044			1.03	1.54	2.57	3.30	
	3240	Clay		170	.071			1.64	2.44	4.08	5.25	
	3300	300' haul, sand & gravel		140	.086			1.99	2.97	4.96	6.35	
	3320	Common earth		120	.100			2.32	3.46	5.78	7.40	
	3340	Clay		100	.120			2.79	4.16	6.95	8.90	
	4000	200 H.P., 50' haul, sand & gravel	B-10B	1,400	.009			.20	.60	.80	.97	
	4020	Common earth		1,230	.010			.23	.69	.92	1.11	
	4040	Clay		770	.016			.36	1.10	1.46	1.77	
	4200	150' haul, sand & gravel		595	.020			.47	1.42	1.89	2.29	
	4220	Common earth		516	.023			.54	1.64	2.18	2.64	
	4240	Clay		325	.037			.86	2.60	3.46	4.19	
	4400	300' haul, sand & gravel		310	.039			.90	2.73	3.63	4.40	
	4420	Common earth		270	.044			1.03	3.13	4.16	5.05	
	4440	Clay		170	.071			1.64	4.97	6.61	8	
	5000	300 H.P., 50' haul, sand & gravel	B-10M	1,900	.006			.15	.54	.69	.82	
	5020	Common earth		1,650	.007			.17	.62	.79	.94	
	5040	Clay		1,025	.012			.27	1	1.27	1.52	
	5200	150' haul, sand & gravel		920	.013			.30	1.12	1.42	1.70	
	5220	Common earth		800	.015			.35	1.28	1.63	1.95	
	5240	Clay		500	.024			.56	2.05	2.61	3.13	
	5400	300' haul, sand & gravel		470	.026			.59	2.19	2.78	3.32	
	5420	Common earth		410	.029			.68	2.50	3.18	3.82	
	5440	Clay		250	.048			1.12	4.11	5.23	6.25	
	5500	460 H.P., 50' haul, sand & gravel	B-10X	1,930	.006			.14	.67	.81	.96	
	5510	Common earth		1,680	.007			.17	.77	.94	1.11	
	5520	Clay		1,050	.011			.27	1.23	1.50	1.77	
	5530	150' haul, sand & gravel		1,290	.009			.22	1	1.22	1.45	
	5540	Common earth		1,120	.011			.25	1.16	1.41	1.66	
	5550	Clay		700	.017			.40	1.85	2.25	2.66	
	5560	300' haul, sand & gravel		660	.018			.42	1.96	2.38	2.82	
	5570	Common earth		575	.021			.48	2.25	2.73	3.23	
	5580	Clay		350	.034			.80	3.70	4.50	5.30	
	6000	700 H.P., 50' haul, sand & gravel	B-10V	3,500	.003			.08	.81	.89	1.02	
	6010	Common earth		3,035	.004			.09	.94	1.03	1.17	
	6020	Clay		1,925	.006			.14	1.48	1.62	1.86	
	6030	150' haul, sand & gravel		2,025	.006			.14	1.41	1.55	1.76	
	6040	Common earth		1,750	.007			.16	1.63	1.79	2.04	
	6050	Clay		1,100	.011			.25	2.59	2.84	3.24	

029 300 | Lawns & Grasses

			CREW	DAILY OUTPUT	MAN-HOURS	UNIT	1995 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P	
308	2200	Fescue 5.5#/M.S.F., tall, push spreader	A-1	10	.800	M.S.F.	7.35	15.50	6	28.85	39.50	308
	2300	Tractor spreader	B-66	52	.154		7.35	3.72	3.62	14.69	17.80	
	2400	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		22.50	6.50	7.15	36.15	42.50	
	2500	Chewing, push spreader	A-1	10	.800		8.55	15.50	6	30.05	41	
	2600	Tractor spreader	B-66	52	.154		8.55	3.72	3.62	15.89	19.10	
	2700	Hydro or air seeding, with mulch and fertil.	B-81	80	.300		23.50	6.50	7.15	37.15	43.50	
	2900	Crown vetch, 4#/M.S.F., push spreader	A-1	10	.800		38.50	15.50	6	60	74	
	3000	Tractor spreader	B-66	52	.154		38.50	3.72	3.62	45.84	52	
	3100	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		53	6.50	7.15	66.65	76	
	3300	Rye, 10#/M.S.F., annual, push spreader	A-1	10	.800		4.85	15.50	6	26.35	37	
	3400	Tractor spreader	B-66	52	.154		4.85	3.72	3.62	12.19	15.05	
	3500	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		18.25	6.50	7.15	31.90	38	
	3600	Fine textured, push spreader	A-1	10	.800		13.95	15.50	6	35.45	47	
	3700	Tractor spreader	B-66	52	.154		13.95	3.72	3.62	21.29	25	
	3800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		28.50	6.50	7.15	42.15	49	
	4000	Shade mix, 6#/M.S.F., push spreader	A-1	10	.800		10.30	15.50	6	31.80	43	
	4100	Tractor spreader	B-66	52	.154		10.30	3.72	3.62	17.64	21	
	4200	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		25.50	6.50	7.15	39.15	46	
	4400	Slope mix, 6#/M.S.F., push spreader	A-1	10	.800		8.65	15.50	6	30.15	41	
	4500	Tractor spreader	B-66	52	.154		8.65	3.72	3.62	15.99	19.20	
	4600	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		23.50	6.50	7.15	37.15	43.50	
	4800	Turf mix, 4#/M.S.F., push spreader	A-1	10	.800		8.50	15.50	6	30	41	
	4900	Tractor spreader	B-66	52	.154		8.50	3.72	3.62	15.84	19.05	
	5000	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		23.50	6.50	7.15	37.15	43.50	
	5200	Utility mix, 7#/M.S.F., push spreader	A-1	10	.800		10.45	15.50	6	31.95	43	
	5300	Tractor spreader	B-66	52	.154		10.55	3.72	3.62	17.89	21.50	
	5400	Hydro or air seeidng, with mulch and fertilizer	B-81	80	.300		25.50	6.50	7.15	39.15	46	
	5600	Wildflower, .10#/M.S.F., push spreader	A-1	10	.800		4.30	15.50	6	25.80	36.50	
	5700	Tractor spreader	B-66	52	.154		4.30	3.72	3.62	11.64	14.40	
	5800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		18.30	6.50	7.15	31.95	38	
	7000	Apply fertilizer, 800 lb./acre	B-64	5.60	2.857	Ton	213	56.50	46.50	316	375	
	7050	Apply limestone, 800 lb./acre	"	5.60	2.857	"	58	56.50	46.50	161	204	
	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	102	12.40	269.40	345	316
	0200	4 M.S.F.		7	5.714		164	116	14.15	294.15	380	
	0300	1000 S.F.		6	6.667		180	136	16.55	332.55	430	
	0500	Sloped ground, over 8 M.S.F.		6	6.667		164	136	16.55	316.55	415	
	0600	4 M.S.F.		5	8		175	163	19.85	357.85	475	
	0700	1000 S.F.		4	10		189	204	25	418	555	
	1000	Bent grass sod, on level ground, over 6 M.S.F.		20	2		305	40.50	4.96	350.46	405	
	1100	3 M.S.F.		18	2.222		340	45	5.50	390.50	455	
	1200	1000 S.F.		16	2.500		360	51	6.20	417.20	480	
	1500	Sloped ground, over 6 M.S.F.		15	2.667		320	54.50	6.60	381.10	445	
	1600	3 M.S.F.		13.50	2.963		350	60.50	7.35	417.85	490	
	1700	1000 S.F.		12	3.333		370	68	8.25	446.25	520	
320	0010	**STOLENS, SPRIGGING**										320
	0100	6" O.C., by hand	1 Clab	4	2	M.S.F.	11.50	39		50.50	74.50	
	0110	Walk behind sprig planter	"	80	.100		11.50	1.94		13.44	15.75	
	0120	Towed sprig planter	B-66	350	.023		11.50	.55	.54	12.59	14.10	
	0130	9" O.C., by hand	1 Clab	5.20	1.538		8.50	30		38.50	57	
	0140	Walk behind sprig planter	"	92	.087		8.50	1.69		10.19	12.05	
	0150	Towed sprig planter	B-66	420	.019		8.50	.46	.45	9.41	10.55	
	0160	12" O.C., by hand	1 Clab	6	1.333		5.25	26		31.25	47.50	
	0170	Walk behind sprig planter	"	110	.073		5.25	1.41		6.66	8.05	
	0180	Towed sprig planter	B-66	500	.016		5.25	.39	.38	6.02	6.80	

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.	Average Fixed Over-head	Over-head	Profit	Total Overhead & Profit		Rate with O & P	
Abbr.	Trade	Hourly	Daily	Ins.				%	Amount	Hourly	Daily
Skwk	Skilled Workers Average (35 trades)	$25.35	$202.80	19.8%	16.8%	13.0%	10.0%	59.6%	$15.10	$40.45	$323.60
	Helpers Average (5 trades)	18.85	150.80	21.2		11.0		59.0	11.10	29.95	239.60
	Foreman Average, Inside ($.50 over trade)	25.85	206.80	19.8		13.0		59.6	15.40	41.25	330.00
	Foreman Average, Outside ($2.00 over trade)	27.35	218.80	19.8		13.0		59.6	16.30	43.65	349.20
Clab	Common Building Laborers	19.40	155.20	21.7		11.0		59.5	11.55	30.95	247.60
Asbe	Asbestos Workers	28.00	224.00	19.0		16.0		61.8	17.30	45.30	362.40
Boil	Boilermakers	29.30	234.40	12.1		16.0		54.9	16.10	45.40	363.20
Bric	Bricklayers	25.25	202.00	19.3		11.0		57.1	14.40	39.65	317.20
Brhe	Bricklayer Helpers	19.55	156.40	19.3		11.0		57.1	11.15	30.70	245.60
Carp	Carpenters	24.60	196.80	21.7		11.0		59.5	14.65	39.25	314.00
Cefi	Cement Finishers	23.90	191.20	12.4		11.0		50.2	12.00	35.90	287.20
Elec	Electricians	28.50	228.00	7.9		16.0		50.7	14.45	42.95	343.60
Elev	Elevator Constructors	29.05	232.40	9.2		16.0		52.0	15.10	44.15	353.20
Eqhv	Equipment Operators, Crane or Shovel	26.15	209.20	13.0		14.0		53.8	14.05	40.20	321.60
Eqmd	Equipment Operators, Medium Equipment	25.15	201.20	13.0		14.0		53.8	13.55	38.70	309.60
Eqlt	Equipment Operators, Light Equipment	24.15	193.20	13.0		14.0		53.8	13.00	37.15	297.20
Eqol	Equipment Operators, Oilers	21.40	171.20	13.0		14.0		53.8	11.50	32.90	263.20
Eqmm	Equipment Operators, Master Mechanics	26.85	214.80	13.0		14.0		53.8	14.45	41.30	330.40
Glaz	Glaziers	24.50	196.00	16.0		11.0		53.8	13.20	37.70	301.60
Lath	Lathers	24.30	194.40	13.9		11.0		51.7	12.55	36.85	294.80
Marb	Marble Setters	25.10	200.80	19.3		11.0		57.1	14.35	39.45	315.60
Mill	Millwrights	25.95	207.60	13.2		11.0		51.0	13.25	39.20	313.60
Mstz	Mosaic and Terrazzo Workers	24.55	196.40	11.0		11.0		48.8	12.00	36.55	292.40
Pord	Painters, Ordinary	22.60	180.80	16.4		11.0		54.2	12.25	34.85	278.80
Psst	Painters, Structural Steel	23.50	188.00	64.2		11.0		102.0	23.95	47.45	379.60
Pape	Paper Hangers	22.85	182.80	16.4		11.0		54.2	12.40	35.25	282.00
Pile	Pile Drivers	24.70	197.60	33.4		16.0		76.2	18.80	43.50	348.00
Plas	Plasterers	23.70	189.60	17.4		11.0		55.2	13.10	36.80	294.40
Plah	Plasterer Helpers	19.80	158.40	17.4		11.0		55.2	10.95	30.75	246.00
Plum	Plumbers	29.30	234.40	10.1		16.0		52.9	15.50	44.80	358.40
Rodm	Rodmen (Reinforcing)	27.10	216.80	36.1		14.0		76.9	20.85	47.95	383.60
Rofc	Roofers, Composition	22.05	176.40	36.4		11.0		74.2	16.35	38.40	307.20
Rots	Roofers, Tile and Slate	22.05	176.40	36.4		11.0		74.2	16.35	38.40	307.20
Rohe	Roofer Helpers (Composition)	15.60	124.80	36.4		11.0		74.2	11.60	27.20	217.60
Shee	Sheet Metal Workers	28.10	224.80	13.7		16.0		56.5	15.90	44.00	352.00
Spri	Sprinkler Installers	30.85	246.80	10.4		16.0		53.2	16.40	47.25	378.00
Stpi	Steamfitters or Pipefitters	29.25	234.00	10.1		16.0		52.9	15.45	44.70	357.60
Ston	Stone Masons	25.35	202.80	19.3		11.0		57.1	14.45	39.80	318.40
Sswk	Structural Steel Workers	27.15	217.20	44.4		14.0		85.2	23.15	50.30	402.40
Tilf	Tile Layers	24.45	195.60	11.0		11.0		48.8	11.95	36.40	291.20
Tilh	Tile Layer Helpers	19.95	159.60	11.0		11.0		48.8	9.75	29.70	237.60
Trlt	Truck Drivers, Light	20.00	160.00	16.9		11.0		54.7	10.95	30.95	247.60
Trhv	Truck Drivers, Heavy	20.35	162.80	16.9		11.0		54.7	11.15	31.50	252.00
Sswl	Welders, Structural Steel	27.15	217.20	44.4		14.0		85.2	23.15	50.30	402.40
Wrck	*Wrecking	19.40	155.20	44.4		11.0		82.2	15.95	35.35	282.80

*Not included in Averages.