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3.4-6(1) Postmining Land Use

The preparation plant and refuse pile area have the potential of supporting wildlife habitat, grazing, and industrial. The reclamation plan supports both the designated pre- and postmining land uses of wildlife habitat and grazing, and the industrial use listed below.

The postmining land use for the preparation plant area is for industrial use by Price River Water Improvement District (PRWID). PRWID desires the land (approx. 46.2 acres) to address immediate and long term expansion of its water treatment and distribution system as expressed in the letter of intent and agreements presented in Appendix 3.4L. This is a higher and better use of the land.

Proof of publication and letters to and comments from the legal or equitable owner of record of the surface areas to be affected, concerning the proposed use are provided in Appendix 3.4L.

The lands not required for PRWID's intended use, as shown on Map 3.4-9, which includes the refuse pile will be reclaimed to its premining land use of wildlife habitat (approx. 49.1 acres).

In order to facilitate the industrial postmining land use, primary roads P-1, P-2, P-4, P-5, and P-6 will be maintained in their entirety or portion there of as shown on Maps 3.4-9 and 3.4-12. Map 3.4-9 also shows general locations of underground utilities such as: raw water, culinary water, and sewer. The underground utilities lie immediately below or adjacent to Primary roads P-1 and P-4.

It should also be noted that primary roads P-1 and P-4 are not only used by the Permittee, but also Utah Power and Light, Helper City, Price City, and PRWID to check and repair their underground utilities. Furthermore, this corridor is used as a secondary escape way should the railroad crossings be blocked during an emergency. Primary roads P-2 and P-5 are routinely used by Utah Power and Light to inspect and repair their power line the traverses up Barn Canyon.

3.4-6(2) Reclamation Work

The preparation plant was designed to remain in use until the minable reserve base is depleted or until mining permanently ceases. Reclamation of the School House Canyon refuse site will begin as soon as the canyon is filled to its design capacity or until no longer needed for the disposal of coal processing waste.

The post-mining reclamation topography plan for the preparation plant area is shown on Maps 3.4-9 (Preparation Plant Area and Refuse Pile Reclamation Topography Map) and 3.4-10 (Preparation Plant Area and Refuse Pile Reclamation Cross-Sections and Profile Map). The reclamation work will consist of the following: demolition, backfilling and grading, pond removal, topsoil placement, and seeding and mulching.

A description of these activities follows.

Demolition - All existing structures which lie within the disturbed area boundary and do not support the postmining land uses will be removed. However, utilities within the utility corridor, along with a buried telephone cable parallel with the utility corridor, will remain. Water supply intakes serving the preparation plant outside the disturbed area boundary will also remain. In addition, the diversion and culverts identified on Map 3.4-9 will remain.

Portal Sealing - There are no portals to seal at the preparation plant.

Grading - The area will be graded to promote drainage and approximate the topography noted on Maps 3.4-9, 3.4-10 and 3.4-10a. This topography will be achieved by blending the soil material into the adjacent area and creating landforms which resemble the surrounding topography. The mass balance calculations associated with the grading are presented in Table 3.4-5. The grading plan as shown on Map 3.4-9 meets the criteria set forth in R645-301-553, Backfilling and Grading.

A comparison of Maps 3.4-1 and 3.4-10 indicates that all post-SMCRA and most pre-SMCRA cut slopes will be backfilled to the extent practical during reclamation. Those pre-SMCRA cut slopes which cannot practically be reclaimed are identified on Map 3.4-9. The cut slopes were analyzed for stability in their present configuration and for long-term retention following reclamation. This analysis is presented in Appendix 3.4H, with the cross sections used to analyze the slopes shown on Map 3.4-8.

As indicated in Section 4.0 of Appendix 3.4-H, the calculated factor of safety for the retained cut slopes exceeds the minimum static factor of safety of 1.3 stipulated by R645-301-553.130. Appendix 3.4-H further documents the existence of natural cliffs and ledges in the preparation plant area and concludes that the cut slopes to be retained are similar in structural composition and geometry to the naturally existing cliff/ledge formations and thus are compatible with the surrounding topography.

During the backfilling and grading, the following work will be performed:

- Elimination of berms and temporary diversions, except where necessary to support the postmining land use .
- Grading to remove cut slopes to the extent practical and establish overland flow drainage to support postmining land uses.
- Construction of permanent stream channels.
- Removal of existing culverts, except where necessary to support the post mining land use.
- Removal of Ponds 011, 012A and 012B, and 013.
- Maintain existing accesses and utility corridors
- Soil preparation, seeding, fertilizing and mulching.

The reclamation of the Willow Creek Preparation Plant area will take place over the area which was the old town site of Castle Gate. Hence, old utilities, foundations and debris may be uncovered during the grading operation. This may result in the alteration of the contours shown on Maps 3.4-9 and 3.4-10 by as many as two contour intervals in order to keep from uncovering the old town site. If foundation debris is cut during the reclamation process, it will be used as deep fill layers against cut slopes or as fill material within ponds.

Reclamation will also include the removal of all roads and culverts, except as noted on Map 3.4-9 which are necessary to support the postmining land use, and the establishment of permanent stream channels.

The slurry injection wells discussed in Section 3.10 of this exhibit have been sealed, and the area in the immediate vicinity of the wells reclaimed in accordance with the plan contained in Section 3.10 of this exhibit. The piezometers in the downstream embankment of Pond 013 will be removed during reclamation.

The reclamation topography plan for the Unit Train Loadout area is shown on Map 3.4-9. A discussion of the reclamation plan is included in Section 3.8 of this exhibit.

The backfill and grading topography shown on Map 3.4-9 is compatible with the postmining land use of industrial, wildlife habitat and grazing, and provides adequate drainage and long term stability as required by R645-301-553.522. The final configuration for the refuse pile is suitable for the approved postmining land use of wildlife habit and grazing. A profile and cross-sections of the refuse pile are shown on Map 3.4-10 and 3.4-10a.

Grading will be done in order to establish drainage and stabilize cutslopes. The scheduling of the grading work will minimize the disturbance to the hydrologic balance. Sediment ponds will remain in place as long as possible during the grading work. The planned sequence of removal of the sediment control structures follows:

- During the reshaping, resoiling, mulching, deep gouging, reseeding, final mulching, and channel construction on the refuse pile, Pond 013 will be maintained in full or partial capacity until when the channel must be constructed through the pond and pond embankment.
- Prior to the removal of Pond 013, most of the refuse pile upstream will have been treated using the deep gouging and mulching alternative sediment control measures.
- During the brief period when the refuse pile channel is not connected to the undisturbed culvert, any flow coming down the channel will flow into Ponds 012A and 012B. To minimize the potential for offsite contribution of sediment, and overloading the ponds' abilities to treat runoff, weather patterns will be monitored and work performed when conditions are less likely to cause significant flow from upstream watersheds.
- Ponds 011, 012A and 012B will be maintained until the majority of the land reporting to them is reshaped and gouged, and their backfilling is required.
- As required for temporary treatment, strawbales and/or silt fences will be installed following the removal of sediment ponds and maintained until the reclamation alternative sediment control measures are in place.

Resoiling - Most of the 77.9 acres in the preparation plant area and refuse pile area which will be reclaimed were disturbed by mining activities prior to the enactment of SMCRA. Hence, no topsoil was salvaged from the site except in the area of post-SMCRA disturbance (e.g., the refuse pile and the clean-coal storage area). The existing soils at the site will be used as resoiling material except at the refuse pile and the clean-coal storage area, where the salvaged topsoil stored at the Gravel Canyon or Willow Creek stockpile will be used.

Access onto and from Highway 6 or 191 will be conducted in accordance with the Utah Department of Transportation's requirements to protect the public's safety. All appropriate signs and traffic control personnel will be utilized.

The existing soils at the preparation plant site were sampled in May 1991 and analyzed for several chemical and physical parameters, including those recommended in the Division "Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining," dated April 1988. Results of these analyses are presented in Appendix 8-2, while sampling locations are depicted on Map 8-4. As indicated in Appendix 8-2, each of the parameters fell within the "good" to "fair" ranges as indicated in the above mentioned guideline. Hence, soil at the site is suitable for use in reclamation.

Given the time frame between the 1991 soil sampling and the probable onset of reclamation, the resoiling materials will be sampled again prior to reclamation. Appropriate horizons encountered within test pits installed for this effort will be sampled, with the samples being analyzed for appropriate parameters as recommended by the Division.

In March 2004, four soil pits were sampled and analyzed in the preparation plant and clean coal stockpiles areas to ensure suitability. The soil pit locations are shown on Map 3.4-12 and the analyses presented in Appendix 3.4M. These soil samples along with those discussed in Volume 1, Section 3.1.1.5 and Chapter 8 show the subsoils to be suitable for use during reclamation. Therefore, this soil material will be used instead of the soil remaining at Gravel Canyon.

The soils remaining in Gravel Canyon will be redistributed on site to enhance the reclamation and wildlife habitat. To redistribute this soil onto the industrial land use area only to be disturbed at a later date by the Price River Water Improvement District is not the best utilization of the soil resource.

The refuse pile will be covered with 36" of soil from the Gravel Canyon soil storage site and Pond 13 embankment material during reclamation. Approximately 96,800 cubic yards of material will be needed for this purpose. Approximately 80,654 cubic yards will be soil from the Gravel Canyon and/or Willow Creek stockpile and approximately 16,146 cubic yards from the Pond 13 embankment and adjacent area. Justification for use of less than 4' of cover on the refuse pile is the nontoxic nature of the refuse. Approximately one year prior to placement of substitute topsoil on the refuse pile, the refuse will be evaluated in accordance with Division in order to prove non-toxicity. Results of the tests will be forwarded to DOGM for review and be incorporated into Appendix 3.4M. The sample locations coincide with the station locations shown on Map 3.4-12.

During the construction of the Willow Creek Mine, approximately 450,000 tons of coal waste was removed from the mine portal face-up placed by the Division of Oil, Gas and Mining's Abandoned Mined Lands (AML) Department during their cleanup of several coal waste sites along the Price River and placed on the refuse pile. The location and depth of this material is shown on maps generated for MSHA in 1996 and 2000 (Appendix 3.4M). By overlaying these maps, it can be seen what the topography of the refuse pile surface was before the coal waste was placed, after it was placed, and what the surface was prior to reclamation.

It should be noted, that prior to removing this coal waste and placing it on the refuse pile, approximately 16 inches of growth media was salvaged and stockpiled for redistribution during reclamation. The Division of Oil, Gas and Mining did not analyze this coal waste for its toxic and acid generating potential, but instead, only covered it with a skiff of soil after they removed it from along the Price River and used it as backfill against a pre-SMCRA highwall and other cut-faces.

By contrast, the permittee is placing a minimum of four-feet of suitable cover material over this material where it is intercepted during the construction of the reclamation channel on the refuse pile to minimize the toxicity affects that may occur due to the elevated boron concentrations identified in the coal waste.

Any acid forming or toxic materials exposed during the grading operation will be buried either on the Refuse Pile, adjacent to a cut slope, within a sedimentation pond, or in place. In any case, the acid and/or toxic material will be buried under at least four feet of nonacid- and nontoxic forming material as measured by the final reclamation grade.

The soil material placed on the refuse pile will be deep gouged, following the placement of 2.0 tons/acres of certified noxious weed free hay. The gouges provide a means by which to harvest precipitation and snow-melt, minimize erosion, provide a place for seeds to settle, and other enhancement aspects suitable for vegetation success. Map 3.4-12 "Preparation Plant Area and Refuse Pile Reclamation Topography and Treatment Map" shows the areas to be deep gouged and mulched. This includes portions of the preparation plant area that will support the industrial postmining land use.

Seeding and Mulching - Two revegetation seed mixes will be used at the preparation plant site, as indicated in Chapter 9 of this exhibit, and Section 5.3, Volume I. The majority of the site will be seeded with the Upland Seed Mixture (Table 5.3-2b). The riparian areas shown on Map 3.4-9 will be seeded with species list #3. Following the placement of the growth media and prior to application of the reclamation seed mix, hay will be incorporated into the growth media at a rate of 2 tons per acre. This will be done to improve soil structure for aeration purposes, increase micropore space, and improve the water holding capacity of the soil. Incorporation of the mulch will occur through deep gouging. No fertilizer will be used during the reseeding activities.

Following seeding, an additional 1.0 to 1.5 tons per acre of certified noxious weed free straw mulch will be spread over the seeded growth media mostly by mechanical blowers with occasional hand spreading. The straw mulch will then be sprayed with a tackifier and mulch mixture at about 500 lbs per acre following spreading to retain it on the reseeded slopes. The tackifier and mulch technique provides a better means for retaining the straw mulch onto the reseeded areas than did the crimping technique.

Reclamation Monitoring

Reclamation monitoring will consist of water and vegetation monitoring until bond release.

3.4-6(3) Reclamation Hydrology

Reclamation Channel Design - The reclamation channels for the Willow Creek Preparation Plant area were designed to approximate the geometry of the existing natural stream channels and to convey the design flow under stable conditions. The natural channel sections were measured in the field and approximated with a trapezoidal cross section. The reclamation channels were generally designed with a 2H:1V side slope to ensure channel stability. However, existing stream channels, Castle Gate Ditches CGD-3 and CGD-4 were constructed with 1H:1V side slopes. These two ditches were previously designed for the operational hydrology of the Castle Gate area and were determined to be adequately designed for reclamation hydrology. The hydraulic slope of each channel was measured from electronic versions of Map 3.4-10.

All calculations supporting the designs of the reclamation hydrology structures are presented in Appendix 3.4J. Curve numbers for the undisturbed drainage areas were based on professional judgement and typical tabulated values. The reclaimed areas were assumed to have a curve number of 75. The reclamation channel drainage areas for the Preparation Plant Area are presented on Maps 3.4-11 and in the calculations in Appendix 3.4J.

Peak discharge rates used to determine channel capacities and riprap sizing for the reclamation channels were calculated based on the 100-year 6-hour precipitation event of 2.10 inches for perennial channels, intermittent channels, and any channel associated with the refuse pile. All other channels were designed for the 10-year 6-hour storm event of 1.4 inches (Miller et.al, 1973). A summary of the runoff calculations is presented in Appendix 3.4J and Table 3.4-6. The reclamation channel geometries and minimum riprap sizes are presented in Table 3.4-7.

Appendix 3.4J contains calculations for riprap and filter blanket requirements for permanent stream channels. The thickness, and thus the volume, of the riprap for each channel is related to the average proposed riprap stone diameter. For all channels the method developed by the U.S. Department of Transportation (1967), was used to determine the average riprap particle size (D_{50}). The proposed thickness of the riprap in these channels is twice the D_{50} dimension, as recommended by Barfield et al. (1981). Filter blanket volumes are based on a thickness equal to one half the riprap thickness, but not less than six inches (Barfield et al., 1981).

The following general approach was used during design of the reclamation channels:

- The design capacity of the perennial and intermittent reclamation channels, as well as any channel associated with the refuse pile was based on the 100-year 6-hour storm and the minimum channel slope.
- The design capacity of the ephemeral reclamation channels was based on the 10-year 6-hour storm and the minimum channel slope.
- Riprap was sized based on the 100-year 6-hour storm and the maximum channel slope for perennial channel, intermittent channels and all channels associated with the refuse pile.
- Riprap was sized based on the 10-year 6-hour storm and the maximum channel slope for ephemeral drainage channels.
- The roughness coefficient (Manning's "n") for riprapped channels was determined according to the equation (Abt et al., 1981):

$$n = 0.0456(D_{50} * \text{slope})^{0.159}$$

where, n = Manning's roughness coefficient
 D_{50} = median riprap diameter (ft)
 Slope = channel slope (ft/ft)

- Designs are based on channel construction on soil. Where the reclamation channel construction occurs on rock, riprap quantities will be reduced or eliminated (depending on the competency of the rock).
- When transitioning downstream from a steep channel slope to a flat channel slope, the larger riprap from the steep section will be extended into the channel section with the flatter slope for at least 15 feet to minimize erosion (Simons, Li & Associates, 1982).

- The reclamation channels are designed to pass the peak discharge with a minimum freeboard of 0.5 foot.

A detailed riprap and filter blanket design is not presented in this text since adequate soil samples were not available. The permittee is committed to preparing a detailed design for the riprap and filter blanket gradations. Samples will be taken once the reclamation grading has progressed sufficiently to expose the base of the reclamation channels. The riprap and filter blanket gradations for all channels will be engineered based on methods presented in Barfield et al. (1981). The procedure presented by Searcy (1967) will be used to design the riprap size for all channels. This design procedure assumes that the riprap is predominately angular in shape. The filter blanket will consist of a properly graded coarse grained soil; a synthetic fabric will not be used.

Table 3.4-8 summarizes the required riprap and filter blanket volumes for the reclamation channels. Total volumes reported in Table 3.4-8 do not account for the riprap required at the base of the reclamation culverts.

Reclamation Culvert Design - Calculations regarding design of the Willow Creek preparation plant reclamation culverts are presented in Appendix 3.4J. Summaries of the reclamation culvert discharges and designs are presented in Table 3.4-9.

Three culverts will remain for the preparation plant reclamation plan. As indicated in Appendix 3.4J, culvert CGC-1 is an adequately designed existing 18 inch culvert which will remain after reclamation. No riprap is required at the CGC-1 outlet.

CGC-5 is an adequately designed existing 48-inch diameter culvert located under the road and the Utah Railway spur. CGC-5 extends to the Price River and will be shortened during reclamation as shown on Map 3.4-9. An average riprap size of 40 inches will be required at the outlet.

CGC-2 consists of two 84-inch diameter CMP culverts which discharge into the channel of the Price River. These culverts are adequately designed to convey the peak flow resulting from the 100-year, 6-hour precipitation event. An average riprap size of 30 inches is required at the outlet.

3.4-6(4) Alternative Sediment Control Measures

Due to the desire to avoid redisturbance in a future phase of reclamation, the operational hydrology sedimentation ponds 011, 012A and 012B, and 013 will be removed during the reclamation grading operations. Therefore, alternative sediment control measures will be implemented during reclamation of the site to reduce the quantity of sediment yield from the area. These ASCMs will include the following practices in varying degrees:

1. Placement of growth media,
2. Incorporation of hay mulch into the growth media,
3. Deep gouging of the growth media,
4. Seeding the prepared soil,
5. Addition of more mulch following seeding, and
6. Physically or chemically anchoring the final mulch layer.

Based on Simons, Li & Associates (1983), these methods constitute some of the best available control technology for the purpose of mining reclamation. These methods have been very successful at recently reclaimed sites and are expected to work well on this site.

The alternative sediment control measures can be classified into three categories: filtering structures, mechanical treatment, and surface protection measures. Filtering structures inhibit runoff and sediment transport capacity by reducing flow velocity. They also physically trap sediment in the filter openings while allowing water to pass through. Mechanical treatment increases surface roughness thereby reducing overland flow velocity, which minimizes the sediment transport capacity. Detaining some of the would-be runoff also improves soil moisture for plant germination. Surface protection measures include mulching, mulch binders, netting, and seeding. These measures are the most effective controls since they minimize the amount

of soil detached by raindrop impact, and thus limit soil loss at the source. Surface protection measures also increase the surface roughness and increase water infiltration into the ground.

Mechanical treatment of slopes will be performed by ripping and/or deep gouging the soil to a depth of 18" to 24". Ripper shanks, if used, should be spaced about seven feet apart, or as allowed by the piece of equipment, and create parallel slots four to ten inches wide. Ripping and or deep gouging will loosen the soil and allow root penetration, increase surface roughness, and increase moisture storage. This will allow for quicker vegetation establishment, which will reduce erosion. The depressions from roughening trap sediment dislodged by raindrop impact and overland flow. They also shorten the exposed reaches over which runoff will flow, thereby reducing the sediment carrying capacity of the runoff.

In regard to surface protection measures, the incorporation of the mulch into the surface roughening will ensure that the major portion of mulch is anchored on site. The mulch itself can significantly reduce the amount of sediment yield from an area (Simons, Li & Associates, 1983). The mulch also helps retain moisture to allow for seed germination. Based on a rainfall intensity factor of 0.61 inches per hour, the minimum mulch application rate is 0.9 tons per acre to prevent mulch removal by rainfall (Simon et al., 1983). The referenced figure assumes that no chemical binder will be used. The intensity factor corresponds to a 10-year 6-hour storm event. Mulch, with a tackifier, will be applied at the rate of 2,000 pounds per acre.

Permanent plant growth is the best method of controlling erosion from slopes, according to Simons, Li & Associates (1983). Upon completion of the grading in accordance with the plan depicted in Map 3.4-9, and mechanical treatment of the soil, the reclaimed area will be seeded with grasses, shrubs and forbs. The species seed mix is addressed in Chapter 9, and Section 5.3, Volume I. Seeding will be performed at the appropriate time of the year in consideration of available moisture for germination. Areas in which the seed does not germinate will be reseeded. Following seeding the area will be mulched again at a rate of 1.0 to 1.5 tons per acre.

Appendix 3.4K presents calculations that quantify the sediment yield that could be expected annually under pre-mining conditions, immediately after reclamation, and after vegetation establishment, as 20.78 tons/acre/yr, 0.12 tons/acre/yr, and 18.82 tons/acre/yr, respectively. These calculations were performed to compare the sediment yield during each of the time periods to demonstrate that the reclaimed surface will produce less sediment than the same area under undisturbed conditions. The cumulative implementation of each sediment control measure substantially reduces the amount of sediment eroded from the reclaimed areas, to the point that the mulch and roughening theoretically inhibits soil loss more effectively than the undisturbed ground cover. Since the undisturbed areas contributing sediment to the stream channels are often larger than the reclaimed areas, most of the sediment erosion will occur from the undisturbed areas. As long as the depressions from surface roughening are in place, the sediment yield from upgradient areas will be prevented from reaching any stream channels.

Whenever possible, a minimum of one method of sediment control will be in place during reclamation construction. Filter fabric (silt) fences and/or straw bales will be installed to collect sediment runoff from areas which will not report to sedimentation ponds as soon as it is feasible to do so. Upon completion of the grading and soil ripping, the reclaimed area will be seeded and mulched.

The possibility exists that a 10-year 6-hour storm (or larger) will occur during the grading and removal of the sedimentation ponds. Although every reasonable effort will be made to have at least one sediment control measure in place, there may be a period of time when that is not feasible. However, the probability that a 10-year event will occur during the construction period of approximately six months is only 5.1% (Linsley and Frazini, 1979). This probability is relatively small, and thus no special measures will be taken to address the possibility.

The alternative sediment controls constructed during reclamation will be inspected quarterly or after every major storm event. Observations made during these inspections, as well as corrective actions taken, will be recorded. Corrections to any weaknesses in the

implementation of the sediment control plan will be remedied immediately to prevent future silt runoff into the Price River. Corrective action will be taken when a gully greater than nine inches in depth is created due to lack of vegetation establishment, or when the mulch and seed have been transported by wind or overland flow. Corrective action will consist of regrading of the ground surface only as necessary to fill in six inch gullies caused by erosion, and reseeding and mulching, as warranted, to reestablish vegetation.

3.4-7 Reclamation Timetable

The following time frames can be used to estimate the length of time for reclamation.

- | | |
|------------------------------------|--|
| 1. Demolition | Week Completed with the exception of the Load out facility |
| 2. Grading | Week 1-28 |
| 3. Resoiling | Week 4-30 |
| 4. Seed bed preparation | Week 5-32 |
| 5. Seeding & mulching | Week 6-34 |
| 6. Vegetation and water monitoring | For 10 years after seeding |
| 7. Reclamation Monitoring | Until Bond Release |

3.4-8 Reclamation Costs

The reclamation bond amount calculated for the Postmining land use change for the Preparation Plant Area and Refuse Pile is presented in Exhibit 17. Actual and accepted contractor bid costs for the refuse pile area are used in this bonding cost.

3.4.9 References

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**TABLE 3.4-5
RECLAMATION MASS BALANCE SUMMARY**

WILLOW CREEK MINE PREPARATION PLANT REFUSE PILE

AREA	CUT (CY)		FILL (CY)		NET (CY)	
	Subsoil	Topsoil	Subsoil	Topsoil	Subsoil	Topsoil
Refuse Pile (refuse only)	172,318		169,421	0	2,897 (C)	0
Topsoil from Gravel Canyon/Willow Creek Stockpile	0	80,654	0	0	0	80,654 (C)
Channel from Pond 13 to the road (CGRD-1)	20,508 ^(a)	0	4,362	0	16,146 (C)	0
Topsoil need to cover refuse with 3' of soil	0	0	0	96,800	0	96,800 (F)
SUBTOTAL	192,826	80,654	173,783	96,800	19,043 (C)	16,146 (F)
TOTAL	273,480		270,583		2,897 (C)	

WILLOW CREEK MINE PREPARATION PLANT AREA

AREA	CUT (CY)		FILL (CY)		NET (CY)	
	Subsoil	Topsoil	Subsoil	Topsoil	Subsoil	Topsoil
Concrete and surface coal waste to be buried	3,000	0	0	0	3,000 (C)	0
Train Loadout	756	0	556	0	200 (C)	0
Clean Coal Stockpile Area	5,187	0	15,014	10,639	9,827 (F)	10,639 (F)
Prep Plant and Raw Coal Stockpile Area	10,703	0	33,155	0	22,452 (F)	0
Access Road to Refuse Pile	10,233	0	10,559	0	326 (F)	0
Belt Transfer Tower Area	41	0	1,528	0	1,487 (F)	0
Topsoil from Gravel Canyon/Willow Creek to cover Clean Coal Stockpile Slope	0	10,639	0	0	0	10,639 (C)
SUBTOTAL	29,920	10,639	60,812	10,639	30,892 (F)	0.00 (C)
TOTAL	40,559		71,451		30,892 (F)	

- (a) Most of this cut is from the Pond 013 embankment and will be used as growth media to cover the coal refuse with 3' of soil.
- (b) Volume calculation by GRID method with a node spacing of 10 feet or less and a swell factor of 1.0. (Softdesk, Inc., formerly DCA Software, Inc.)
- (c) Excess cut material and fill shortages will be compensated for in the field with minor excavation and backfill modifications during reclamation construction activities. Changes will be based on survey information generated during reclamation.

TABLE 3.4-6
PREPARATION PLANT
RECLAMATION WATERSHED CHARACTERISTICS

WATERSHED (CGRWS-)	CURVE NUMBER	TIME OF CONCENTRATION (hr)	DRAINAGE AREA (acres)	PEAK FLOW (cfs)^(a)
1	72	0.450	261.1	36.92
2	75	0.100	11.8	4.36
3	75	0.081	4.7	1.80
4	75	0.073	4.7	1.83
5	75	0.080	8.05	3.08
6	71	0.108	4.78	0.12
7	88	0.146	5.48	2.5
8	91	0.213	5.41	3.08
9	78	0.096	19.0	2.24
10	83	0.047	3.24	0.95
10	83	0.047	3.24	0.95

(a) Peak flows based on the following design events:

10-year, 6-hour
CGRWS-6
CGRWS-7
CGRWS-8
CGRWS-9
CGRWS-10

100-year, 6-hour
CGRWS-1
CGRWS-2
CGRWS-3
CGRWS-4
CGRWS-5

TABLE 3.4-7

RECLAMATION DITCH DESIGN SUMMARY

Diversion Ditch (CGRD-)	Design Flow (cfs)	Minimum Conditions				Calculation Results		Min. Design Requirements	
		Bottom Width (ft) ^(a)	Side Slopes (ft)	Max. Bottom Slope (%)	Min. Bottom Slope (%)	Max. Velocity (ft/s)	Max. Flow Depth (ft)	Channel Depth (ft)	Riprap D ₅₀ (in)
1	36.92	8	2:1	29.0	4.7	8.24	0.72	1.5	12
2	4.36	3	2:1	27.0	2.0	5.38	0.39	1.0	6
3 (MS) ^(b)	1.80	3	2:1	10.0	2.0	3.57	0.24	1.0	None
3 (SS) ^(b)	1.80	3	2:1	23.5	10.0	3.82	0.17	1.0	6
4 (MS) ^(b)	1.82	3	2:1	10.0	2.0	3.58	0.25	1.0	none
4 (SS) ^(b)	1.82	3	2:1	32.3	10.0	4.12	0.17	1.0	6
5 (MS) ^(b)	3.08	3	2:1	4.7	2.0	3.36	0.33	1.0	None
5 (SS) ^(b)	3.08	3	2:1	32.3	4.7	4.96	0.27	1.0	6
6	0.12	3	2:1	26.7	2.7	1.91	0.04	1.0	None
7	3.60	3	2:1	35.7	1	5.32	0.41	1.0	6
8	2.50	3	2:1	27.8	1	4.43	0.33	1.0	6
9	3.08	0	3:1	7.8	1.1	4.97	0.66	1.25	None
10	2.24	0	1.5:1	6.7	0.5	4.83	0.9	1.5	None
11	0.96	0	3:1	4.9	0.71	3.12	0.46	1.25	None

(a) Minimum bottom width measured at minimum depth from top of channel.

(b) MS = mild slope (no riprap), SS = steep slope (riprapped section).

(c) Riprap D₅₀ calculated by using the Searcy method developed for the U.S. D.O.T.

(d) Channel dimensions represent the operational configuration. The watershed area changed and this calculation was done to verify that the operational channel was still adequate.

TABLE 3.4-8

**RECLAMATION CHANNEL RIPRAP AND
FILTER BLANKET SUMMARY**

Channel (CGRD-) ^(e)	Riprap D ₅₀ (in)	Length (ft)	Riprap Thickness (in)	Riprap Volume (ft ³)	Filter Thickness (in)	Filter Volume (ft ³)
1	12	2,680	24	96,480	12	64,320
2	6	110	12	990	6	660
3	6	90	12	810	6	540
4	6	130	12	1,170	6	780
5	6	210	12	1,890	6	1,260
7	6	75	12	675	6	450
8	6	75	12	675	6	450
TOTALS				102,690		68,460

Channels CGRD-6, CGRD-9, CGRD-10, and CGRD-8 require no riprap or filter (see Table 3.4-7)

TABLE 3.4-9

RECLAMATION CULVERT DESIGN SUMMARY

Culvert (CGC-)	Size and Type	Slope (%)	Peak Flow (cfs)	Outflow Velocity (ft/s)	Actual Outlet D ₅₀ ^(a) (in)
1	18" CMP	17	0.12	3.48	None Req'd
2	2-84" CMP	5	222.90	14.29	30
5	60" Concrete	10	36.92	21.16	40

(a) Actual riprap size exceeds minimum requirements under reclamation

Note: The above culverts are existing operational culverts that will be left in place to convey runoff from reclamation channels under the road and railroad tracks to the Price River. Greater detail about these culverts can be found on Table 3.4-3.

CGC-5 will be replaced by channel CGRD-1 up to the road where the inlet is assumed to be projecting for the inlet capacity estimate.

May 2004

APPENDIX 3.4J
DESIGN OF RECLAMATION DIVERSIONS

Design of Reclamation Diversions Willow Creek Preparation Plant

Methodology

- Curve number techniques of the U.S. SCS (1972)
- Triangular unit hydrograph of the U.S. SCS (1972) as programmed by Hawkins + Marshall (1979)
- Precipitation depths

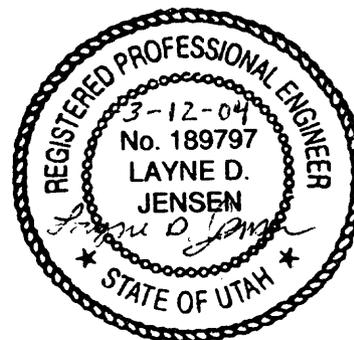
10-yr, 6-hr → 1.4 in } NOAA Atlas 2:
100-yr, 6-hr → 2.1 in } Volume III - Utah

- Drainage Areas, slopes and hydraulic lengths determined using contour maps in AutoCad.
- All Calculations for the Refuse Pile are made assuming the 100-yr, 6-hr storm event. All other calculations assume a 10-yr, 6-hr storm event.
- The same CN for each vegetation type will be used as listed in Appendix 3.40 of Exhibit 19. Namely:

Conifer	CN = 65
Grassland / Sagebrush	CN = 70
Mixed Brush	CN = 75
Pinyon / Juniper	CN = 75
Disturbed	CN = 90
Reclaimed	CN = 75
Paved	CN = 98

see Exhibit 13, Appendix H-1, Page 2

- Hydrology calculations for the Pond 12a + 12b area can be found as part of the Willow Creek Mine Permit in Exhibit 13 Appendix H-1



Willow Creek Prep Plant Reclamation Weighted Curve Numbers

Watershed Area (a)	Undisturbed		Reclaimed		Disturbed.		Weighted CN (b)
	Area (ac.)	CN *	Area (ac.)	CN	Area (ac.)	CN #	
CGRWS-1	130.5	71	25.5	75	0	85	72
CGRWS-2	11.7	75	0.1	75	0	85	75
CGRWS-3	4.6	75	0.1	75	0	85	75
CGRWS-4	4.6	75	0.1	75	0	85	75
CGRWS-5	7.85	75	0.2	75	0	85	75
CGRWS-6	3.9	70	0.88	75	0	90	71
CGRWS-7	0	75	0.89	75	4.59	90	88
CGRWS-8	0	75	0	75	5.41	91	91
CGRWS-9	5.24	75	9.97	75	4.21	91	78
CGRWS-10	0.35	75	1.34	75	1.89	91	83

Notes

a See Exhibit 3.4-11 for watershed locations

b Weighted CN = (CN1)(A1)+(CN2)(A2)+(CN3)(A3)+(CN4)(A4) / (A1+A2+A3+A4)

* Represents an area weighted average of vegetation types in undisturbed areas.

Represents an area weighted average of paved and disturbed areas or areas that were previously disturbed but revegetated with time.

**CASTLE GATE PREPARATION PLANT
REFUSE PILE RUNOFF SUMMARY**

Watershed Area a	Drainage Area (ac)	Curve Number	S (in)	Y (%)	I (ft)	L (hr)	Time of Conc. (hr)	Peak Flow (cfs)
CGRWS-1	261.1	72	3.889	64	8175	0.270	0.450	36.92
CGRWS-2	11.8	75	3.333	90	1725	0.060	0.100	4.36
CGRWS-3	4.7	75	3.333	83.6	1265	0.049	0.081	1.80
CGRWS-4	4.7	75	3.333	96.6	1201	0.043	0.073	1.83
CGRWS-5	8.05	75	3.333	67.8	1080	0.048	0.080	3.08
CGRWS-6	4.78	71	4.085	62	1294	0.064	0.108	0.12
CGRWS-7	5.48	88	1.364	12.1	1330	0.087	0.146	2.5
CGRWS-8	5.41	91	0.989	14.6	2802	0.128	0.213	3.08
CGRWS-9	19	78	2.821	36.8	1963	0.096	0.160	2.24
CGRWS-10	3.24	83	2.048	36.9	980	0.047	0.078	0.95

Notes

Watershed locations can be found on Exhibit 3.4-10 and attached map

S = 1000/CN - 10

Y = average watershed slope = (length of contour lines)(contour interval)/(watershed area)

I = hydraulic length

L = watershed lag = $(I^{0.8}(S+1)^{0.7}) / (1900(Y)^{0.5})$

Time of Concentration = 1.67L

Peak Flow is based on a 100-yr 6-hr storm event for CGWS – 1 through 5 and a 10 – yr 6 – hr storm

For the remaining watersheds.

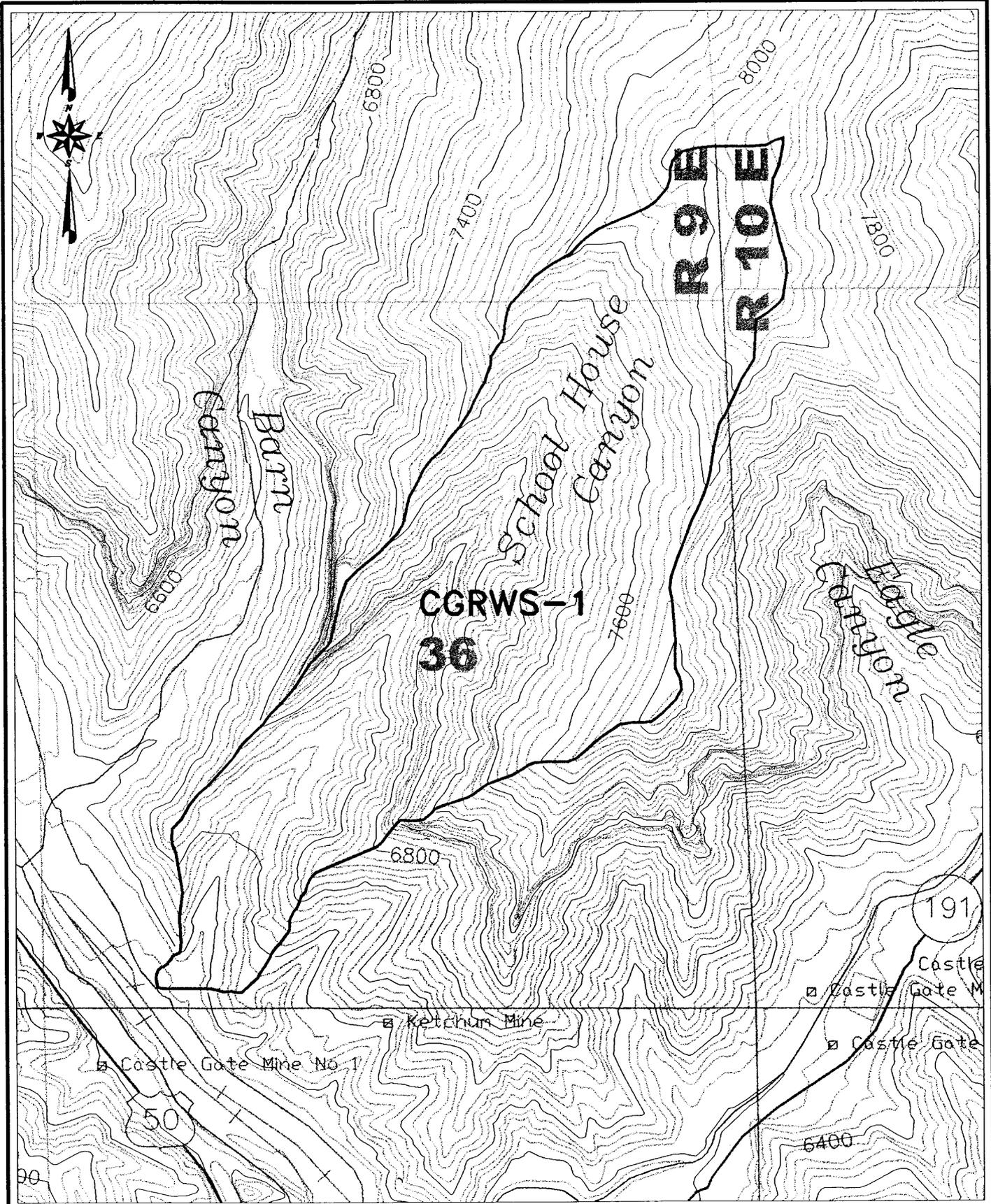


FIGURE 1. SCHOOL HOUSE CANYON MAIN CHANNEL WATERSHED



Storm Distribution

The peak flow generated during a storm event is based on the size of the storm and the storm distribution. For reclamation channels designed for the Prep. Plant area the storm event is a 10-year 6-hour storm event for intermittent drainages and 100-year 6-hour storm event for any channels associated with the Refuse Pile. The storm distribution to be used for both storm events is the SCS type "B". This has been the accepted storm distribution for 6-hour storm events for over 20 years. In 1979 the Utah Division of Oil, Gas, and Mining contracted with Professor Richard H. Hawkins of Utah State University to develop a storm hydrograph program. In the report generated by Professor Hawkins he identifies two appropriate storm distributions. The first is the Farmer-Fletcher storm distribution and the second is the SCS type "B". The Farmer-Fletcher storm distribution was developed for Central, Southern, and Eastern Utah and is the most appropriate storm distribution for the Prep. Plant area. However, the SCS type "B" storm distribution will be used since it provides a more conservative peak flow estimate (i.e. a higher peak flow).

There has been some confusion as to what SCS type "B" storm distribution refers to. SCS type "B" refers to the storm distribution presented in the National Resource Conservation Service National Engineering Handbook Section 4 on Figure 21.2(b). The "B" in SCS type "B" comes from the (b) in the figure number. The figure from the National Engineering Handbook is presented on page 4b of this calculation. This storm distribution can be compared to the storm distribution presented in Figure 1 of the Storm Hydrograph Program report by Professor Hawkins to verify that the distribution referred to as SCS type "B" is the same distribution shown in the National Engineering Handbook Section 4 Figure 21.2(b). Professor Hawkins has modified the distribution to make it dimensionless so that it can also be used for storm durations other than just the 6 hour storm.

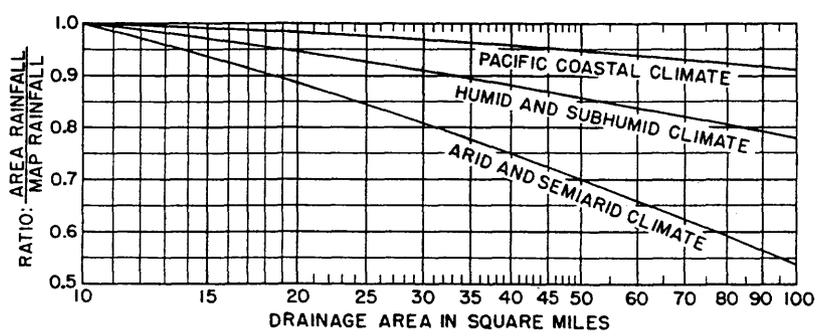
The software, (SCSHYDRO) used to calculate peak flows for these designs, is based on the program developed by Professor Hawkins for the Division of Oil, Gas, and Mining.

References

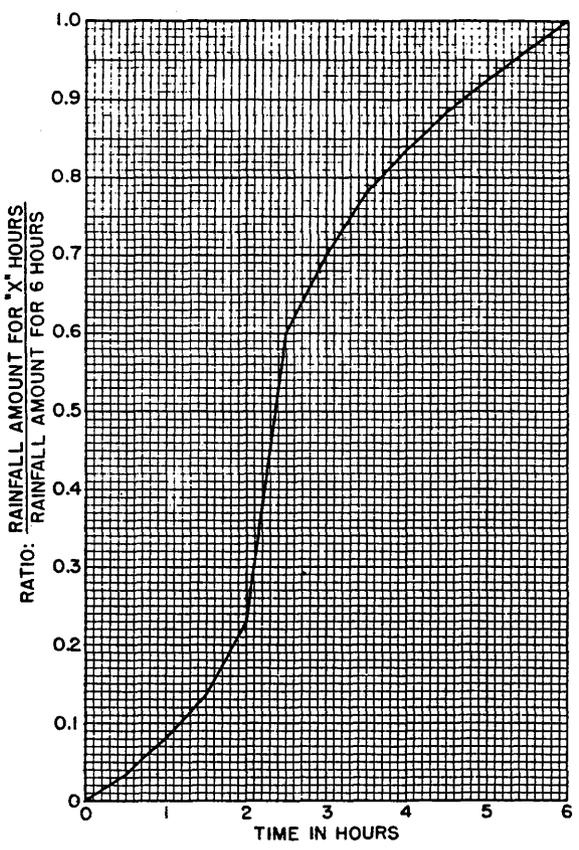
Hawkins, R.H. and K.A. Marshall. 1979. Storm Hydrograph Program. Final Report to the Utah Division of Oil, Gas, and Mining. Utah State University. Logan, Utah.

U.S. Department of Agriculture, 1997. NRCS National Engineering Handbook. Section 4 Hydrology. National Resource Conservation Service. Washington, D.C.

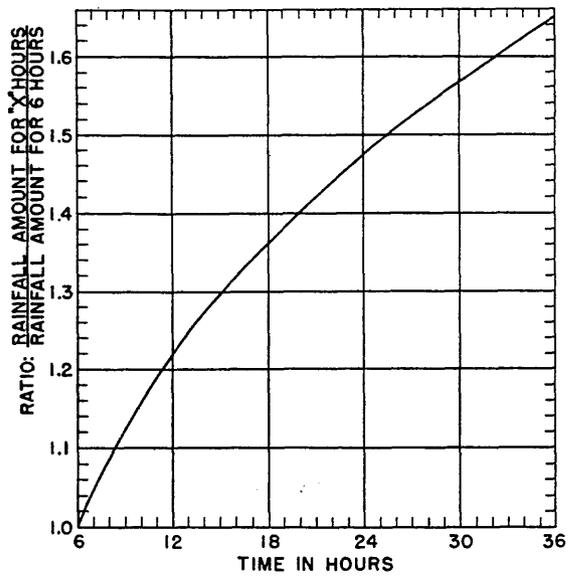
HYDROLOGY: CRITERIA FOR DESIGN STORMS USED IN DEVELOPING EMERGENCY SPILLWAY DESIGN AND FREEBOARD HYDROGRAPHS



(a) RAINFALL RATIOS FOR DRAINAGE AREAS OF 10 TO 100 SQUARE MILES



(b) SIX HOUR DESIGN STORM DISTRIBUTION



(c) RELATIVE INCREASE IN RAINFALL AMOUNT FOR STORM DURATIONS OVER SIX HOURS

FIGURE 21.2

<p>REFERENCE</p>	<p>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING DIVISION - CENTRAL TECHNICAL UNIT</p>	<p>STANDARD DWG. NO. ES-1003 SHEET 1 OF 1 DATE 7-2-56 REVISED 9-10-63</p>
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Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-1

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type 'b' Area = 261.10 acres
Depth = 2.10 inches CN = 72.00
Duration = 6.0 hrs Time conc.= 0.45 hrs

OUTPUT SUMMARY

Runoff depth: 0.335 inches
Initial abstr: 0.778 inches
Peak flow: 36.92 cfs (0.140 iph)
at time: 2.820 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-2

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 11.80 acres
Depth = 2.10 inches CN = 75.00
Duration = 6.0 hrs Time conc.= 0.10 hrs

OUTPUT SUMMARY

Runoff depth: 0.431 inches
Initial abstr: 0.667 inches
Peak flow: 4.36 cfs (0.366 iph)
at time: 2.520 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-3

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 4.70 acres
Depth = 2.10 inches CN = 75.00
Duration = 6.0 hrs Time conc.= 0.08 hrs

OUTPUT SUMMARY

Runoff depth: 0.431 inches
Initial abstr: 0.667 inches
Peak flow: 1.80 cfs (0.380 iph)
at time: 2.517 hrs

Triangular Hydrograph Calculations using

SCSHYDRO Program

Watershed I.D.:
CGRWS-4

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 4.70 acres
Depth = 2.10 inches CN = 75.00
Duration = 6.0 hrs Time conc.= 0.07 hrs

OUTPUT SUMMARY

Runoff depth: 0.431 inches
Initial abstr: 0.667 inches
Peak flow: 1.83 cfs (0.386 iph)
at time: 2.511 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-5

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 8.05 acres
Depth = 2.10 inches CN = 75.00
Duration = 6.0 hrs Time conc.= 0.08 hrs

OUTPUT SUMMARY

Runoff depth: 0.431 inches
Initial abstr: 0.667 inches
Peak flow: 3.08 cfs (0.380 iph)
at time: 2.517 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-6

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 4.78 acres
Depth = 1.40 inches CN = 71.00
Duration = 6.0 hrs Time conc.= 0.11 hrs

OUTPUT SUMMARY

Runoff depth: 0.073 inches
Initial abstr: 0.817 inches
Peak flow: 0.12 cfs (0.026 iph)
at time: 3.520 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-7

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type 'b' Area = 5.48 acres
Depth = 1.40 inches CN = 88.00
Duration = 6.0 hrs Time conc.= 0.15 hrs

OUTPUT SUMMARY

Runoff depth: 0.510 inches
Initial abstr: 0.273 inches
Peak flow: 2.50 cfs (0.452 iph)
at time: 2.540 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-8

INPUT SUMMARY

.....
STORM : WATERSHED :
Dist.= SCS Type `b' Area = 5.41 acres
Depth = 1.40 inches CN = 91.00
Duration = 6.0 hrs Time conc.= 0.21 hrs
.....

OUTPUT SUMMARY

.....
Runoff depth: 0.660 inches
Initial abstr: 0.198 inches
Peak flow: 3.08 cfs (0.565 iph)
at time: 2.548 hrs
.....

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-9

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type `b' Area = 19.00 acres
Depth = 1.40 inches CN = 78.00
Duration = 6.0 hrs Time conc.= 0.16 hrs

OUTPUT SUMMARY

Runoff depth: 0.191 inches
Initial abstr: 0.564 inches
Peak flow: 2.24 cfs (0.117 iph)
at time: 2.581 hrs

Triangular Hydrograph Calculations using
SCSHYDRO Program

Watershed I.D.:
CGRWS-10

INPUT SUMMARY

STORM : WATERSHED :
Dist.= SCS Type 'b' Area = 3.24 acres
Depth = 1.40 inches CN = 83.00
Duration = 6.0 hrs Time conc.= 0.08 hrs

OUTPUT SUMMARY

Runoff depth: 0.323 inches
Initial abstr: 0.410 inches
Peak flow: 0.95 cfs (0.292 iph)
at time: 2.517 hrs

Reclamation Channel Design

- All Channels related to the Refuse Pile are designed to handle a 100-yr, 6-hr storm event.
- All channels not associated with the refuse pile are designed to handle the 10-yr, 6-hr storm event.
- The Manning n for riprap channels will be determined based on the following equation.

$$n = 0.0456 (D_{50} \times \text{Slope})^{0.159} \quad \text{Abt, et. al (1987)}$$

Where D_{50} = riprap size (in)
Slope = channel slope (f_1/f_1)

- A $n = 0.035$ will be used for rocky earthen channels.
- Riprap is not necessary for flows less than 5 fps.

Channels designed based on

- maximum slope to determine erosional stability
- minimum slope to determine cross-sectional requirements.

The maximum allowable velocity for a riprap channel is based on the method presented by Searcy (1967) See nomograph on pg 53 of this calculation

The minimum freeboard and hence the channel depth is determined by adding 20% of the flow depth or 0.5' whichever is greater (Barfield et. al. 1994)

Flowmaster Calculation sheets pages 18-45

Design Summary page 17

Channel Cross-sections pages 46-48

TABLE 3.4-7

RECLAMATION DITCH DESIGN SUMMARY

Diversion Ditch (CGRD-)	Design Flow (cfs)	Minimum Conditions				Calculation Results		Min. Design Requirements	
		Bottom Width (ft) ^(a)	Side Slopes (ft)	Max. Bottom Slope (%)	Min. Bottom Slope (%)	Max. Velocity (ft/s)	Max. Flow Depth (ft)	Channel Depth (ft)	Riprap D ₅₀ (in)
1	36.92	8	2:1	29.0	4.7	8.24	0.72	1.5	12
2	4.36	3	2:1	27.0	2.0	5.38	0.39	1.0	6
3 (MS) ^(b)	1.80	3	2:1	10.0	2.0	3.57	0.24	1.0	None
3 (SS) ^(b)	1.80	3	2:1	23.5	10.0	3.82	0.17	1.0	6
4 (MS) ^(b)	1.82	3	2:1	10.0	2.0	3.58	0.25	1.0	none
4 (SS) ^(b)	1.82	3	2:1	32.3	10.0	4.12	0.17	1.0	6
5 (MS) ^(b)	3.08	3	2:1	4.7	2.0	3.36	0.33	1.0	None
5 (SS) ^(b)	3.08	3	2:1	32.3	4.7	4.96	0.27	1.0	6
6	0.12	3	2:1	26.7	2.7	1.91	0.04	1.0	None
7	3.60	3	2:1	35.7	1	5.32	0.41	1.0	6
8	2.50	3	2:1	27.8	1	4.43	0.33	1.0	6
9	3.08	0	3:1	7.8	1.1	4.97	0.66	1.25	None
10	2.24	0	1.5:1	6.7	0.5	4.83	0.9	1.5	None
11	0.96	0	3:1	4.9	0.71	3.12	0.46	1.25	None

(a) Minimum bottom width measured at minimum depth from top of channel.

(b) MS = mild slope (no riprap), SS = steep slope (riprapped section).

(c) Riprap D₅₀ calculated by using the Searcy method developed for the U.S. D.O.T.

(d) Channel dimensions represent the operational configuration. The watershed area changed and this calculation was done to verify that the operational channel was still adequate.

CGRD-1 MINIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.042 $D_{50} = 12''$
Slope	0.047000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	8.00 ft
Discharge	36.92 cfs

$n = 0.0456 (D_{50}^{0.159})$
(Abt et al.)

Results	
Depth	0.72 ft $< 1.5' \therefore ok$
Flow Area	6.7 ft ²
Wetted Perimeter	11.20 ft
Top Width	10.86 ft
Critical Depth	0.81 ft
Critical Slope	0.030353 ft/ft
Velocity	5.47 ft/s
Velocity Head	0.47 ft
Specific Energy	1.18 ft
Froude Number	1.22
Flow Type	Supercritical

CGRD-1 MAXIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.056 <i>D₅₀ = 12"</i>
Slope	0.290000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	8.00 ft
Discharge	36.92 cfs

Results	
Depth	0.50 ft
Flow Area	4.5 ft ²
Wetted Perimeter	10.23 ft
Top Width	9.99 ft
Critical Depth	0.81 ft
Critical Slope	0.053960 ft/ft
Velocity	8.24 ft/s <i>< 10.75 fps ∴ ok</i>
Velocity Head	1.06 ft
Specific Energy	1.55 ft
Froude Number	2.17
Flow Type	Supercritical

CGRD-2 MIN SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PLATEAU MINING
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.032 $D_{50} = 6''$
Slope	0.020000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	4.36 cfs 100-yr 6-hr

$n = 0.0456 (D_{50} \times Slope)^{0.159}$
(Abt cr. cl.)

Results	
Depth	0.39 ft < 1.0' OK
Flow Area	1.5 ft ²
Wetted Perimeter	4.74 ft
Top Width	4.55 ft
Critical Depth	0.37 ft
Critical Slope	0.023669 ft/ft
Velocity	2.98 ft/s
Velocity Head	0.14 ft
Specific Energy	0.53 ft
Froude Number	0.92
Flow Type	Subcritical

CGRD-2 MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PLATEAU MINING
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.049 <i>0.50 = 6"</i>
Slope	0.270000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	4.36 cfs <i>100-yr 6-hr</i>

Results	
Depth	0.23 ft
Flow Area	0.8 ft ²
Wetted Perimeter	4.04 ft
Top Width	3.93 ft
Critical Depth	0.37 ft
Critical Slope	0.054693 ft/ft
Velocity	5.38 ft/s <i>< 7.5 f/s</i>
Velocity Head	0.45 ft
Specific Energy	0.68 ft
Froude Number	2.09
Flow Type	Supercritical

CGRD-3 MIN SLOPE *No Riprap* Worksheet for Trapezoidal Channel

Project Description	
Worksheet	PLATEAU MINING
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035 <i>rocky soil</i>
Slope	0.020000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.80 cfs

Results	
Depth	0.24 ft <i>< 1.0' ok</i>
Flow Area	0.9 ft ²
Wetted Perimeter	4.09 ft
Top Width	3.98 ft
Critical Depth	0.21 ft
Critical Slope	0.032172 ft/ft
Velocity	2.11 ft/s <i>< 5.0 fps ok</i>
Velocity Head	0.07 ft
Specific Energy	0.31 ft
Froude Number	0.80
Flow Type	Subcritical

CGRD-3 NO RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035 <i>Rocky soil</i>
Slope	0.100000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.80 cfs

Results	
Depth	0.15 ft
Flow Area	0.5 ft ²
Wetted Perimeter	3.68 ft
Top Width	3.61 ft
Critical Depth	0.21 ft
Critical Slope	0.032172 ft/ft
Velocity	<u>3.57 ft/s</u> <i>< 5.0 fps OK</i>
Velocity Head	0.20 ft
Specific Energy	0.35 ft
Froude Number	1.68
Flow Type	Supercritical

CGRD-3 RIPRAP MIN SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.042 <i>D₅₀ = 6"</i>
Slope	0.100000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.80 cfs

Results	
Depth	0.17 ft <i>< 1.0' ok</i>
Flow Area	0.6 ft ²
Wetted Perimeter	3.76 ft
Top Width	3.68 ft
Critical Depth	0.21 ft
Critical Slope	0.046329 ft/ft
Velocity	3.17 ft/s
Velocity Head	0.16 ft
Specific Energy	0.33 ft
Froude Number	1.42
Flow Type	Supercritical

CGRD-3 RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description

Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.048 <i>0.50 = 6"</i>
Slope	0.235000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.80 cfs

Results

Depth	0.14 ft
Flow Area	0.5 ft ²
Wetted Perimeter	3.64 ft
Top Width	3.57 ft
Critical Depth	0.21 ft
Critical Slope	0.061015 ft/ft
Velocity	<u>3.82 ft/s</u> <i>< 7.5 fps OK</i>
Velocity Head	0.23 ft
Specific Energy	0.37 ft
Froude Number	1.86
Flow Type	Supercritical

CGRD-4 NO RIPRAP MIN SLOPE Worksheet for Trapezoidal Channel

Project Description

Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.035 <i>rocky soil</i>
Slope	0.020000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.82 cfs

Results

Depth	<u>0.25 ft</u> <i>< 1.0' ok</i>
Flow Area	0.9 ft ²
Wetted Perimeter	4.10 ft
Top Width	3.98 ft
Critical Depth	0.21 ft
Critical Slope	0.032110 ft/ft
Velocity	2.12 ft/s
Velocity Head	0.07 ft
Specific Energy	0.32 ft
Froude Number	0.80
Flow Type	Subcritical

CGRD-4 NO RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035 <i>rocky soil</i>
Slope	0.100000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.82 cfs

Results	
Depth	0.15 ft
Flow Area	0.5 ft ²
Wetted Perimeter	3.69 ft
Top Width	3.61 ft
Critical Depth	0.21 ft
Critical Slope	0.032110 ft/ft
Velocity	<u>3.58 ft/s</u> <i>< 5.0 fps OK</i>
Velocity Head	0.20 ft
Specific Energy	0.35 ft
Froude Number	1.68
Flow Type	Supercritical

CGRD-4 RIPRAP MIN SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.042 <i>0.50 = 6"</i>
Slope	0.100000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.82 cfs

Results	
Depth	0.17 ft <i>< 1.0' OK</i>
Flow Area	0.6 ft ²
Wetted Perimeter	3.76 ft
Top Width	3.68 ft
Critical Depth	0.21 ft
Critical Slope	0.046240 ft/ft
Velocity	3.18 ft/s
Velocity Head	0.16 ft
Specific Energy	0.33 ft
Froude Number	1.43
Flow Type	Supercritical

CGRD-4 RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.051 <i>D₅₀ = 6"</i>
Slope	0.323000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	1.82 cfs

Results	
Depth	0.14 ft
Flow Area	0.4 ft ²
Wetted Perimeter	3.60 ft
Top Width	3.54 ft
Critical Depth	0.21 ft
Critical Slope	0.067114 ft/ft
Velocity	<u>4.12 ft/s</u> <i>< 7.5 fps OK</i>
Velocity Head	0.26 ft
Specific Energy	0.40 ft
Froude Number	2.06
Flow Type	Supercritical

CGRD-5 NO RIPRAP MIN SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035 <i>rocky soil</i>
Slope	0.020000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.08 cfs

Results	
Depth	0.33 ft <i>< 1.0' ok</i>
Flow Area	1.2 ft ²
Wetted Perimeter	4.49 ft
Top Width	4.33 ft
Critical Depth	0.30 ft
Critical Slope	0.029381 ft/ft
Velocity	2.52 ft/s
Velocity Head	0.10 ft
Specific Energy	0.43 ft
Froude Number	0.84
Flow Type	Subcritical

CGRD-5 NO RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.035 <i>rocky soil</i>
Slope	0.047000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.08 cfs

Results	
Depth	0.26 ft
Flow Area	0.9 ft ²
Wetted Perimeter	4.17 ft
Top Width	4.04 ft
Critical Depth	0.30 ft
Critical Slope	0.029382 ft/ft
Velocity	<u>3.36 ft/s</u> <i>< 5.0 fps OK</i>
Velocity Head	0.18 ft
Specific Energy	0.44 ft
Froude Number	1.24
Flow Type	Supercritical

CGRD-5 RIPRAP MIN SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.037 <i>Q₅₀ = 6"</i>
Slope	0.047000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.08 cfs

Results	
Depth	0.27 ft <i>< 1.0' OK</i>
Flow Area	1.0 ft ²
Wetted Perimeter	4.21 ft
Top Width	4.08 ft
Critical Depth	0.30 ft
Critical Slope	0.033369 ft/ft
Velocity	3.22 ft/s
Velocity Head	0.16 ft
Specific Energy	0.43 ft
Froude Number	1.17
Flow Type	Supercritical

CGRD-5 RIPRAP MAX SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Plateau Mining
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.051 <i>D₅₀ = 6"</i>
Slope	0.323000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.08 cfs

Results	
Depth	0.18 ft
Flow Area	0.6 ft ²
Wetted Perimeter	3.82 ft
Top Width	3.74 ft
Critical Depth	0.30 ft
Critical Slope	0.061651 ft/ft
Velocity	<u>4.96 ft/s</u> <i>< 7.5 ft/s ok</i>
Velocity Head	0.38 ft
Specific Energy	0.57 ft
Froude Number	2.14
Flow Type	Supercritical

CGRD-6 MINIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.027000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	0.12 cfs

Results	
Depth	0.04 ft <i>< 1.0' ok</i>
Flow Area	0.1 ft ²
Wetted Perimeter	3.18 ft
Top Width	3.16 ft
Critical Depth	0.04 ft
Critical Slope	0.040148 ft/ft
Velocity	0.95 ft/s
Velocity Head	0.01 ft
Specific Energy	0.06 ft
Froude Number	0.84
Flow Type	Subcritical

CGRD-6 MAXIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.267000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	0.12 cfs

Results	
Depth	0.02 ft
Flow Area	0.1 ft ²
Wetted Perimeter	3.09 ft
Top Width	3.08 ft
Critical Depth	0.04 ft
Critical Slope	0.040147 ft/ft
Velocity	1.91 ft/s <i>< 5.0 fps ok</i>
Velocity Head	0.06 ft
Specific Energy	0.08 ft
Froude Number	2.35
Flow Type	Supercritical

CGRD-7 MINIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description

Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.030 <i>0.50 = 6''</i>
Slope	0.010000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.60 cfs <i>from CGD-14 reach flow</i>

Results

Depth	0.41 ft <i>< 1.0' ok</i>
Flow Area	1.5 ft ²
Wetted Perimeter	4.82 ft
Top Width	4.62 ft
Critical Depth	0.33 ft
Critical Slope	0.021048 ft/ft
Velocity	2.32 ft/s
Velocity Head	0.08 ft
Specific Energy	0.49 ft
Froude Number	0.71
Flow Type	Subcritical

CGRD-7 MAXIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.052 <i>D₅₀ = 6"</i>
Slope	0.357000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	3.60 cfs <i>From flow in CGD-14,</i>

Results	
Depth	0.20 ft
Flow Area	0.7 ft ²
Wetted Perimeter	3.89 ft
Top Width	3.80 ft
Critical Depth	0.33 ft
Critical Slope	0.063236 ft/ft
Velocity	5.32 ft/s <i>< 7.5 f_{ps}</i>
Velocity Head	0.44 ft
Specific Energy	0.64 ft
Froude Number	2.22
Flow Type	Supercritical

CGRD-8 MINIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>D₅₀ = 6"</i>
Slope	0.010000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	2.50 cfs

Results	
Depth	0.33 ft <i>< 1.0' ok</i>
Flow Area	1.2 ft ²
Wetted Perimeter	4.48 ft
Top Width	4.32 ft
Critical Depth	0.26 ft
Critical Slope	0.022346 ft/ft
Velocity	2.07 ft/s
Velocity Head	0.07 ft
Specific Energy	0.40 ft
Froude Number	0.69
Flow Type	Subcritical

CGRD-8 MAXIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.050 <i>0.50 = 5"</i>
Slope	0.278000 ft/ft
Left Side Slope	2.00 H : V
Right Side Slope	2.00 H : V
Bottom Width	3.00 ft
Discharge	2.50 cfs

Results	
Depth	0.17 ft
Flow Area	0.6 ft ²
Wetted Perimeter	3.76 ft
Top Width	3.68 ft
Critical Depth	0.26 ft
Critical Slope	0.062071 ft/ft
Velocity	4.43 ft/s <i>< 7.5 for ok</i>
Velocity Head	0.30 ft
Specific Energy	0.47 ft
Froude Number	1.99
Flow Type	Supercritical

CGRD-9 MINIMUM SLOPE
Worksheet for Triangular Channel

Project Description

Worksheet	Preparation Plant Hydrology
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.011000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Discharge	3.08 cfs

Results

Depth	0.66 ft <i>< 1.25' ok</i>
Flow Area	1.3 ft ²
Wetted Perimeter	4.15 ft
Top Width	3.94 ft
Critical Depth	0.58 ft
Critical Slope	0.021258 ft/ft
Velocity	2.39 ft/s
Velocity Head	0.09 ft
Specific Energy	0.74 ft
Froude Number	0.73
Flow Type	Subcritical

CGRD-9 MAXIMUM SLOPE Worksheet for Triangular Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.078000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Discharge	3.08 cfs

Results	
Depth	0.45 ft
Flow Area	0.6 ft ²
Wetted Perimeter	2.87 ft
Top Width	2.73 ft
Critical Depth	0.58 ft
Critical Slope	0.021258 ft/ft
Velocity	4.97 ft/s <i>< 5.0 fpm close out ok</i>
Velocity Head	0.38 ft
Specific Energy	0.84 ft
Froude Number	1.84
Flow Type	Supercritical

Also the steepest slope is at the beginning of the channel where the discharge is much less and therefore the velocity will be lower

CGRD-10 MINIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>conc earth</i>
Slope	0.005000 ft/ft
Left Side Slope	1.50 H : V
Right Side Slope	1.50 H : V
Bottom Width	0.00 ft
Discharge	2.24 cfs

Results	
Depth	0.90 ft <i>< 1.5' ok</i>
Flow Area	1.2 ft ²
Wetted Perimeter	3.26 ft
Top Width	2.71 ft
Critical Depth	0.67 ft
Critical Slope	0.024087 ft/ft
Velocity	1.83 ft/s
Velocity Head	0.05 ft
Specific Energy	0.96 ft
Froude Number	0.48
Flow Type	Subcritical

CGRD-10 MAXIMUM SLOPE Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.067000 ft/ft
Left Side Slope	1.50 H:V
Right Side Slope	1.50 H:V
Bottom Width	0.00 ft
Discharge	2.24 cfs

} represents configuration of the operational pipe. This calculation verifies that the current pipe is adequate.

Results	
Depth	0.56 ft
Flow Area	0.5 ft ²
Wetted Perimeter	2.00 ft
Top Width	1.67 ft
Critical Depth	0.67 ft
Critical Slope	0.024087 ft/ft
Velocity	4.83 ft/s <i>< 5.0 fms ∴ OK</i>
Velocity Head	0.36 ft
Specific Energy	0.92 ft
Froude Number	1.62
Flow Type	Supercritical

CGRD-11 MINIMUM SLOPE Worksheet for Triangular Channel

Project Description	
Worksheet	Preparation Plant Hydrology
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.030 <i>bar earth</i>
Slope	0.007100 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Discharge	0.96 cfs

Results	
Depth	0.46 ft <i>< 1.25' ∴ ok</i>
Flow Area	0.6 ft ²
Wetted Perimeter	2.91 ft
Top Width	2.76 ft
Critical Depth	0.36 ft
Critical Slope	0.024832 ft/ft
Velocity	1.51 ft/s
Velocity Head	0.04 ft
Specific Energy	0.50 ft
Froude Number	0.56
Flow Type	Subcritical

CGRD-11 MAXIMUM SLOPE Worksheet for Triangular Channel

Project Description

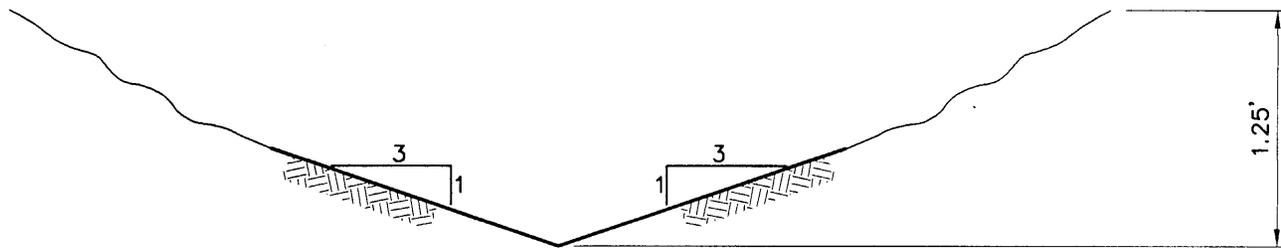
Worksheet	Preparation Plant Hydrology
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data

Mannings Coefficient	0.030 <i>bare earth</i>
Slope	0.049000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Discharge	0.96 cfs

Results

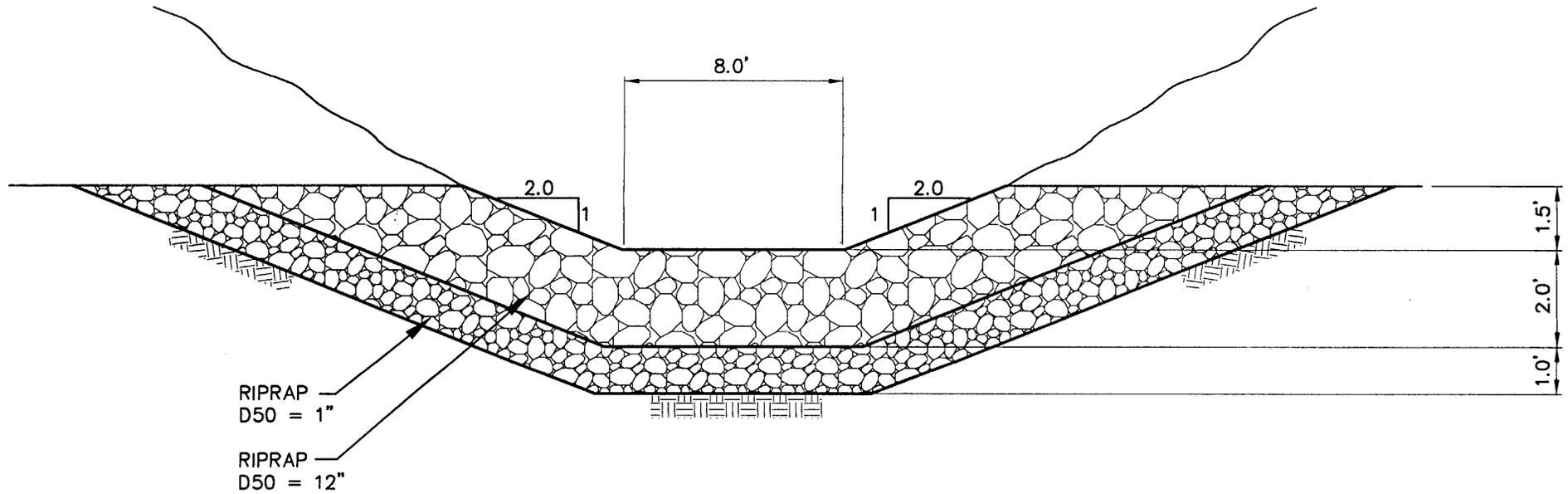
Depth	0.32 ft
Flow Area	0.3 ft ²
Wetted Perimeter	2.03 ft
Top Width	1.92 ft
Critical Depth	0.36 ft
Critical Slope	0.024833 ft/ft
Velocity	3.12 ft/s <i>< 5.0 for ok</i>
Velocity Head	0.15 ft
Specific Energy	0.47 ft
Froude Number	1.38
Flow Type	Supercritical



NO SCALE

FIGURE 2. CGRD-9 AND CGRD-11

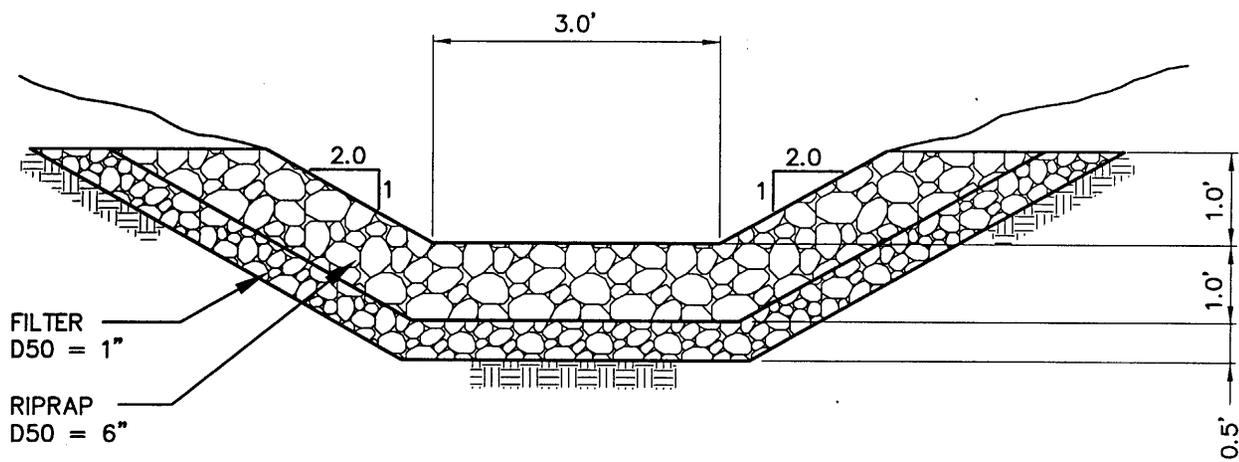




NO SCALE

FIGURE 3. MAIN CHANNEL CROSS-SECTION





NO SCALE

FIGURE 4. CGRD-2, CGRD-7, CGRD-8 AND
RIPRAPPED PORTIONS OF CGRD-3, CGRD-4 AND CGRD-5

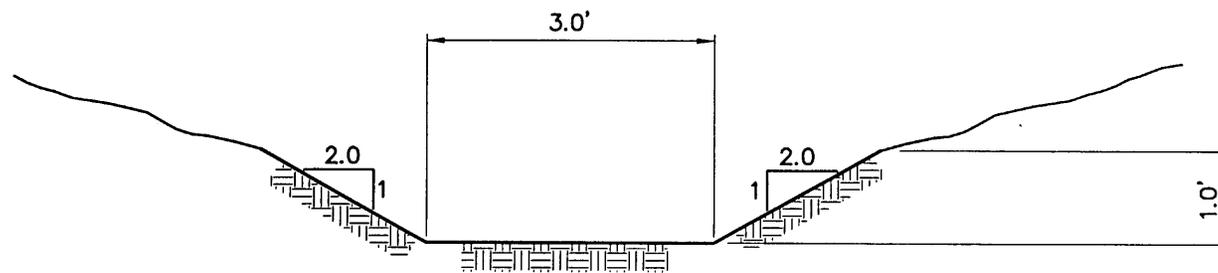


FIGURE 5. CGRD-6, AND NON-RIPRAPPED PORTIONS OF CGRD-3, CGRD-4 AND CGRD-5

- Culverts -

Three operational culverts will be used to convey runoff from the reclaimed area under the road and railroad tracks to the Price River.

C6C-1 is connected to C6R0-6 and must handle a design flow of 0.12 cfs (C6RWS-6). Table 3.4-3 states that this 18" CMP has a capacity of 11 cfs. Therefore this culvert is adequate for use during reclamation.

Culvert Slope = 17%
Outlet velocity = 3.48 (Pg 50)
Required Riprap size = None

C6C-2 is connected to C6R-3. The drainage area for this ditch and channel have not changed other than the required capacity being reduced due to the runoff from Schoolhouse Canyon no longer being diverted to Barn Canyon. These culverts had the required capacity prior to removing the Schoolhouse Canyon runoff and therefore, has even more excess capacity.

C6C-2 consists of (2) 84" CMPs with a combined capacity of 900 cfs as seen on Table 3.4-3. Prior to removing the Schoolhouse Canyon Runoff the peak flow was estimated to be 222.9 cfs. Thus, these culverts are adequate.

Culvert Slope = 5%
Assumed Peak flow = 222.9 cfs
Outlet velocity = 14.29 (Pg 91)
Required Riprap size = 20"

C6C-5 is connected to C6R0-1 and must handle 36.92 cfs (C6RWS-1). According to Table 3.4-3 this is a 60" culvert. After excavating the culvert it was found to start at 60" However, it then reduces to a 48" culvert. The culvert will have at least a HW/D = 2 which gives an inlet capacity of 125 cfs (pg 54). Therefore, this culvert is adequate.

Culvert Slope = 10%
Outlet Velocity = 21.8 fps (pg 52)
Required Riprap = 40"

CGC-1 OUTLET VELOCITY Worksheet for Circular Channel

Project Description	
Worksheet	Prep Plant Hydrology
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.024
Slope	0.170000 ft/ft
Diameter	18 in
Discharge	0.12 cfs

Results	
Depth	0.08 ft
Flow Area	3.5e-2 ft ²
Wetted Perimeter	0.69 ft
Top Width	0.66 ft
Critical Depth	0.13 ft
Percent Full	5.2 %
Critical Slope	0.020638 ft/ft
Velocity	3.48 ft/s <i>< 5 fps no riprap needed</i>
Velocity Head	0.19 ft
Specific Energy	0.27 ft
Froude Number	2.69
Maximum Discharge	25.23 cfs
Discharge Full	23.46 cfs
Slope Full	0.000004 ft/ft
Flow Type	Supercritical

CGC-2 OUTLET VELOCITY Worksheet for Circular Channel

Project Description	
Worksheet	Prep Plant Hydrology
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.024
Slope	0.050000 ft/ft
Diameter	84 in
Discharge	111.45 cfs

Requires height of pipe from in case channel

Results	
Depth	1.80 ft
Flow Area	7.8 ft ²
Wetted Perimeter	7.43 ft
Top Width	6.11 ft
Critical Depth	2.72 ft
Percent Full	25.6 %
Critical Slope	0.010196 ft/ft
Velocity	14.29 ft/s
Velocity Head	3.17 ft
Specific Energy	4.97 ft
Froude Number	2.23
Maximum Discharge	832.29 cfs
Discharge Full	773.71 cfs
Slope Full	0.001037 ft/ft
Flow Type	Supercritical

Requires D₅₀ = 20"

CGC-5 OUTLET VELOCITY Worksheet for Circular Channel

Project Description	
Worksheet	PREP PLANT HYDROLOGY
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.013
Slope	0.100000 ft/ft
Diameter	48 in
Discharge	36.92 cfs

Results	
Depth	0.77 ft
Flow Area	1.7 ft ²
Wetted Perimeter	3.64 ft
Top Width	3.16 ft
Critical Depth	1.81 ft
Percent Full	19.3 %
Critical Slope	0.003732 ft/ft
Velocity	21.75 ft/s
Velocity Head	7.35 ft
Specific Energy	8.12 ft
Froude Number	5.23
Maximum Discharge	488.60 cfs
Discharge Full	454.22 cfs
Slope Full	0.000661 ft/ft
Flow Type	Supercritical

D₅₀ = 40"

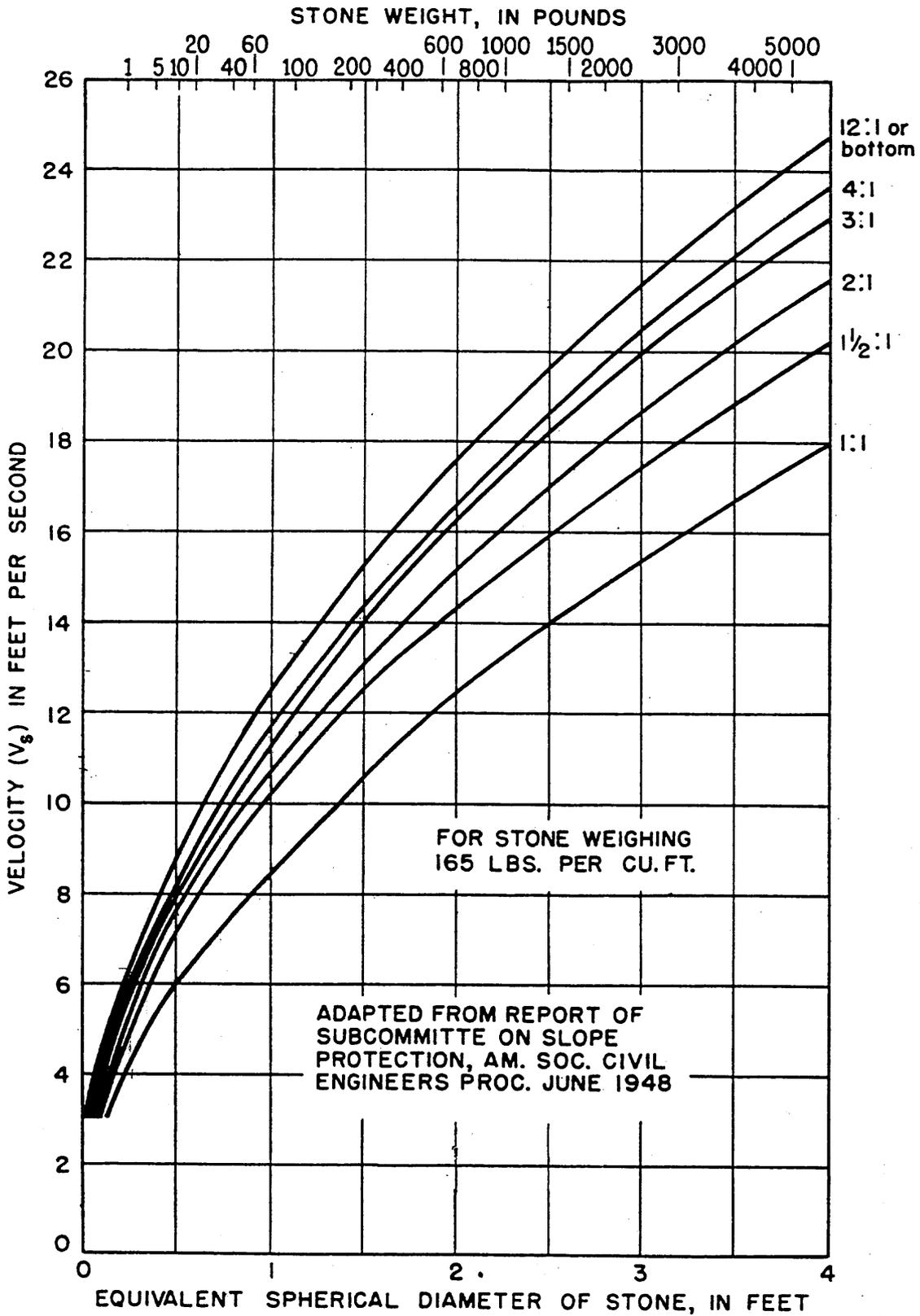
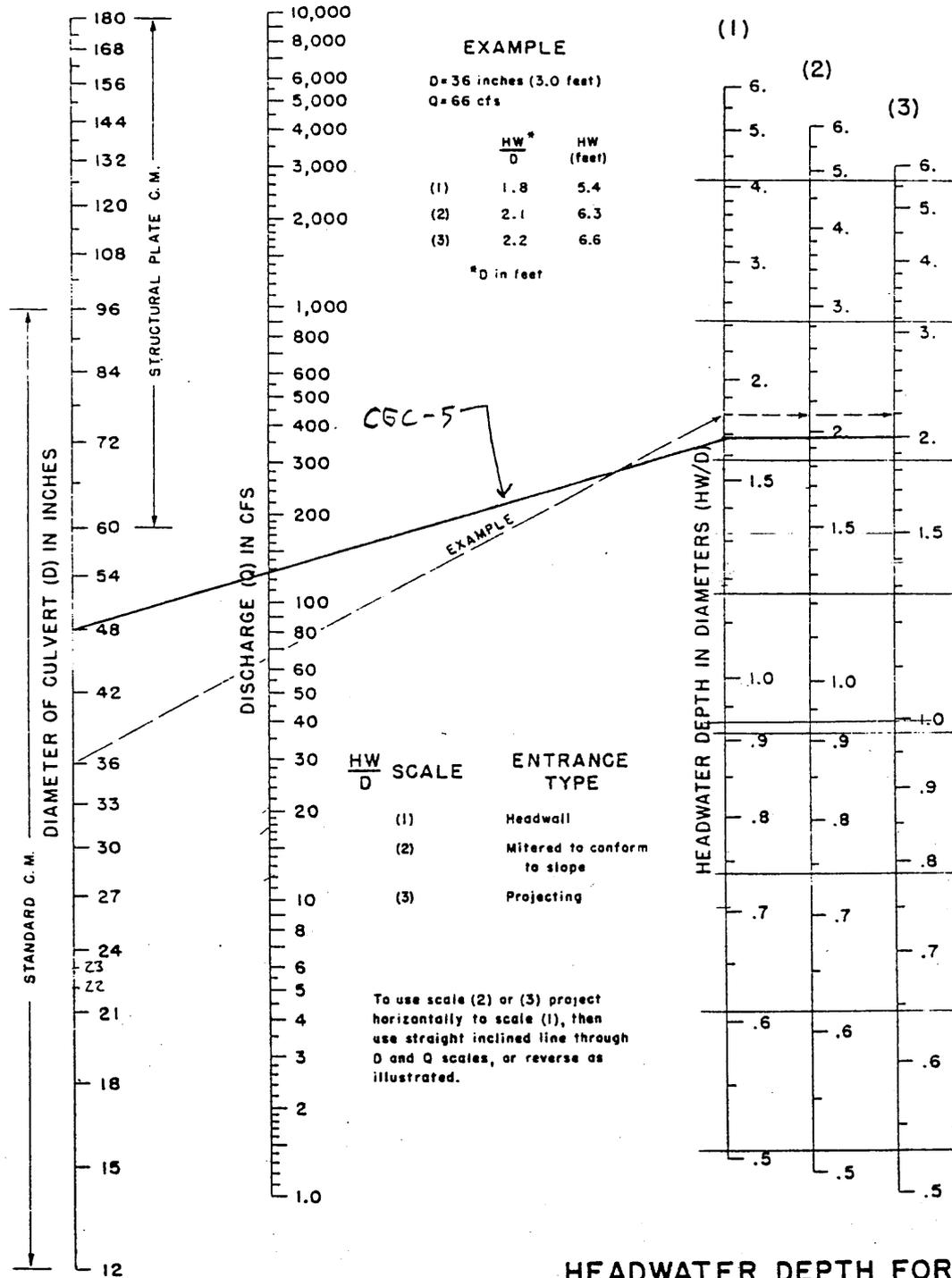


FIG. 2-SIZE OF STONE THAT WILL RESIST DISPLACEMENT FOR VARIOUS VELOCITIES AND SIDE SLOPES

Searcy, J.K. 1967. Use of Riprap for Bank Protection, U.S. Dept. of Transportation, Bureau of Public Roads, U.S. Government Printing Office, Washington D.C.

CHART 5



HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

5-23

Ref (U.S. Dept. of Transportation, 1977)
 Hydraulic Charts for the selection of Highway Culverts.
 Hydraulic Engineering Circular No. 5. Federal Highway
 Administration. Washington, D.C.

APPENDIX 3.4K

**RECLAMATION PERIOD ALTERNATIVE
SEDIMENT CONTROL CALCULATIONS**

Comparison of Pre-Mining and Post-Reclamation Sediment Yields for the Willow Creek Preparation Plant and Refuse Pile

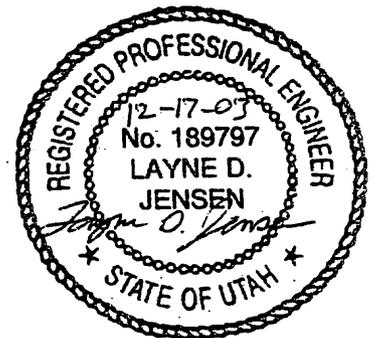
Sediment control after reclamation of the Preparation Plant and Refuse Pile will be by Alternate Sediment Control Measures ("ASCM"). The same reclamation methods will be used for the reclamation of this site as was used for the reclamation of Hardscrabble Canyon, Crandall Canyon, Adit No. 1, and Star Point Mines. Sediment control at these sites have been successful and the same methods are expected to be successful at this site as well. The sediment control methods to be applied at this site are as follows:

1. Deep gouging;
2. Mixing hay into the soil;
3. Mulching the gouged surface;
4. Securing the mulch with a tackifier; and
5. Revegetation.

The purpose of this calculation is to evaluate the sediment yield characteristics of the disturbed area under pre-mining and post-mining conditions. The three conditions to be evaluated will be as follows:

1. Pre-mining, This site was a town prior to the building of the Preparation Plant. The site has been disturbed for over 100 years. Hence pre-disturbance information is not available and the pre-mining condition is a disturbed condition. Although the pre-mining condition is a disturbed condition where possible an undisturbed condition will be assumed for these calculations.
2. Immediate Post-Reclamation, after deep gouging, mulching and seeding but before vegetation establishment.
3. Long Term Post-Reclamation, after vegetation is well established and depressions from deep gouging are mostly gone.

Mixing hay into the soil consists of 2 tons/acre of hay being mixed into the soil during deep gouging. Another 1 to 1.5 tons/acre of straw mulch will be broadcast on the surface. The straw mulch will be secured with a tackifier when the site is hydroseeded. A small amount of wood fiber mulch will also be applied with the tackifier during hydroseeding.



Methodology

Sediment yield calculations will be made using the Modified Universal Soil Loss Equation ("MUSLE") as presented by Israelsen et. al. (1984) and Barfield et. al. (1994)

$$A = R * K * LS * VM$$

where:

- A = Sediment Yield (tons/acre/year)
- R = Rainfall Factor
- K = Soil Erodibility Factor
- LS = Length and Steepness of slope factor
- VM = Erosion Control Factor

Each of the above factors will be evaluated for each of the three conditions.

Rainfall Factor (R)

R=11 From Map R7 Israelsen et. al. (1984)

The same factor will apply for all three conditions.

Soil Erodibility Factor (K)

As mentioned above the site has been disturbed for a long time and pre-disturbance data are not available. The Soil Survey of Carbon Area, Utah categorizes soils in the vicinity of the site that were not disturbed at the time of the survey. The bottom of the canyon with relatively flat slopes are identified as map unit 107 Shupert-Winette Complex. The erodibility factor identified in Table 12 on page 280 is 0.24 for the surface sample. The steep slopes around the disturbed areas are identified as Map unit 121 Travisilla-rock outcrop-Gerst Complex. The near surface has some cementation and has a very low erodibility of 0.05 while soils 2 inches down have a much higher erodibility factor of 0.37. Since the bulk of the site is the flatter areas and the erodibility factor of 0.24 is between the two extremes of the steep slopes factor I will assume a soil erodibility factor of 0.24 for the undisturbed condition.

Most of the soil being used during the reclamation of the Preparation Plant and Refuse Pile area is being hauled over from the Gravel Canyon Topsoil Stockpile. This stockpile is mostly composed of topsoil hauled from Crandall Canyon during the construction of that facility. The area where the soils were hauled from are identified as map unit 125 Uinta-Toze Families Complex. This soil has a surface soil erodibility factor of 0.24 with the lower soil layers having a factor of 0.15 and 0.1. These soils had high organic content and lower clay content than the soils in the Preparation Plant Area and should be excellent growth media. Since most of the soils stripped from Crandall Canyon have an Erodibility Factor of 0.15 of 0.10 I will assume a factor of 0.20 for both reclamation time periods

Length-Steepness Factor (LS)

$$LS = \left(\frac{65.41 S^2}{S^2 + 10,000} + \frac{4.56 S}{\sqrt{S^2 + 10,000}} + 0.005 \right) \left(\frac{l}{72.6} \right)^m$$

Where:

LS = Length Steepness Factor

S = Slope Gradient (%)

l = Slope Length (ft)

m = empirical exponent (function of slope)

Pre-mining

Since the site was disturbed before or near 1900 no pre-disturbance topography is available. However, using adjacent undisturbed topography the site had slopes between 1 and 100%. Most of the site is located in a broad relatively flat area of Price Canyon. The slopes of the undisturbed areas on the canyon sides are mostly between 60% and 80%. In an undisturbed conditions the slopes extend unbroken from the ridge lines down to the channels in the canyons. These distances may be up to 1100'. However most slope lengths are 400' to 500' in length. The steepest slopes will generate the greatest erosion so I will focus on the steep areas when comparing sediment yield. For the undisturbed conditions I will assume a slope of 60% and a slope length of 400'.

$$LS = 46.3 \text{ (Table C-1 Israelsen et. al. (1984))}$$

Immediate Post Reclamation

The reclaimed areas will be deep gouged prior to seeding. Deep gouging creates 1 to 3' deep holes that prevent runoff from concentrating and achieving an erosive velocity. In the early stages of reclamation the gouges prevent any water from running off the reclaimed areas. The gouges also stop any runoff from upgradient undisturbed areas. Therefore, the slope length is very short. I will assume a slope length of 10' although the distance is actually less. The maximum slope of reclamation is a 2:1 slope or 50%. I will assume the maximum slope of 50% and a slope length of 10'.

$$LS = 5.64 \text{ (Table C-1 Israelsen et. al. (1984))}$$

Long-term Post Reclamation

In the long term the depressions from gouging will disappear leaving an unbroken slope with a maximum slope of 50%. I will assume a 50% slope and the same slope length as for the pre-mining condition (400').

$$LS = 35.65 \text{ (Table C-1 Israelsen et. al. (1984))}$$

Erosion Control Factor (VM)

Pre-Mining

No pre-mining vegetation data is available. However, Exhibit 9-1 identifies adjacent undisturbed areas to be mostly mixed brush. I will use the Castle Gate Mixed Brush reference area to estimate the Erosion Control Factor.

Total vegetation cover = 40.9%
Litter/rock cover = 35.2%
Bare soil = 23.9%

Grass density = 51% ==> 21%
Sage brush = 26% ==> 10.6%
Other brush = 23% ==> 9.4%
Total brush 20%

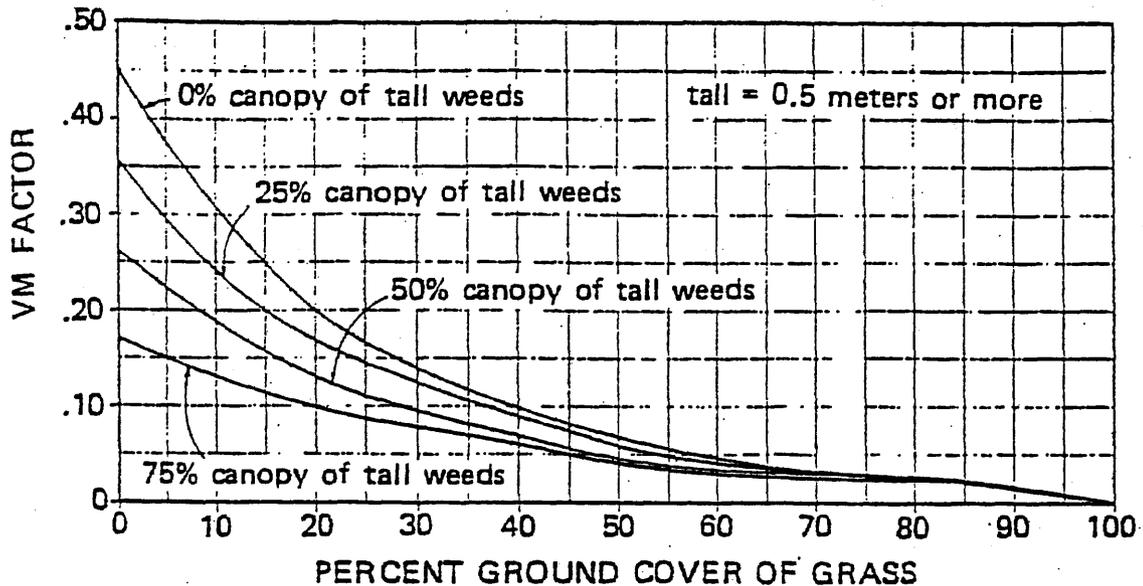


Figure 7. Relationship between grass density and VM factor.

Israelsen et. al. (1984)

$$VM = 0.17$$

Immediate Post Reclamation

$$R * K * LS = 11 * 0.24 * 5.64 = 14.89$$

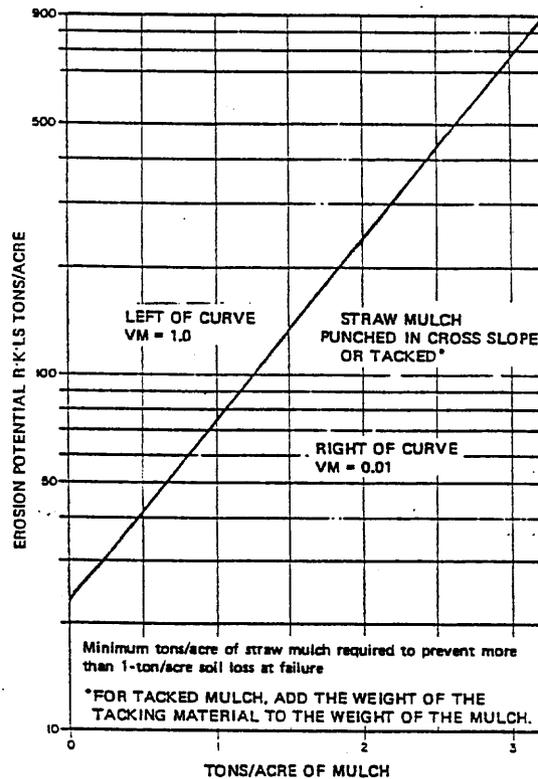


Figure 4. Straw mulch anchored vs. R·K·LS.

At least 1 ton/acre of mulch will be added with a tackifier to the reclaimed surface. Therefore, the point plots on the right side of the line.

$$VM = 0.01$$

Long-term Post Reclamation

Section 3.2.2.4 of the Willow Creek Permit describes the vegetation in an area near the site that has been reclaimed (The old Royal Refuse Pile). I will use that data to estimate the Erosion Control Factor although the Preparation Plant area will be better vegetated.

- Total plant cover = 30%
- Brush density = 50% ==> 15.5%
- Grasses density = 40% ==> 12.4%

$$VM = 0.24 \text{ (see figure 7 on page 4)}$$

Calculation Summary

<u>Time Period</u>	<u>R</u>	<u>K</u>	<u>LS</u>	<u>VM</u>	<u>A (tons/acre/yr)</u>
Pre-Mining	11	0.24	46.3	0.17	20.78
Immediate Post Reclamation	11	0.20	5.64	0.01	0.12
Long-term Post Reclamation	11	0.20	35.65	0.24	18.82

Thus the reclaimed surface will generate far less sediment immediately after reclamation and will generate slightly less sediment for the long-term post reclamation period.

APPENDIX 3.4L

RECLAMATION CORRESPONDENCE, PUBLICATIONS, AGREEMENTS

SPECIAL WARRANTY DEED

THIS SPECIAL WARRANTY DEED is made and entered into effective the 26 day of April, 2004, by and between **PLATEAU MINING CORPORATION**, a Delaware corporation, with an address P. O. Box 30, Helper, Utah 84526 (hereinafter referred to as "Grantor"), and **PRICE RIVER WATER IMPROVEMENT DISTRICT**, a special water improvement district organized and operating under the laws of the State of Utah, with an address at 265 South Fairgrounds Road, P. O. Box 903, Price, Utah 84501 (hereinafter referred to as "Grantee").

WITNESSETH, THAT, Grantor, for and in consideration of Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, subject to the reservations contained herein, does hereby grant and convey unto the said Grantee, and to its successors and assigns forever, all of Grantor's right, title, interest in, of and to those certain tracts, parcels or lots of land located in Carbon County, Utah, as further described in Exhibit "A" attached hereto and made a part hereof (the "Premises").

TOGETHER WITH the following:

1. The surface, including any and all timber, standing or laying;
2. All personal property, fixtures and equipment affixed to the Premises;
3. To the extent that Grantor owns such, all electrical equipment, including, but not limited to, power lines, power poles, power substations and equipment associated therewith, unless otherwise specifically excluded herein or as may otherwise be excluded in writing between the parties; and
4. To the extent that Grantor owns such, any and all structures located thereon, therein or thereunder, ponds, ditches and water storage facilities, water lines, water taps, water metering devices, sewage lines and septic sewage tanks and systems, if any, which are appurtenant to the Premises.

RESERVING, HOWEVER, the following:

1. Unto, Blackhawk Coal Company ("Blackhawk"), its successors and assigns, all minerals, mineral interests, fissionable materials, coals, oils, gases, coalbed methane, geothermal resources, clays, spars, potash, sand, gravel, asphalt, commercial rock, veins, lodes and deposits of every kind and nature whatsoever in, on or under the Premises, together with those certain mining and development rights more fully set forth in Sections I and II of that certain Special Warranty Deed dated effective December 14, 1995 between Blackhawk, Grantor, and Amax Land Company, Grantee, recorded in Book 366, Page 467, Carbon County, Utah, to which record reference is made herein for all purposes;
2. Unto Grantor, its successors and assigns, that certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "Culinary Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Grantor the right to use,

maintain, replace and remove the Culinary Water Facilities; and (ii) the right to utilize the present electrical service to the Culinary Water Facilities. Upon the permanent removal by Grantor of the Culinary Water Facilities, Grantor agrees to prepare and provide Grantee with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Grantor, in its sole discretion, determines that it no longer requires use of the Culinary Water Facilities, Grantor agrees to notify Grantee of such in writing and Grantee shall have thirty (30) days after it receives the aforesaid notice from Grantor to provide Grantee with a written request to have the Culinary Water Facilities conveyed to Grantee by Bill of Sale. Upon any such conveyance by Grantor to Grantee, Grantee shall thereupon assume and be solely responsible for, and Grantor shall be released from the requirement to perform, any maintenance, removal and reclamation of the Culinary Water Facilities;

3. That certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "North Raw Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Grantor the right to use, maintain, replace and remove the North Raw Water Facilities; and (ii) the right to utilize the present electrical service to the North Raw Water Facilities. Upon the permanent removal by Grantor of the North Raw Water Facilities, Grantor agrees to prepare and provide Grantee with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Grantor, in its sole discretion, determines that it no longer requires use of the North Raw Water Facilities, Grantor agrees to notify Grantee of such in writing and Grantee shall have thirty (30) days after it receives the aforesaid notice from Grantor to provide Grantee with a written request to have the North Raw Water Facilities conveyed to Grantee by Bill of Sale. Upon any such conveyance by Grantor to Grantee, Grantee shall thereupon assume and be solely responsible for, and Grantor shall be released from the requirement to perform, any maintenance, removal and reclamation of the North Raw Water Facilities;
4. Any and all personal property belonging to Grantor located upon and which is not attached to the Premises, together with the right to enter over, across and upon the Premises for the sole purpose of retrieving and removing said personal property. Grantor agrees that any such personal property shall be removed from the Premises on or before August 1, 2004;
5. Grantor may be required by law, regulatory authorities and its mining permits, to perform certain reclamation related activities with respect to the Premises. For so long as Grantor has any such obligations, it shall be entitled to have reasonable access over, on and across the Premises in order to perform such reclamation related activities;
6. A right-of-way over, across and upon the Premises at further shown on Exhibit "B" attached hereto and made a part hereof (or at such other location or locations to be determined by Grantor in consultation with Grantee), for the purpose of allowing Grantor ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Grantor's activities involving (i) the Potable Water Facilities; (ii) the North Raw Water Facilities; and (iii) a water monitoring well located on adjacent lands owned and/or controlled by Grantor, which activities include, but are not limited to, the plugging and

abandonment of said water monitoring well. Grantor's rights reserved hereunder are non-exclusive and expressly subject to Grantee's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Grantor's rights hereunder, together with all rights reasonably necessary to those purposes. Grantor's rights hereunder shall be exercised so as not to unreasonably interfere with Grantee's interests, and Grantee shall exercise such rights so as not to unreasonably interfere with the activities of Grantor permitted hereunder. Should Grantor, in its sole discretion, determine that the right-of-way reserved herein, or any portion thereof, is no longer required by Grantor, Grantor agrees to prepare and provide Grantee with a full or partial, as the case may be, Release of Right-Of-Way and Quitclaim Deed in recordable form; and

7. A right-of-way over, across and upon the Premises at such location or locations to be determined by Grantor in consultation with Grantee, for the purpose of allowing Grantor ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Grantor's activities involving Grantor's coal refuse pile located on lands adjacent to the Premises and which are owned and/or controlled by Grantor. Grantor's rights reserved hereunder are non-exclusive and expressly subject to Grantee's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Grantor's rights hereunder, together with all rights reasonably necessary to those purposes. Grantor's rights hereunder shall be exercised so as not to unreasonably interfere with Grantee's interests, and Grantee shall exercise such rights so as not to unreasonably interfere with the activities of Grantor permitted hereunder. Should Grantor, in its sole discretion, determine that the right-of-way reserved herein, or any portion thereof, is no longer required by Grantor, Grantor agrees to prepare and provide Grantee with a full or partial, as the case may be, Release of Right-Of-Way and Quitclaim Deed in recordable form.

TO HAVE AND TO HOLD the above described Premises with the appurtenances, unto said Grantee, its successors and assigns, forever; and the said Grantor, for itself and its successors and assigns, does hereby covenant and agree to and with the said Grantee and its successors and assigns that it is lawfully seized in fee of the aforesaid Premises; that the same are free of all encumbrances except as otherwise stated below and in Exhibit "A" attached hereto and made a part hereof:

This conveyance is subject to all zoning laws, ordinances and rules and regulations of governmental authorities; all current and future real estate taxes and assessments; all covenants, conditions, agreements, reservations, restrictions, easements and rights-of-way which are of record; all existing public highways; boundary line disputes, overlaps, shortages in area, encroachments and any matters or facts not of record which would be disclosed by a physical inspection or accurate survey of the Premises, including by way of illustration, but not limitation, easements and claims of easements not shown by the public records; all rights, title and interest of all tenants and occupants under all leases, licenses, franchises, concessions and other unrecorded occupancy agreements, for the use and occupancy of any of the Premises which have been disclosed to Grantor; all leases which are of record or are referred to in any

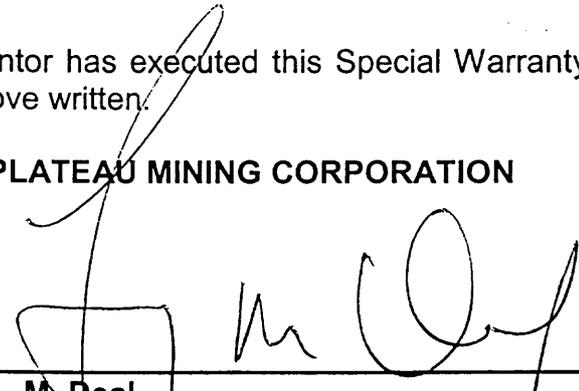
instrument of record; all recorded conveyances or reservations of minerals or timber; such additional out conveyances, exceptions or limitations, if any, as may be disclosed by any of the copies or originals of deeds, leases, easements, licenses, permits, abstracts of title, certificates of title, title opinions, title policies, affidavits and other documents which disclose the state or condition of title to the Premises and which were provided to Grantor prior to the date of this conveyance; and

that Grantor has good right to convey the same to Grantee as aforesaid; and with respect to the above described Premises Grantor will specially warrant title only against claims arising out of its own acts and omissions and the acts and omissions of any persons claiming by, through or under Grantor, but none others; i.e., Grantor does not warrant title against claims arising out of acts or omissions of prior title holders.

Notwithstanding anything contained herein to the contrary, by the acceptance and recording of this Special Warranty Deed, Grantee covenants and agrees to and with Grantor that it shall not assign, transfer or otherwise sell, in whole or in part, all or any portion of the Premises until such time as Seller receives Phase III SMCRRA bond release from the State of Utah, Division of Oil, Gas and Mining with regard to the Premises. Any transfer by sale or otherwise in violation of this provision shall be deemed null and void.

IN WITNESS WHEREOF, Grantor has executed this Special Warranty Deed effective as of the date and year first above written.

PLATEAU MINING CORPORATION

atb By: 

L. M. Deal
Vice President, Regional Sales (West)

APPROVED
ltg

EXHIBIT "A"

Attached to and made a part thereof that certain Special Warranty Deed dated effective the 26 day of April, 2004 between Plateau Mining Corporation, Grantor, and Price River Water Improvement District, Grantee, covering the following described lands located in the County of Carbon, State of Utah, to-wit:

A parcel of land situated in the E/2 of Section 35 and the W/2 of Section 36, Township 12 South, Range 9 East, SLB&M, Carbon County, Utah, bounded and described as follows:

BEGINNING at a point 731.34 feet North 89° 46' 21" East along section line and 90.98 feet north of the southwest corner of said Section 36, said point lies on the easterly right-of-way line of the D&RGW railroad, and running thence northwesterly along said railroad right-of-way the following four (4) courses:

1. North 37° 35' 06" West, 505.11 feet to a point of curvature of a 3900.00 foot radius tangent curve to the right, thence northwesterly 382.30 feet along the arc of said curve to a point of tangency;
2. Thence North 31° 58' 08" West, 1146.06 feet to a point of curvature of a 550.00 foot radius tangent curve to the right, thence northwesterly 281.38 feet along the arc of said curve to a point of tangency;
3. Thence North 02° 39' 23" West, 419.27 feet to a point of curvature of a 925.00 foot radius tangent curve to the left, thence northwesterly 718.80 feet along the arc of said curve to a point of tangency;
4. Thence North 47° 10' 04" West, 732.92 feet;

Thence leaving said railroad right-of-way, North 00° 12' 15" West 992.57 feet;

Thence East 660 feet;

Thence South 660 feet;

Thence East 660 feet to the east line of said Section 35;

Thence East 660 feet;

Thence South 1320 feet;

Thence North 89° 49' 06" East, 654.96 feet to the southeast corner of the SW/4 NW/4 of said Section 36;

Thence South 00° 13' 28" East, 1030.01 feet;

Thence South 35° 00' 00" West, 580.00 feet;

Thence South 01° 40' 20" West, 547.88 feet;

EXHIBIT "A" – CONTINUED

Thence South 06° 53' 35" West, 340.34 feet;

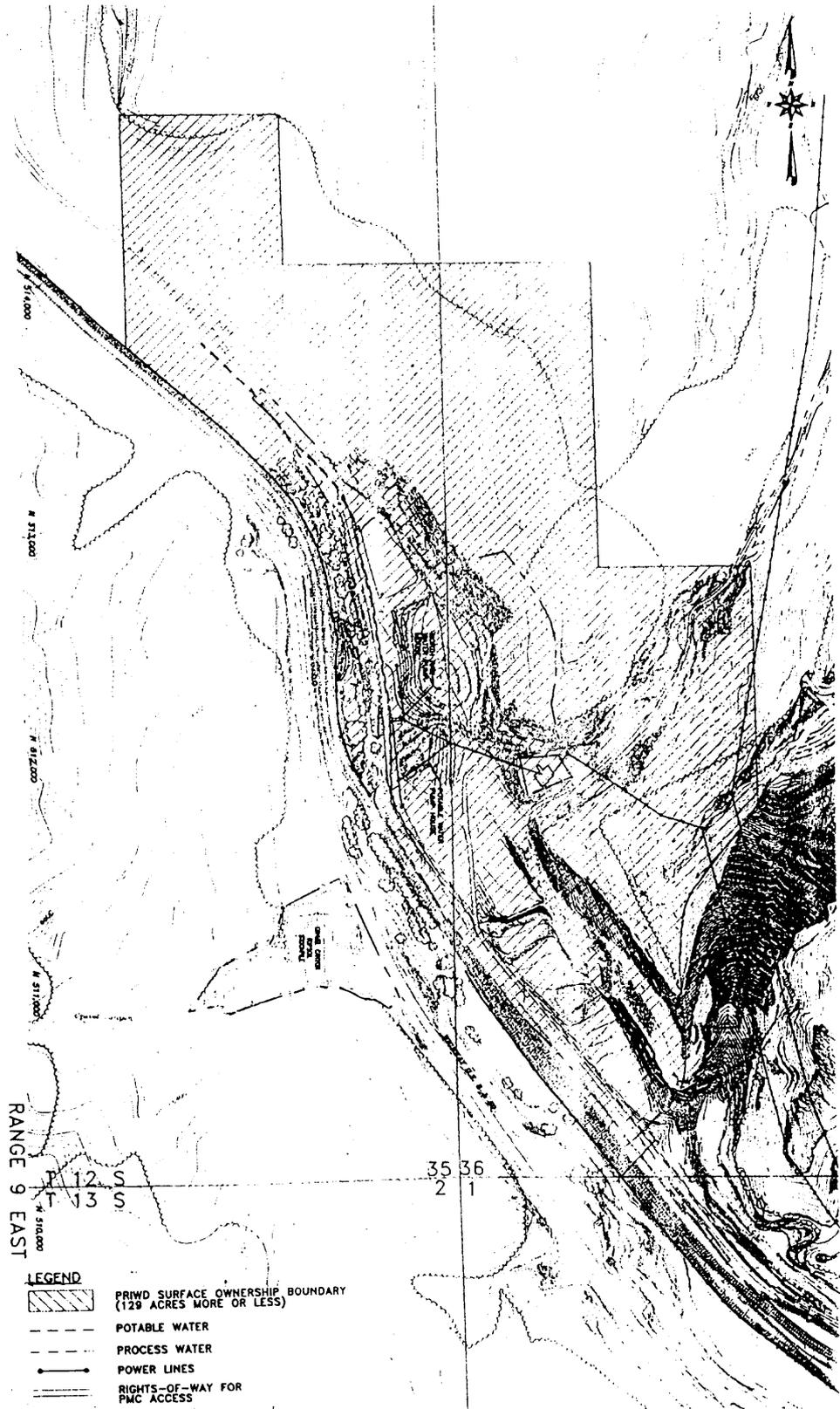
Thence South 47° 57' 20" West, 126.01 feet;

Thence south 52° 24' 54" West, 111.97 feet to the **POINT OF BEGINNING**, containing 128.50 acres, more or less, in accordance with Survey dated April 5, 2004 by Bruce T. S. Ware (Ware Surveying & Engineering, L.L.C.), RLS No. 153834.

And being a portion of the same tracts, parcels or lots of land excepted and reserved by Plateau Mining Corporation in that certain Special Warranty Deed dated effective November 7, 2003 between Plateau Mining Corporation, Grantor, and Blackhawk Coal Company, Grantee, recorded on November 12, 2003 in Book 552, page 789, Carbon County, Utah, to which record reference is made herein for all purposes.

EXHIBIT "B"

Attached to and made a part thereof that certain Special Warranty Deed dated effective the 26 day of April, 2004 between Plateau Mining Corporation, Grantor, and Price River Water Improvement District, Grantee.



PURCHASE AGREEMENT

THIS PURCHASE AGREEMENT (the "Agreement") is made and entered into effective the 23rd day of April, 2004, by and between **PLATEAU MINING CORPORATION**, a Delaware corporation, with an address P. O. Box 30, Helper, Utah 84526 (hereinafter referred to as "Seller"), and **PRICE RIVER WATER IMPROVEMENT DISTRICT**, a special water improvement district organized and operating under the laws of the State of Utah, with an address at 265 South Fairgrounds Road, P. O. Box 903, Price, Utah 84501 (hereinafter referred to as "Buyer").

WITNESSETH:

WHEREAS, Seller desires to sell and Buyer desires to purchase and receive all those certain tracts, parcels or lots of land located in the County of Carbon, State of Utah, as further described in Exhibit "A" attached hereto and made a part hereof, and subject to the terms and conditions contained herein (the "Premises").

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements contained herein, the parties hereby agree as follows:

1. Property (Rights) Included in Sale (Subject to the Exclusions/Reservations in Paragraph 2 below):

- a. The surface, including any and all timber, standing or laying;
- b. All personal property, fixtures and equipment affixed to the Premises;
- c. To the extent that Seller owns such, all electrical equipment, including, but not limited to, power lines, power poles, power substations and equipment associated therewith, unless otherwise specifically excluded herein or as may otherwise be excluded in writing between the parties; and
- d. To the extent that Seller owns such, any and all structures located thereon, therein or thereunder, including any and all ponds, ditches and water storage facilities, water lines, water taps, water metering devices, sewage lines and septic sewage tanks and systems, if any, which are appurtenant to the Premises.

2. Property (Rights) Excluded/Reserved in Sale:

- a. All minerals, mineral interests, fissionable materials, coals, oils, gases, coalbed methane, geothermal resources, clays, spars, potash, sand, gravel, asphalt, commercial rock, veins, lodes and deposits of every kind and nature whatsoever in, on or under the Premises, reserved by Blackhawk Coal Company ("Blackhawk"), its successors and assigns, together with those certain mining and development rights more fully set forth in Sections I and II of that certain Special Warranty Deed dated effective December 14, 1995 between Blackhawk, Grantor, and Amax Land Company, Grantee, recorded in Book 366, Page 467, Carbon County, Utah, to which record reference is made herein for all purposes;

- b. That certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "Culinary Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Seller the right to use, maintain, replace and remove the Culinary Water Facilities; and (ii) the right to utilize the present electrical service to the Culinary Water Facilities. Upon the permanent removal by Seller of the Culinary Water Facilities, Seller agrees to prepare and provide Buyer with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Seller, in its sole discretion, determines that it no longer requires use of the Culinary Water Facilities, Seller agrees to notify Buyer of such in writing and Buyer shall have thirty (30) days after it receives the aforesaid notice from Seller to provide Buyer with a written request to have the Culinary Water Facilities conveyed to Buyer by Bill of Sale. Upon any such conveyance by Seller to Buyer, Buyer shall thereupon assume and be solely responsible for, and Seller shall be released from the requirement to perform, any maintenance, removal and reclamation of the Culinary Water Facilities;
- c. That certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "North Raw Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Seller the right to use, maintain, replace and remove the North Raw Water Facilities; and (ii) the right to utilize the present electrical service to the North Raw Water Facilities. Upon the permanent removal by Seller of the North Raw Water Facilities, Seller agrees to prepare and provide Buyer with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Seller, in its sole discretion, determines that it no longer requires use of the North Raw Water Facilities, Seller agrees to notify Buyer of such in writing and Buyer shall have thirty (30) days after it receives the aforesaid notice from Seller to provide Buyer with a written request to have the North Raw Water Facilities conveyed to Buyer by Bill of Sale. Upon any such conveyance by Seller to Buyer, Buyer shall thereupon assume and be solely responsible for, and Seller shall be released from the requirement to perform, any maintenance, removal and reclamation of the North Raw Water Facilities;
- d. Any and all personal property belonging to Seller located upon and which is not attached to the Premises, together with the right to enter over, across and upon the Premises for the sole purpose of retrieving and removing said personal property. Seller agrees that any such personal property shall be removed from the Premises on or before August 1, 2004;
- e. Seller may be required by law, regulatory authorities and its mining permits, to perform certain reclamation related activities with respect to the Premises. For so long as Seller has any such obligations, it shall be entitled to have reasonable access over, on and across the Premises in order to perform such reclamation related activities;
- f. A right-of-way over, across and upon the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (or at such other location or locations to

be determined by Seller in consultation with Buyer), for the purpose of allowing Seller ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Seller's activities involving (i) the Potable Water Facilities; (ii) the North Raw Water Facilities; and (iii) a water monitoring well located on adjacent lands owned and/or controlled by Seller, which activities include, but are not limited to, the plugging and abandonment of said water monitoring well. Seller's rights reserved hereunder are non-exclusive and expressly subject to Buyer's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Seller's rights hereunder, together with all rights reasonably necessary to those purposes. Seller's rights hereunder shall be exercised so as not to unreasonably interfere with Buyer's interests, and Buyer shall exercise such rights so as not to unreasonably interfere with the activities of Seller permitted hereunder. Should Seller, in its sole discretion, determine that the right-of-way reserved herein, or any portion thereof, is no longer required by Seller, Seller agrees to prepare and provide Buyer with a full or partial, as the case may be, Release of Right-Of-Way and Quitclaim Deed in recordable form;

- g. A right-of-way over, across and upon the Premises at such location or locations to be determined by Seller in consultation with Buyer, for the purpose of allowing Seller ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Seller's activities involving Seller's coal refuse pile located on lands adjacent to the Premises and which are owned and/or controlled by Seller. Seller's rights reserved hereunder are non-exclusive and expressly subject to Buyer's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Seller's rights hereunder, together with all rights reasonably necessary to those purposes. Seller's rights hereunder shall be exercised so as not to unreasonably interfere with Buyer's interests, and Buyer shall exercise such rights so as not to unreasonably interfere with the activities of Seller permitted hereunder. Should Seller, in its sole discretion, determine that the right-of-way reserved herein is no longer required by Seller, Seller agrees to prepare and provide Buyer with a Release of Right-Of-Way and Quitclaim Deed in recordable form; and
- h. Notwithstanding anything contained herein to the contrary, Buyer, for itself and its employees, officers, contractors, subcontractors, agents, guests, invitees, successors and assigns, hereby agrees that Buyer shall be responsible and indemnify and hold harmless Seller from any and all damages whatsoever to all areas of the Premises reclaimed by Seller under Seller's Surface Mine Control and Reclamation Act ("SMCRA") Permit extended liability period.

- 3. **Purchase Price:** The purchase price of the Premises is Thirty-Two Thousand Five Hundred Dollars (\$32,500.00), which amount, less (a) the down payment specified in paragraph 4 below; (b) the 2003 ad valorem taxes assessed against the Premises, if said taxes have not already been paid by Seller; and (c) Seller's prorata share of the 2004 ad valorem taxes assessed against the Premises, shall be paid to Seller in the

form of a check(s), wire transfer(s) or in immediately available funds on the closing date (the "Closing").

4. **Down Payment:** Unless otherwise agreed to in writing between the parties, within ten (10) business days following the execution of this Agreement by Seller and Buyer, Buyer agrees to pay Seller, or such other party or entity as they may otherwise designate in writing, a down payment of Three Thousand Two Hundred Fifty Dollars (\$3,250.00), which amount shall be credited against the Purchase Price at the time of Closing. In addition, and unless otherwise agreed to in writing by both Seller and Buyer, if the closing does not take place on or before the date specified below, Seller shall be entitled to retain as liquidated damages the down payment herein specified and the parties shall have no further obligations under this Agreement; provided, however, if the parties are unable to close due to a lack of marketable and/or insurable title due to liens, encumbrances and defects in Seller's title to the Premises as determined by Buyer, then in that event this Agreement may, at Buyer's option, be terminated or further extended by agreement in writing between Buyer and Seller until such time as Buyer assures itself that Seller has and is able to convey marketable and/or insurable title to the Premises. In the event this Agreement is terminated by Buyer due to Seller's inability to convey marketable and/or insurable title to the Premises, Seller shall not be entitled to retain the down payment and shall remit the down payment to Buyer forthwith.
5. **Closing:** Subject to paragraph 4 above and the failure of Blackhawk Coal Company to exercise or waive its right of first refusal, unless otherwise agreed to in writing between the parties, the Closing of this purchase and sale transaction shall take place on or before the 30th day of April, 2004, at Seller's address shown above or at such other address that the parties may agree upon. At the time of Closing, Buyer shall deliver to Seller the remainder of the agreed upon purchase price in accordance with paragraph 3 above.
6. **Title:** Title to the Premises shall pass to Buyer on the date of the Closing, at which time Seller shall give Buyer a Special Warranty Deed in substantially the same form as that set forth in Exhibit "C" attached hereto and made a part hereof, free and clear of all liens and encumbrances except all rights-of-way, reservations, restrictions, easements, covenants and conditions as may appear of record on the date of Closing, and except the 2004 ad valorem taxes which are due and payable in 2004. Seller shall not create any lien or encumbrance against the Premises between the date of this Agreement and Closing, and shall remove any such lien or encumbrance at or prior to the Closing at their sole cost.
7. **Taxes:** Payment of the 2003 and all prior years' ad valorem taxes on the Premises, if any are still owed at the time of Closing, the same constituting a lien which is due and payable, shall be paid by or on the behalf of Seller prior to the Closing. Payment of the 2004 ad valorem taxes on the Premises, the same constituting a lien which is or may not yet be due and payable, shall be prorated between Seller and Buyer based upon the 2004 ad valorem taxes if known, or upon the 2003 ad valorem taxes if not known, which proration shall be considered final between the parties hereto. Further, Buyer and Seller hereby agree that (a) Buyer shall be responsible for any and all real property transfer fees, if any, associated with the Premises; and (b) Buyer shall be

solely responsible for the filing of any applicable forms/statements, if any, associated therewith.

8. **Assignment:** Buyer hereby covenants and agrees to and with Seller that it shall not assign, transfer or otherwise sell, in whole or in part, any of Buyer's rights and obligations under this Agreement and/or all or any portion of the Premises until such time as Seller receives Phase III SMCRA bond release from the State of Utah, Division of Oil, Gas and Mining with regard to the Premises. Any assignment or transfer by sale or otherwise in violation of this provision shall be deemed null and void.

9. **Inspection and Warranties:** Seller represents and warrants to Buyer:

- a. that it is a Delaware corporation, validly existing and in good standing under the laws of the State of Delaware, with full power and authority to enter into and perform this Agreement in accordance with the terms and conditions hereof and the execution and delivery of the Agreement has been authorized by all necessary corporation actions;
- b. that the Premises is free and clear of all encumbrances except as otherwise stated below:

The Premises is subject to a right of first refusal vested in Blackhawk Coal Company by virtue of that certain Exchange Agreement dated effective November 7, 2003 between Blackhawk Coal Company and Plateau Mining Corporation, a Memorandum of which is recorded in Book 552, Page 756, Carbon County, Utah, to which record reference is made herein for all purposes; all zoning laws, ordinances and rules and regulations of governmental authorities; all current and future real estate taxes and assessments; all covenants, conditions, agreements, reservations, restrictions, easements and rights-of-way which are of record; all existing public highways; boundary line disputes, overlaps, shortages in area, encroachments and any matters or facts not of record which would be disclosed by a physical inspection or accurate survey of the Premises, including by way of illustration, but not limitation, easements and claims of easements not shown by the public records; all rights, title and interest of all tenants and occupants under all leases, licenses, franchises, concessions and other unrecorded occupancy agreements, for the use and occupancy of any of the Premises which have been disclosed to Seller; all leases which are of record or are referred to in any instrument of record; all recorded conveyances or reservations of minerals or timber; such additional out conveyances, exceptions or limitations, if any, as may be disclosed by any of the copies or originals of deeds, leases, easements, licenses, permits, abstracts of title, certificates of title, title opinions, title policies, affidavits and other documents which disclose the state or condition of title to the Premises and which were provided to Seller prior to the date of this Agreement;

- c. that it will specially warrant and defend the Premises against its own acts and none others;
- d. that with respect to the Premises, to the best of Seller's knowledge, there are no pending or threatened actions, suits, claims or proceedings; and

- e. that, to the best of Seller's knowledge, there are no other third party leases, tenancies, licenses or other third rights or interests in or to the Premises except as may otherwise be set forth herein.

The representations and warranties shall survive the Closing and transfer of title.

It is understood and agreed that Buyer, or its designated agent or consultant, has inspected the Premises as described herein, for which Seller makes no representations or warranties except as may be expressed herein. Subject to the representations and warranties made herein, Buyer accepts any and all improvements, personal property and fixtures located on or in the Premises in an as is condition **"AS IS, WHERE IS, WITH ALL FAULTS, AND WITHOUT REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF ANY KIND OR CHARACTER, INCLUDING, BUT NOT LIMITED TO, THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR USE, DESIGN, CONSTRUCTION, CONDITION OR OTHERWISE, WHETHER EXPRESSED OR IMPLIED BY LAW OR FACT."**

10. **Representations of Buyer:** Buyer represents that it is a special water improvement district, duly organized and operating under the laws of the State of Utah, with full power and authority to enter into and perform this Agreement in accordance with the terms and conditions hereof and the execution and delivery of the Agreement has been authorized by all necessary special water improvement district actions.
11. **Default:** In the event of default by either party in the performance of the terms and conditions of this Agreement, the defaulting party agrees to pay all attorney fees and costs incurred by the non-defaulting party. If Seller fails to consummate the sale (other than for Buyer's default), or in the event Blackhawk Coal Company exercises its right of first refusal to purchase the Premises, the down payment money shall be returned to Buyer. In the event of default by Buyer, Seller shall have the right to retain as liquidated damages all amounts paid by Buyer as a down payment.
12. **Entire Agreement and Modification:** This Agreement represents the full and complete agreement between the parties regarding the subject matter hereof and all parties executing this instrument have received a copy of same. The terms and conditions of this Agreement merge with and supersede any prior or contemporaneous, oral or written, statements or agreements. This Agreement may only be modified or amended by a written instrument signed by both parties hereto.
13. **Further Assurances:** Buyer, at the request of Seller, shall execute and deliver to Seller any available instruments, agreements, documents, permits or applications, or any other papers reasonably required by Seller, and Buyer shall do such other acts as may be reasonably requested by Seller, all to effect the purposes of this Agreement. Conversely, Seller, at the request of Buyer, shall execute and deliver to Buyer any available instruments, agreements, documents, permits or applications, or any other papers reasonably required by Buyer, and Seller shall do such other acts as may be reasonably requested by Buyer, all to effect the purposes of this Agreement.

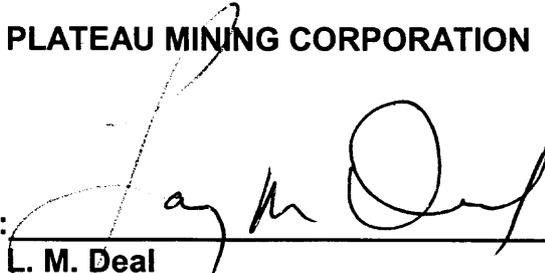
14. **Counterpart Agreements:** This Agreement may be executed in any number of counterparts and shall be binding upon all owners of an interest in the Premises who execute the same or a counterpart hereof, whether or not named herein as one of the parties, and whether or not the owners of the aforesaid interest have executed other counterparts or have not entered into this Agreement.
15. **Construction:** Paragraph headings in this Agreement are inserted for convenience only, and shall not be considered a part of this Agreement, or used in its interpretation. Unless otherwise provided, or unless the context shall otherwise require, words importing the singular number shall include the plural number, words importing the masculine gender shall include the feminine gender, and vice versa. This Agreement shall not be construed against either party merely or solely because of the draftsmanship hereof.
16. **Governing Law:** This Agreement shall be construed in accordance with and governed by the laws of the State of Utah and all rules, regulations and ordinances of the County of Carbon. Each of the parties hereto consents to the jurisdiction of any appropriate court in the State of Utah in the event there is a dispute or disagreement arising out of this Agreement.
17. **Severance:** Should any portion of this Agreement be declared invalid and unenforceable, then such portion shall be deemed to be severed from this Agreement and shall not affect the remainder thereof.
18. **Brokers/Agents:** No agent, broker, finder or investment banker is entitled to any brokerage, finders or other fee or commission in connection with the transactions contemplated by this Agreement, and each of the parties shall hold the other harmless from and against any such fee or commission.
19. **Binding Affect:** All the terms, conditions, reservations, covenants and restrictions of this Agreement shall survive closing and shall be binding upon and shall inure to the benefit of the personal representatives, heirs, successors and assigns, respectively, of each of the parties hereto.

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IN WITNESS WHEREOF, Seller and Buyer have executed this Agreement in duplicate effective as of the date first above written.

SELLER:

PLATEAU MINING CORPORATION

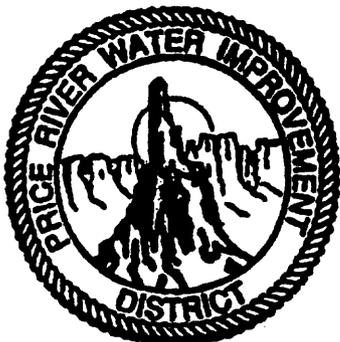
ceb
By: 

L. M. Deal
Vice President, Regional Sales (West)

APPROVED


BUYER:

PRICE RIVER WATER IMPROVEMENT DISTRICT,
a special water improvement district organized
and operating under the laws of the State of Utah



By: 
Keith W. Cox
Chairman

Attest: 
Name: KATHY BALL
Title: SEC-TREAS

CORPORATE ACKNOWLEDGEMENT

STATE OF COLORADO)
) ss.
COUNTY OF DOUGLAS)

The foregoing instrument was acknowledged before me this 23rd day of April, 2004, by **L. M. Deal**, the Vice President, Regional Sales (West), of Plateau Mining Corporation, a Delaware corporation.



Ann Marie Bruzenhan
Notary Public

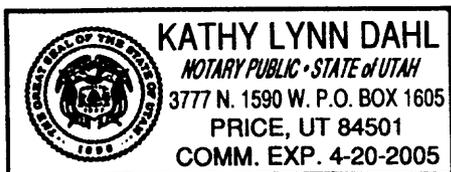
7999 South Jasmine Circle
Englewood, CO 80112-3052
Address

My Commission expires: May 21, 2004

SPECIAL WATER IMPROVEMENT DISTRICT ACKNOWLEDGMENT

STATE OF UTAH)
) ss.
COUNTY OF CARBON)

The foregoing instrument was acknowledged before me this 26 day of APRIL, 2004, by **Keith W. Cox**, the Chairman of Price River Water Improvement District, a special water improvement district organized and operating under the laws of the State of Utah, and that the above and foregoing instrument was signed by him in accordance with a resolution of the said Price River Water Improvement District, duly passed in regular meeting on the 20 day of APRIL, 2004, and that the said action was the action of the Price River Water Improvement District.



Kathy Lynn Dahl
Notary Public

CARBON COUNTY, UTAH
Address

My Commission expires: 4-20-2005

EXHIBIT "A"

Attached to and made a part thereof that certain Purchase Agreement dated effective the 23rd day of April, 2004 between Plateau Mining Corporation, Seller, and Price River Water Improvement District, Buyer, covering the following described lands located in the County of Carbon, State of Utah, to-wit:

A parcel of land situated in the E/2 of Section 35 and the W/2 of Section 36, Township 12 South, Range 9 East, SLB&M, Carbon County, Utah, bounded and described as follows:

BEGINNING at a point 731.34 feet North 89° 46' 21" East along section line and 90.98 feet north of the southwest corner of said Section 36, said point lies on the easterly right-of-way line of the D&RGW railroad, and running thence northwesterly along said railroad right-of-way the following four (4) courses:

1. North 37° 35' 06" West, 505.11 feet to a point of curvature of a 3900.00 foot radius tangent curve to the right, thence northwesterly 382.30 feet along the arc of said curve to a point of tangency;
2. Thence North 31° 58' 08" West, 1146.06 feet to a point of curvature of a 550.00 foot radius tangent curve to the right, thence northwesterly 281.38 feet along the arc of said curve to a point of tangency;
3. Thence North 02° 39' 23" West, 419.27 feet to a point of curvature of a 925.00 foot radius tangent curve to the left, thence northwesterly 718.80 feet along the arc of said curve to a point of tangency;
4. Thence North 47° 10' 04" West, 732.92 feet;

Thence leaving said railroad right-of-way, North 00° 12' 15" West 992.57 feet;

Thence East 660 feet;

Thence South 660 feet;

Thence East 660 feet to the east line of said Section 35;

Thence East 660 feet;

Thence South 1320 feet;

Thence North 89° 49' 06" East, 654.96 feet to the southeast corner of the SW/4 NW/4 of said Section 36;

Thence South 00° 13' 28" East, 1030.01 feet;

Thence South 35° 00' 00" West, 580.00 feet;

EXHIBIT "A" – CONTINUED

Thence South 01° 40' 20" West, 547.88 feet;

Thence South 06° 53' 35" West, 340.34 feet;

Thence South 47° 57' 20" West, 126.01 feet;

Thence south 52° 24' 54" West, 111.97 feet to the **POINT OF BEGINNING**, containing 128.50 acres, more or less, in accordance with Survey dated April 5, 2004 by Bruce T. S. Ware (Ware Surveying & Engineering, L.L.C.), RLS No. 153834.

EXHIBIT "B"

Attached to and made a part thereof that certain Purchase Agreement dated effective the 23rd day of April, 2004 between Plateau Mining Corporation, Seller, and Price River Water Improvement District, Buyer.

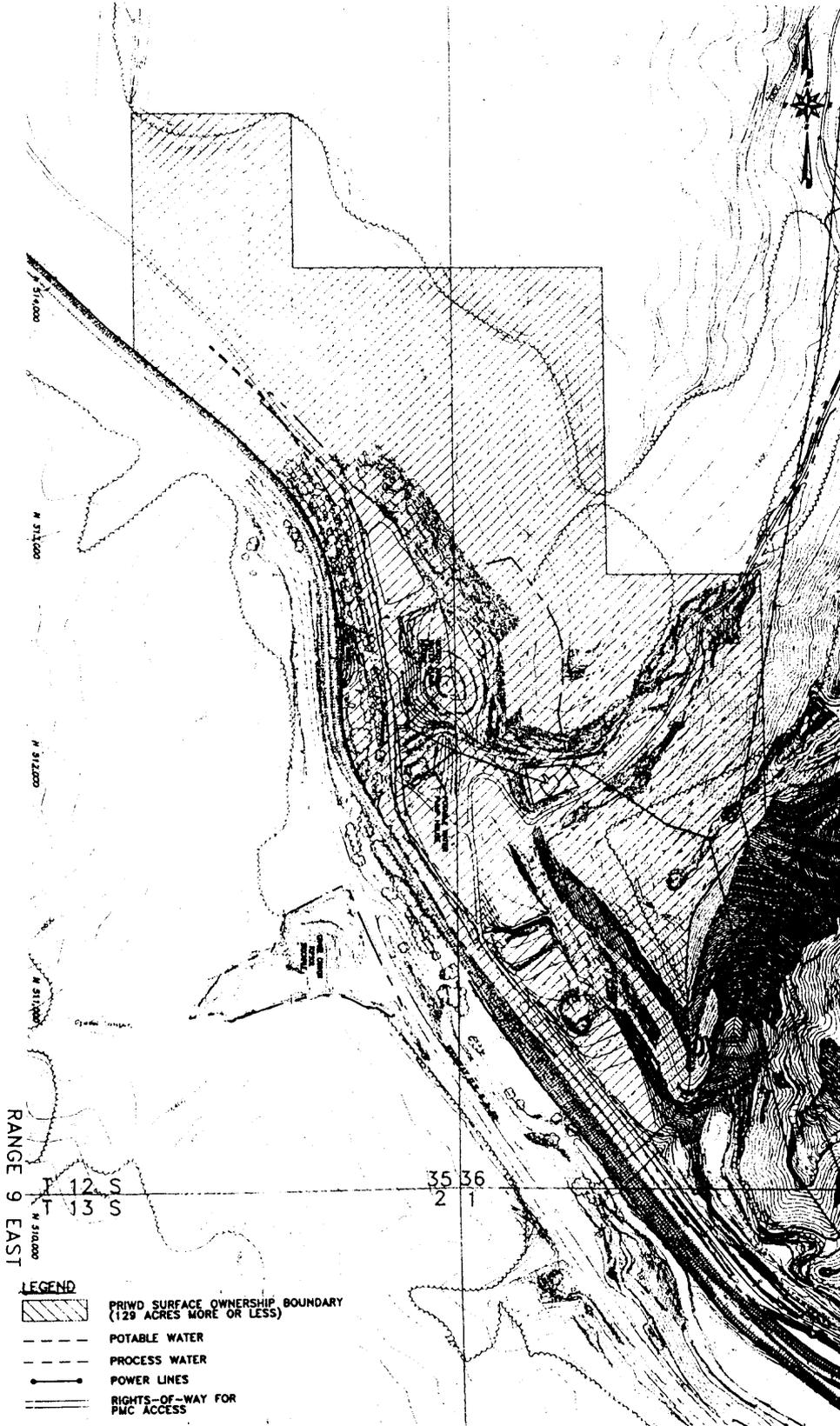


EXHIBIT "C"

Attached to and made a part thereof that certain Purchase Agreement dated effective the 23rd day of April, 2004 between Plateau Mining Corporation, Seller, and Price River Water Improvement District, Buyer.

SPECIAL WARRANTY DEED

THIS SPECIAL WARRANTY DEED is made and entered into effective the _____ day of _____, 2004, by and between **PLATEAU MINING CORPORATION**, a Delaware corporation, with an address P. O. Box 30, Helper, Utah 84526 (hereinafter referred to as "Grantor"), and **PRICE RIVER WATER IMPROVEMENT DISTRICT**, a special water improvement district organized and operating under the laws of the State of Utah, with an address at 265 South Fairgrounds Road, P. O. Box 903, Price, Utah 84501 (hereinafter referred to as "Grantee").

WITNESSETH, THAT, Grantor, for and in consideration of Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, subject to the reservations contained herein, does hereby grant and convey unto the said Grantee, and to its successors and assigns forever, all of Grantor's right, title, interest in, of and to those certain tracts, parcels or lots of land located in Carbon County, Utah, as further described in Exhibit "A" attached hereto and made a part hereof (the "Premises").

TOGETHER WITH the following:

1. The surface, including any and all timber, standing or laying;
2. All personal property, fixtures and equipment affixed to the Premises;
3. To the extent that Grantor owns such, all electrical equipment, including, but not limited to, power lines, power poles, power substations and equipment associated therewith, unless otherwise specifically excluded herein or as may otherwise be excluded in writing between the parties; and
4. To the extent that Grantor owns such, any and all structures located thereon, therein or thereunder, ponds, ditches and water storage facilities, water lines, water taps, water metering devices, sewage lines and septic sewage tanks and systems, if any, which are appurtenant to the Premises.

RESERVING, HOWEVER, the following:

1. Unto, Blackhawk Coal Company ("Blackhawk"), its successors and assigns, all minerals, mineral interests, fissionable materials, coals, oils, gases, coalbed methane, geothermal resources, clays, spars, potash, sand, gravel, asphalt, commercial rock, veins, lodes and deposits of every kind and nature whatsoever in, on or under the Premises, together with those certain mining and development rights more fully set forth in Sections I and II of that certain Special Warranty Deed dated effective December 14, 1995 between Blackhawk, Grantor, and Amax Land Company, Grantee,

EXHIBIT "C" – CONTINUED

recorded in Book 366, Page 467, Carbon County, Utah, to which record reference is made herein for all purposes;

2. Unto Grantor, its successors and assigns, that certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "Culinary Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Grantor the right to use, maintain, replace and remove the Culinary Water Facilities; and (ii) the right to utilize the present electrical service to the Culinary Water Facilities. Upon the permanent removal by Grantor of the Culinary Water Facilities, Grantor agrees to prepare and provide Grantee with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Grantor, in its sole discretion, determines that it no longer requires use of the Culinary Water Facilities, Grantor agrees to notify Grantee of such in writing and Grantee shall have thirty (30) days after it receives the aforesaid notice from Grantor to provide Grantee with a written request to have the Culinary Water Facilities conveyed to Grantee by Bill of Sale. Upon any such conveyance by Grantor to Grantee, Grantee shall thereupon assume and be solely responsible for, and Grantor shall be released from the requirement to perform, any maintenance, removal and reclamation of the Culinary Water Facilities;
3. That certain pump house, water pump, water meter and diversionary water line located on a portion of the Premises as further shown on Exhibit "B" attached hereto and made a part hereof (the "North Raw Water Facilities"), together with (i) a non-exclusive easement under, over, across and upon the Premises for the sole purpose of allowing Grantor the right to use, maintain, replace and remove the North Raw Water Facilities; and (ii) the right to utilize the present electrical service to the North Raw Water Facilities. Upon the permanent removal by Grantor of the North Raw Water Facilities, Grantor agrees to prepare and provide Grantee with a Release of Easement and Quitclaim Deed in recordable form. Notwithstanding the foregoing, at such time as Grantor, in its sole discretion, determines that it no longer requires use of the North Raw Water Facilities, Grantor agrees to notify Grantee of such in writing and Grantee shall have thirty (30) days after it receives the aforesaid notice from Grantor to provide Grantee with a written request to have the North Raw Water Facilities conveyed to Grantee by Bill of Sale. Upon any such conveyance by Grantor to Grantee, Grantee shall thereupon assume and be solely responsible for, and Grantor shall be released from the requirement to perform, any maintenance, removal and reclamation of the North Raw Water Facilities;
4. Any and all personal property belonging to Grantor located upon and which is not attached to the Premises, together with the right to enter over, across and upon the Premises for the sole purpose of retrieving and removing said personal property. Grantor agrees that any such personal property shall be removed from the Premises on or before August 1, 2004;
5. Grantor may be required by law, regulatory authorities and its mining permits, to perform certain reclamation related activities with respect to the Premises. For so long as Grantor has any such obligations, it shall be entitled to have reasonable access

EXHIBIT "C" – CONTINUED

over, on and across the Premises in order to perform such reclamation related activities;

6. A right-of-way over, across and upon the Premises at further shown on Exhibit "B" attached hereto and made a part hereof (or at such other location or locations to be determined by Grantor in consultation with Grantee), for the purpose of allowing Grantor ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Grantor's activities involving (i) the Potable Water Facilities; (ii) the North Raw Water Facilities; and (iii) a water monitoring well located on adjacent lands owned and/or controlled by Grantor, which activities include, but are not limited to, the plugging and abandonment of said water monitoring well. Grantor's rights reserved hereunder are non-exclusive and expressly subject to Grantee's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Grantor's rights hereunder, together with all rights reasonably necessary to those purposes. Grantor's rights hereunder shall be exercised so as not to unreasonably interfere with Grantee's interests, and Grantee shall exercise such rights so as not to unreasonably interfere with the activities of Grantor permitted hereunder. Should Grantor, in its sole discretion, determine that the right-of-way reserved herein, or any portion thereof, is no longer required by Grantor, Grantor agrees to prepare and provide Grantee with a full or partial, as the case may be, Release of Right-Of-Way and Quitclaim Deed in recordable form; and
7. A right-of-way over, across and upon the Premises at such location or locations to be determined by Grantor in consultation with Grantee, for the purpose of allowing Grantor ingress to and egress from the Premises, together with the right to transport personnel, materials and equipment necessary to support Grantor's activities involving Grantor's coal refuse pile located on lands adjacent to the Premises and which are owned and/or controlled by Grantor. Grantor's rights reserved hereunder are non-exclusive and expressly subject to Grantee's right to use and occupy, and to permit others to use and occupy, the Premises or any part thereof for agricultural, industrial and/or commercial uses of all kinds, or for any other purpose not inconsistent with Grantor's rights hereunder, together with all rights reasonably necessary to those purposes. Grantor's rights hereunder shall be exercised so as not to unreasonably interfere with Grantee's interests, and Grantee shall exercise such rights so as not to unreasonably interfere with the activities of Grantor permitted hereunder. Should Grantor, in its sole discretion, determine that the right-of-way reserved herein, or any portion thereof, is no longer required by Grantor, Grantor agrees to prepare and provide Grantee with a full or partial, as the case may be, Release of Right-Of-Way and Quitclaim Deed in recordable form.

TO HAVE AND TO HOLD the above described Premises with the appurtenances, unto said Grantee, its successors and assigns, forever; and the said Grantor, for itself and its successors and assigns, does hereby covenant and agree to and with the said Grantee and its successors and assigns that it is lawfully seized in fee of the aforesaid Premises; that the same are free of all encumbrances except as otherwise stated below and in Exhibit "A" attached hereto and made a part hereof:

EXHIBIT "C" – CONTINUED

This conveyance is subject to all zoning laws, ordinances and rules and regulations of governmental authorities; all current and future real estate taxes and assessments; all covenants, conditions, agreements, reservations, restrictions, easements and rights-of-way which are of record; all existing public highways; boundary line disputes, overlaps, shortages in area, encroachments and any matters or facts not of record which would be disclosed by a physical inspection or accurate survey of the Premises, including by way of illustration, but not limitation, easements and claims of easements not shown by the public records; all rights, title and interest of all tenants and occupants under all leases, licenses, franchises, concessions and other unrecorded occupancy agreements, for the use and occupancy of any of the Premises which have been disclosed to Grantor; all leases which are of record or are referred to in any instrument of record; all recorded conveyances or reservations of minerals or timber; such additional out conveyances, exceptions or limitations, if any, as may be disclosed by any of the copies or originals of deeds, leases, easements, licenses, permits, abstracts of title, certificates of title, title opinions, title policies, affidavits and other documents which disclose the state or condition of title to the Premises and which were provided to Grantor prior to the date of this conveyance; and

that Grantor has good right to convey the same to Grantee as aforesaid; and with respect to the above described Premises Grantor will specially warrant title only against claims arising out of its own acts and omissions and the acts and omissions of any persons claiming by, through or under Grantor, but none others; i.e., Grantor does not warrant title against claims arising out of acts or omissions of prior title holders.

Notwithstanding anything contained herein to the contrary, by the acceptance and recording of this Special Warranty Deed, Grantee covenants and agrees to and with Grantor that it shall not assign, transfer or otherwise sell, in whole or in part, all or any portion of the Premises until such time as Seller receives Phase III SMCRA bond release from the State of Utah, Division of Oil, Gas and Mining with regard to the Premises. Any transfer by sale or otherwise in violation of this provision shall be deemed null and void.

IN WITNESS WHEREOF, Grantor has executed this Special Warranty Deed effective as of the date and year first above written.

PLATEAU MINING CORPORATION

By: _____
Name: _____
Title: _____



PRICE RIVER WATER IMPROVEMENT DISTRICT

265 SOUTH FAIRGROUNDS ROAD
P.O. BOX 903
PRICE, UTAH 84501
PHONE (435) 637-6350



Wells Fargo Bank Northwest, N.A.
180 East Main - Price, UT 84501
www.wellsfargo.com

6568

4/26/2004

PAY TO THE ORDER OF

PLATEAU MINING CORPORATION

32,500.00

Thirty-Two Thousand Five Hundred and 00/100 Dollars

DOLLARS

PLATEAU MINING CORPORATION
P.O. BOX 30
HELPER UT 84526

MEMO

[Handwritten Signature]
DISTRICT TREASURER
[Handwritten Signature]
DISTRICT CLERK

SECURITY FEATURES INCLUDED. DETAILS ON BACK.

⑈006568⑈ ⑆2400297⑆ ⑆1094651575⑈

PRICE RIVER WATER IMPROVEMENT DISTRICT

6568

VENDOR: 937 PLATEAU MINING CORPORATION

4/26/2004

Check No: 6568

INVOICE #	INV DATE	DESCRIPTION	INV AMOUNT
A685120	4/26/2004	PROPERTY PURCHASE	32,500.00

WAIVER OF RIGHT OF FIRST REFUSAL

WHEREAS, Blackhawk Coal Company ("Blackhawk") and Plateau Mining Corporation ("Plateau"), entered into that certain Exchange Agreement ("Exchange Agreement") dated effective as of October 24, 2003, creating a first right of refusal in favor of Blackhawk covering Plateau's interest in certain real property referred to as the "Non-Mine Site Reclamation Lands" as more particularly described in the Exchange Agreement;

WHEREAS, on March 1, 2004, Plateau presented to Blackhawk a First Refusal Notice (as defined in the Exchange Agreement) describing a Third Party Offer (as defined in the Exchange Agreement), covering that portion of the Non-Mine Site Reclamation Lands as described in Exhibit "A" attached hereto;

WHEREAS, it is the desire of Blackhawk to waive the first right of refusal created under the Exchange Agreement with respect to the Third Party Offer covered by the above referenced First Refusal Notice.

NOW, THEREFORE, for good and valuable consideration, Blackhawk does hereby waive its first right of refusal created under the Exchange Agreement with respect to the Third Party Offer described in the above referenced First Refusal Notice; provided, however, that Blackhawk's waiver contained herein shall apply only to the Third Party Offer described in the above referenced First Refusal Notice and any offer made within 180 days of the last day of the Acceptance Period by a third party, including without limitation, the third party who made the Third Party Offer, to enter into a contract with PMC or an Affiliate Transferee (as defined in the Exchange Agreement) to transfer all or a portion of the property described in Exhibit "A" attached hereto on substantially the same Basic Economic Terms (as defined in the Exchange Agreement) and any additional terms and conditions not inconsistent with the Basic Economic Terms as contained in the original Third Party Offer. Blackhawk's first right of refusal under the Exchange Agreement with respect to: (i) those portions of the Non-Mine Site Reclamation Lands not included in the Third Party Offer covered by the above referenced First Refusal Notice; or (ii) any contract for the sale, lease, exchange, or other disposition of the lands subject to the above referenced First Refusal Notice after the aforesaid 180-day period, shall remain in effect in accordance with the terms of the Exchange Agreement.

EXECUTED this 10th day of March, 2004.

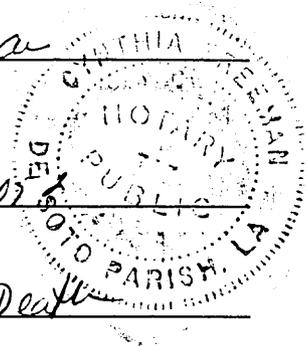
BLACKHAWK COAL COMPANY

By: Sherald M. [Signature] ^{Dka}
Its: PRESIDENT

STATE OF Louisiana)
) ss.
COUNTY/PARISH OF DeSoto)

The foregoing instrument was acknowledged before me this 10th day of March, 2004, by Serald M. Wimmering the President of Blackhawk Coal Company, a Utah corporation.

Cynthia Freuma
Notary Public
128 Freuma Lane
Mansfield La 71078
Address
My commission expires at Death



SEAL

EXHIBIT "A"

Attached to and made a part thereof that certain Waiver of Right of First Refusal dated the 10th day of March, 2004, by Blackhawk Coal Company, covering the following described lands located in the County of Carbon, State of Utah, to-wit:

A parcel of land situated in the E/2 of Section 35 and the W/2 of Section 36, Township 12 South, Range 9 East, SLB&M, Carbon County, Utah, bounded and described as follows:

BEGINNING at a point 731.34 feet North 89° 46' 21" East along section line and 90.98 feet north of the southwest corner of said Section 36, said point lies on the easterly right-of-way line of the D&RGW railroad, and running thence northwesterly along said railroad right-of-way the following four (4) courses:

1. North 37° 35' 06" West, 505.11 feet to a point of curvature of a 3900.00 foot radius tangent curve to the right, thence northwesterly 382.30 feet along the arc of said curve to a point of tangency;
2. Thence North 31° 58' 08" West, 1146.06 feet to a point of curvature of a 550.00 foot radius tangent curve to the right, thence northwesterly 281.38 feet along the arc of said curve to a point of tangency;
3. Thence North 02° 39' 23" West, 419.27 feet to a point of curvature of a 925.00 foot radius tangent curve to the left, thence northwesterly 718.80 feet along the arc of said curve to a point of tangency;
4. Thence North 47° 10' 04" West, 732.92 feet;

Thence leaving said railroad right-of-way, North 00° 12' 15" West 992.57 feet;

Thence East 660 feet;

Thence South 660 feet;

Thence East 660 feet to the east line of said Section 35;

Thence East 660 feet;

Thence South 1320 feet;

Thence North 89° 49' 06" East, 654.96 feet to the southeast corner of the SW/4 NW/4 of said Section 36;

Thence South 00° 13' 28" East, 1030.01 feet;

Thence South 35° 00' 00" West, 580.00 feet;

Thence South 01° 40' 20" West, 547.88 feet;

EXHIBIT "A" - CONTINUED

Thence South 06° 53' 35" West, 340.34 feet;

Thence South 47° 57' 20" West, 126.01 feet;

Thence south 52° 24' 54" West, 111.97 feet to the **POINT OF BEGINNING**, containing 128.50 acres, more or less, in accordance with Survey dated April 5, 2004 by Bruce T. S. Ware (Ware Surveying & Engineering, L.L.C.), RLS No. 153834.

And being a portion of the same tracts, parcels or lots of land excepted and reserved by Plateau Mining Corporation in that certain Special Warranty Deed dated effective November 7, 2003 between Plateau Mining Corporation, Grantor, and Blackhawk Coal Company, Grantee, recorded on November 12, 2003 in Book 552, page 789, Carbon County, Utah, to which record reference is made herein for all purposes.

AFFIDAVIT OF PUBLICATION

STATE OF UTAH)

ss.

County of Carbon,)

I, Ken Larson, on oath, say that I am the Publisher of the Sun Advocate, a twice-weekly newspaper of general circulation, published at Price, State a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and that the first publication was on the 12th day of February, 2004, and that the last publication of such notice was in the issue of such newspaper dated the 4th day of March, 2004.

Ken G. Larson

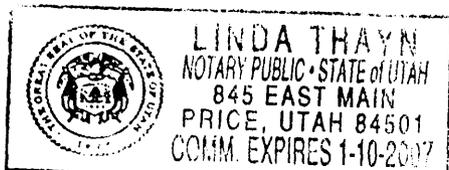
Ken G Larson - Publisher

Subscribed and sworn to before me this 4th day of March, 2004.

Linda Thayne

Notary Public My commission expires January 10, 2007 Residing at Price, Utah

Publication fee, \$ 499.20



PUBLIC NOTICE

**APPLICATION FOR POST MINING LAND USE CHANGE
WILLOW CREEK MINE
PLATEAU MINING CORPORATION
PERMIT C/007/038, APPROVED 04/24/96
CARBON COUNTY, UTAH**

Notice is hereby given that Plateau Mining Corporation, P.O. Box 30, 847 Northwest Highway 191, Helper, Utah 84526, a subsidiary of RAG American Coal Company, 999 Corporate Blvd., Linthicum Heights, MD 21090, has filed an application with the Utah Department of Natural Resources, Division of Oil, Gas and Mining for a change in post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah Coal Program Regulations. The portion of the permit area that is affected is located in Carbon County, Utah as follows:

Township 13 South, Range 9 East

Section 1: Portions of NE/4NW/4; NW/4NW/4

Township 12 South, Range 10 East

Section 35: Portions of E/2NE/4SE/4; NE/4SE/4SE/4; SE/4SE/4NE/4

Section 36: Portions of W/2SW/4;

(Containing a total of 46.2 acres more or less)

The permit area is shown on the Helper U.S. Geological Survey 7.5-minute map.

The Mining and Reclamation Plan is available for public review at: Utah Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801, and at the Carbon County Courthouse, 120 East Main Street, Price, Utah 84501.

Written comments, objections and requests for information conferences on this proposal may be addressed to:

Utah Coal Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Closing date for submission of such comments, objections and requests for public hearing or information conference on this proposal must be submitted by April 3, 2004.

Published in the Sun Advocate February 12, 19, 26 and March 4, 2004.

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Dave Levanger
Carbon County Planning and Zoning
120 East Main Street
Price, Utah 84501

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Levanger:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

The industrial land use boundary will contain 46.2 acres, more or less. Within this acreage, the warehouse/bathhouse/office/lab building, substation, access roads, flat lands, raw water pond, pump houses, and other appurtenant structures will remain to support the proposed land use. The surface owner of the land is PRWID.

Comments from the legal or equitable owner of record of the surface areas to be affected and from the Federal, Utah and local government agencies should be mailed to: Plateau Mining Corporation, Attention: Johnny Pappas, P.O. Box 30, 847 NW Highway 191, Helper, Utah 84526.

If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

Env: Willow Creek Mine-PMLUC
Chrono: JP040216.LTR

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Roger Wheeler
Director Land Management
700 Morrison Road
Gahanna, Ohio 43230-6642

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Wheeler:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

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If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

Env: Willow Creek Mine-PMLUC
Chrono: JP040215.LTR

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Gary Harwood
Helper City
P.O. Box 221
Helper, Utah 84526

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Harwood:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

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If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Harold Cunningham
Utah Power and Light – Carbon Plant
Helper, Utah 84526

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Cunningham:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

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If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

Env: Willow Creek Mine-PMLUC
Chrono: JP040213.LTR

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. William D. Krompel
Commissioner
120 East Main Street
Price, Utah 84501

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Krompel:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

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If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

Env: Willow Creek Mine-PMLUC
Chrono: JP040212.LTR

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Phil Palmer
PRWID
265 South Fairgrounds Road
Price, Utah 84501

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Palmer:

In accordance with the requirements of R645-301-412.200, Plateau Mining Corporation (PMC) is notifying the surface landowners and local government agencies adjacent to the Willow Creek Mine that it has filed an application with the Utah Division of Oil, Gas and Mining for a change in the post mining land use to Permit C/007/038. The land use change will allow the Price River Water Improvement District (PRWID) use of the fee land, where the preparation plant and coal handling facilities once were, for their immediate and future expansion requirements under the provisions of the Utah Coal Mining and Reclamation Act pursuant to R645-301-413.300 of the Utah R645 Coal Rules.

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Comments from the legal or equitable owner of record of the surface areas to be affected and from the Federal, Utah and local government agencies should be mailed to: Plateau Mining Corporation, Attention: Johnny Pappas, P.O. Box 30, 847 NW Highway 191, Helper, Utah 84526.

If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

**PLATEAU
MINING
CORPORATION**

Willow Creek Mine
PO Box 30
847 NW Hwy 191
Helper, Utah 84526
(435) 472-0475
Fax: (435) 472-4782

An affiliate of **RAG**

February 6, 2004

Mr. Mark Mackiewicz
Bureau of Land Management
125 South 600 West
Price, Utah 84501

Re: Industrial Post Mining Land Use, Price River Water Improvement District, Willow Creek Mine, C/007/038, Carbon County, Utah

Dear Mr. Mackiewicz:

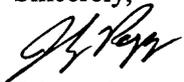
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If you have any questions or need additional information, please do not hesitate to contact me at (435) 472-4741.

Sincerely,



Johnny Pappas
Sr. Environmental Engineer

PR PRICE RIVER WATER
IMPROVEMENT DISTRICT
WID

P.O. Box 903
265 South Fairgrounds Road
Price, Utah 84501
Telephone (435) 637-6350
FAX (435) 637-6374

December 15, 2003

Dennis Ware, Controller
P.O. Box 30
Helper, Utah 84526

RE: Proposed Land Purchase by Price River Water Improvement District

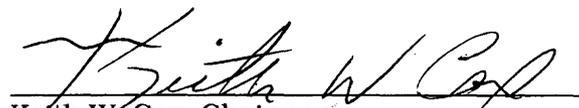
Dear Sir,

Please accept this letter as a formal proposal by the Price River Water Improvement District to purchase up to 130 acres of land currently owned by Cyprus Plateau Corporation in the Price Canyon area of Carbon County, Utah. We submit an offer of \$ 32,500.00 for this parcel so long as the following conditions can be agreed upon:

- The District owns and operates the sewer system through this property, and this system must remain in place and all abandoned connections must be vacated according to District policy.
- The District would request that the power sub-station and all power poles and underground utilities remain as is and undisturbed.
- The District would request that minimal topsoil cover be applied for re-growth areas and that no contouring reclamation be done that we would need to undo at a later date.
- The District will be utilizing the existing buildings (i.e., warehouse, lab, pump houses, etc) and would request that these structures and their accompanying support infrastructure remain.
- The District will be utilizing this area in its entirety; therefore the District will maintain all ditches, culverts, and other diversion structures necessary.
- The District will be utilizing the existing raw water pond and expanding its area.
- The District must also receive a transfer of rights-of-way and easements pertaining to this property for roadway, ingress and egress, utilities, raw water line, etc., as well as any associated easements through adjacent properties pertaining to this parcel.

The District will be pleased to be able to complete this transaction as soon as possible so that the necessary work needed for our purposes can begin. Thank you for your help and consideration.

Sincerely,


Keith W. Cox, Chairman
Price River Water Improvement District



APPENDIX 3.4M
SOIL ANALYSES

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Plateau Mining Corp.
Address: P.O. Box 30
City, ST, ZIP: Helper, UT 84526
Date: 4 March 2004

SOIL ID:

Customer Sample ID	pH	EC dS/m	%Sand	%Clay	%Silt	ppm Ca-SAR
Pit 1	7.44	2.36	45.28	19.28	35.44	159.20
Pit 2	7.48	2.25	51.28	17.28	31.44	201.60
Pit 3	7.26	1.46	83.28	7.28	9.44	68.80
Pit 6	7.63	1.48	76.00	11.28	12.72	53.12
Sta 13+00	8.00	3.03	66.00	14.28	19.72	38.88
Sta 15+00	7.27	1.74	75.28	9.28	15.44	60.00
Sta 17+00	7.03	3.99	78.56	8.28	13.16	429.12
Station 19+00	6.97	4.30	76.56	10.28	13.16	410.40
Sta 21+00	7.52	2.39	73.84	13.28	12.88	39.84

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Plateau Mining Corp.
Address: P.O. Box 30
City, ST, ZIP: Helper, UT 84526
Date: 4 March 2004

SOIL ID:

Customer Sample ID	ppm Mg-SAR	ppm Na-SAR	SAR	Hot Water ppm B	Sat. Paste B ppm
Pit 1	32.48	55.68	1.05	0.55	0.4147
Pit 2	40.32	128.64	2.16	0.56	0.4446
Pit 3	27.68	185.28	4.75	1.02	1.405
Pit 6	29.92	192.48	5.22	0.73	1.166
Sta 13+00	11.68	637.50	22.95	0.78	0.4424
Sta 15+00	44.16	241.44	5.74	3.25	4.343
Sta 17+00	312.00	143.25	1.28	8.88	15.19
Station 19+00	318.72	147.84	1.32	18.39	30.05
Sta 21+00	14.40	456.00	15.69	3.11	4.842

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801-422-2147

Plant and Animal Science

Department

SOIL TEST REPORT AND RECOMMENDATIONS

Name Plateau Mining Corporation

Date: 13-Feb-04

Street P.O. Box 30

Time: 12:06 PM

Helper UT 84526

Telephone: 472-4741

City State Zip

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
0-6" Sta 14+00	Turf	7.32	67.84	17.44	14.72	Sandy Loam		

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Salinity-ECe dS/m	5.20				X		salinity a problem for sensitive crops
SAR-Sodium Absorption Ratio	5.89		X				no sodium hazard
Calcium-SAR ppm Ca	511.00						
Magnesium SAR ppm Mg	316.20						
Sodium SAR ppm Na	689.60						
Boron ppm B	7.97					X	no fertilizer needed

Notes:

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
0-6" Station 14+00	Turf	7.17	65.84	17.44	16.72	Sandy Loam		

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Salinity-ECe dS/m	5.20				X		salinity a problem for sensitive crops
SAR-Sodium Absorption Ratio	5.97		X				no sodium hazard
Calcium-SAR ppm Ca	521.50						
Magnesium SAR ppm Mg	283.80						
Sodium SAR ppm Na	684.20						
Boron ppm B	7.20					X	no fertilizer needed

Notes:

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
0-6" 15+00	Turf	7.20	65.84	17.44	16.72	Sandy Loam		

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Salinity-ECe dS/m	5.93				X		salinity a problem for sensitive crops
SAR-Sodium Absorption Ratio	7.13		X				no sodium hazard
Calcium-SAR ppm Ca	480.00						
Magnesium SAR ppm Mg	284.50						
Sodium SAR ppm Na	801.30						
Boron ppm B	6.28					X	no fertilizer needed

Notes:

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Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
0-6" Sta 15+00	Turf	7.20	75.84	15.44	8.72	Sandy Loam		

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recomendations
Salinity-ECE dS/m	3.75			X			no salinity problem
SAR-Sodium Absorption Ratio	1.35	X					no sodium hazard
Calcium-SAR ppm Ca	517.40						
Magnesium SAR ppm Mg	358.50						
Sodium SAR ppm Na	164.50						
Boron ppm B	10.23					X	no fertilizer needed

Notes:

**TABLE 4.2-1
SOIL RECOVERY AND STORAGE PLANS**

DISTURBANCE AREA	SOIL/ SUBSTITUTE TYPE	VOLUME (cy)
<i>Direct Placement of Salvaged Soils</i>		
Stream Realignment 1	Riparian	1,613
Stream Realignment 2	Riparian	3,227
Total		4,840
<i>Crandall Canyon Stockpiles</i>		
Existing Crandall Canyon Stockpiles (for reclamation of lower Crandall Canyon facilities)	Soil	18,000
<i>Gravel Canyon Stockpile</i>		
Existing Gravel Canyon Stockpile (for reclamation of Schoolhouse Canyon Refuse Pile)	Soil	97,000
Clean Coal Pile Expansion and Sediment Pond 011 Expansion	Undisturbed	10,639
Schoolhouse Canyon Refuse Pile	Undisturbed	15,810
Total		123,449
<i>Willow Creek Stockpile</i>		
Water Tank Area	Disturbed	--
Ventilation Fan Area	Disturbed	10,890
	Undisturbed	5,243
Upper Facilities Bench (Refuse Pile Area)	Reclaimed	21,200
ROM Stockpile Area and Lower Facilities Areas	Disturbed	53,616
	Undisturbed	5,927

**TABLE 4.2-1 (Continued)
SOIL RECOVERY AND STORAGE PLANS**

DISTURBANCE AREA	SOIL/ SUBSTITUTE TYPE	VOLUME (cy)
<i>Willow Creek Stockpile</i>		
Office Trailer and Rock Outcrop Area	Disturbed	5,848
	Reclaimed	13,713
	Undisturbed	4,033
Tunnel Portal Areas	Disturbed	--
	Undisturbed	--
Total		120,470
Subtotals	Disturbed	70,391
	Undisturbed	44,168
	Riparian Reclaimed	4,840
	Existing Stockpiles	115,000
GRAND TOTAL		266,759

Information in Italics denote projected salvage and storage quantities.

- Projected topsoil salvage quantities.

Stockpile locations are shown on the Mine Surface Facilities Map, (Map 18B). With the exception of Map Unit A Mollisol from the Barn Canyon shaft, all topsoil from the shaft site will be placed into storage at the Gravel Canyon topsoil stockpile for use in reclaiming the shaft site upon mine closure. Map Unit A Mollisol from the Barn Canyon shaft will be segregated and stored separately at the Willow Creek topsoil stockpile. The segregated Mollisol soil will be signed to enable easy identification. The Mollisol soils will be used as final top dressing during the reclamation of Barn Canyon. The Barn Canyon shaft was never constructed, therefore no topsoil resources were salvaged or stockpiled.

Stockpiles will be constructed by placing soil materials in successive horizontal layers with stockpile sideslopes at 3H:1V or less. Stockpile construction activities will be designed to minimize compaction of the soil resource to the extent operationally feasible. Where necessary to prevent erosion of stockpiled material by upgradient drainage, temporary berms or diversion ditches will be used to intercept and route drainage around the stockpiles. Drainage from stockpile areas are controlled by the surface drainage and sediment control system as described in section 4.7, Hydrologic Resource Protection. In order to stabilize and minimize erosion of the stockpiled material the surface of all soil stockpiles will be left in a roughened condition to minimize erosion and runoff. Any long-term stockpiles which will remain in-place for over 6 months will be seeded with a rapid-germinating temporary seed mixture as described in Section 5.3, Habitat Restoration Plan, to provide a protective vegetative cover. Seeding will normally occur as soon as reasonably feasible once active soil stockpiling operations cease for a given stockpile area. In addition, each soil and substitute stockpile will be identified by a durable sign placed so as to be readily visible from the closest point of access. Stockpile areas will be inspected on a periodic basis and any significant erosion or other problems will be noted and repaired.

TABLE 4.5-1

SUMMARY OF MINING RELATED DISTURBANCE

Disturbance Area/Description	Disturbed Area Boundary Acres	Industrial Postmining Acres	Wildlife Habitat Acres
Willow Creek Mine Surface Facilities Area	57.2	36.3	20.9
Preparation Plant and Loadout Areas	92.96	46.2	46.76
Gravel Canyon Area	5.75	0	5.75
Crandall Canyon	18.1	0	18.1
Barn Canyon Shaft Facility ⁽¹⁾	2.34	0	2.34
Total Bonded Acres	176.35	82.5	93.85

⁽¹⁾Barn Canyon Shaft Facility was never constructed.

5.2.2 Soil Replacement Plans and Practices

Generally, soil replacement practices will be essentially the same for all surface disturbance areas and will not vary between soil replacement and soil substitute replacement. Typical soil replacement activities will involve:

- Preparation of the regraded surface
- Soil recovery from stockpile, placement, and grading
- Soil preparation measures
- Soil stabilization measures

The following sections describe these specific soil and substitute replacement, preparation, and stabilization practices.

5.2.2.1 Timing of Soil Replacement Activities

Generally, soil replacement and revegetation efforts will be coordinated so that soil materials are revegetated as soon as practically possible following placement. Normally this will involve placement of soil and immediate reseeding at the end of the operating field season in late fall. This approach allows the seed to "winter over" with germination in the spring when soil moisture conditions are elevated due to winter snow accumulations and spring melt.

5.2.2.2 Soil Replacement Practices

Following completion of final backfilling, grading, and drainage reestablishment for surface disturbance areas, soil materials will be recovered from the previously established stockpiles and will be hauled, placed, and spread on the regraded areas. As noted in Section 5.3.2.2, Revegetation Practices and Section 5.4.2.3, Reclamation Practices, the regraded surface will be left in a roughened condition to control runoff, provide a good bond with the replaced soil/substitute material, and promote moisture retention and infiltration. Prior to soil replacement, regraded surfaces will be deep ripped to alleviate compaction and enhance soil bonding.

Typically either tractor-scrappers or wheel loaders will be utilized to recover and load the materials from stockpile and either scrapers or trucks will be utilized to haul and place the material. Where tractor scrapers are utilized for recovery, haulage, and placement, the soil material will be spread in thin horizontal lifts as it is placed. If trucks are used for haulage, a tracked dozer or motor grader will be used to spread and distribute the soil material at a relatively uniform thickness. Replacement thickness will generally be controlled visually by the equipment operators but will also be checked and monitored for general consistency by the PMC operations supervisor or designated representative responsible for reclamation activities. Based on the available existing soil stockpile volumes and the soil recovery plans as outlined in Section 4.2, Soil Handling Plans, the following summarizes approximate soil replacement thicknesses for the general reclamation disturbance areas:

Willow Creek Surface Facilities Area - $(120,470 \text{ CY} \times 27)/(45.46 \text{ AC} \times 43,560) = 19.7$ inches

Willow Creek Prep. Plant and Loadout Areas - (Existing surficial materials)

Schoolhouse Canyon Refuse Pile - $(96,800 \text{ CY} \times 27)/(20.0 \text{ AC} \times 43,560) = 36$ inches

Crandall Canyon Area - (18,000 CY, Replacement depth is variable)

Barn Canyon Area - (906 CY, Replacement depth is variable) never constructed

Clean Coal Storage Area and Pond 011 Expansion Area - $(10,639 \text{ CY} \times 27)/(3.91 \text{ AC} \times 43,560) = 20$ inches

Details relative to soil replacement plans and practices are provided for specific disturbance areas as follows; Castle Gate Preparation Plant, Loadout, Clean Coal Storage Area Expansion, and Schoolhouse Canyon Refuse pile - Exhibit 19, Castle Gate Information (Section 3.4); Crandall Canyon - Exhibit 20, Crandall Canyon Information (Section 3.7-5(5)); Willow Creek and Barn Canyon Facilities Areas - Section 5.4.2, Reclamation Plans and Practices.

Soil placement thickness will vary somewhat dependent on terrain and practical operating constraints, however, every effort will be made to establish a uniform, stable soil layer on all regraded areas. To the extent operationally feasible, efforts will be made during placement to limit equipment traffic in order to minimize compaction.

SECTION 5.3

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5.3.2.3 Revegetation Species and Amounts

Revegetation seed mixtures for the existing permitted Castle Gate preparation plant and loadout, Gravel Canyon, and Crandall Canyon areas have been developed and approved for these areas. PMC proposes to utilize the previously approved seed mixtures for the existing permitted areas. PMC will use three separate revegetation seed mixtures for the new Willow Creek surface facilities disturbance areas; one for temporary vegetative establishment on construction disturbance areas, road cuts, ditches, sedimentation pond embankments, soil/substitute stockpiles and other areas requiring interim erosion control and stabilization; one for permanent revegetation of reclaimed upland areas, and one for permanent revegetation of riparian areas and permanent diversions. The species selected for inclusion in both the temporary and permanent revegetation seed mixtures are native and adapted species which occur within the surface disturbance and adjacent areas and which have a proven adaptability and compatibility to site conditions. Selection of specific plant species for inclusion in the revegetation seed mixtures involve consideration of natural occurrence as documented by vegetative baseline studies, ease of establishment from seed, seed availability, adaptability and vigor, contribution to vegetative diversity, and forage and browse value for various wildlife species.

The temporary seed mixture presented as Table 5.3-1, Temporary Seed Mixture, consists of adapted species which germinate rapidly, are effective sod formers, and so are well suited to establish an effective temporary vegetative cover. The temporary seed mixture will be used for those disturbed areas which will not be utilized on an ongoing basis as active operating areas but will be disturbed prior to or in conjunction with final site reclamation. The temporary seed mixture may also be used as a stubble mulch to stabilize areas which are particularly subject to potential erosion.

The permanent seed mixture for upland areas is presented as Table 5.3-2 and Table 5.3-2b, Permanent Seed Mixture (Upland). Table 5.3-2b reflects availability of seed during 2004 reclamation. The permanent upland seed mixture consists of a variety of predominantly native grasses, forbs, and shrubs with proven site adaptability and good hardiness which have been specifically selected for their value as browse and forage species consistent with the postmining land use of wildlife habitat as recommended by the UDWR. The permanent mixture will be utilized for revegetation of all upland surface disturbance areas and includes a variety of species found in both the grass-sage and pinyon juniper vegetation communities. Based on their occurrence in natural plant communities in the area, available agronomic and wildlife research, and actual operating experience at coal mines in the Price, Utah area, the selected species included in the permanent reclamation seed mixture will provide an effective self-sustaining vegetative cover which will control surface runoff and erosion, provide sufficient diversity to assure the long-term stability of the revegetated community, and is compatible with PMC's wildlife habitat mitigation, restoration, and enhancement objectives.

The permanent seed mixture for riparian areas which will be seeded in areas below the bank-full water level in the stream realignment sections of Willow Creek is presented as Table 5.3-3, Permanent Seed Mixture (Riparian). This seed mixture was developed based upon recommendations from the UDWR and site-specific observations by the vegetation biologist who sampled the riparian bottom plant community.

To the extent reasonably feasible consistent with both site stabilization and reclamation objectives, PMC has selected revegetation species which are predominantly native species. Exceptions include the following adaptive introduced species which are commonly found throughout the western United States and have proven their value in revegetation of disturbed areas:

- Intermediate wheatgrass
- Pubescent wheatgrass
- Yellow sweetclover
- Cicer milkvetch

**TABLE 5.3-2b
PERMANENT SEED MIXTURE (UPLAND)**

Life Form/Species	# Seeds/lb	Drill Seeding Rate # PLS/acre ¹	Broadcast Seeding Rate# PLS/acre
Grasses			
Western wheatgrass (Pascopyrum smithii)	110,000	-	2.00
Bluebunch wheatgrass (Agropyron spicatum)	120,000	-	6.00
Slender wheatgrass (Agropyron trachycaulum)	159,000	-	2.00
Indian ricegrass (Achnatherum hymenoides)	141,000	-	4.00
Thickspike wheatgrass (Elymus lanceolatus)	154,000	-	4.00
Great basin wildrye (Elymus cinereus)	130,000	-	2.00
Forbs			
Showy goldeneye (Viguiera multiflora)	1,055,000	-	0.50
Western yarrow (Achillea lanulosa)	2,500	-	0.25
Blue flax (Linum lewisii)	293,000	-	0.50
Palmer penstemon (Penstemon palmeri)	550,000	-	0.50
Shrubs			
Utah serviceberry (Amelanchier utahensis)	25,800	-	0.50
Winterfat (Ceratooides lanata)	56,700	-	2.00
Fourwing saltbush (Atriplex canescens)	52,000	-	3.00
Whitestem rubber rabbitbrush (Chrysothamnus nauseosus)	400,000	-	0.10
Green Mormon tea (Ephreda viridis)	19,900	-	0.25
Basin big sagebrush (Artemisia tridentata tridentata)	2,500,000	-	0.25
Mountain big sagebrush (Artemisia tridentata vaseyana)	2,500,000	-	0.25
TOTAL	-		28.10

¹ Drill seeding rates not provided because all seeding will be broadcast

WILLOW CREEK MINE - PREPARATION PLANT PMLUC RECLAMATION OPTION BOND ESTIMATE

Permit No.	Item No.	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
					Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
		PREPARATION PLANT AREA										
		DIRECT COST SUMMARY										
		Rough Grading Excavation Total										51,461
		Drainage Controls Total										4,552
		Topsoil Distribution Total										258,351
		Revegetation Total										60,892
		Monitoring Total										110,000
		Total Direct Costs										485,257
		PREPARATION PLANT AREA										
		INDIRECT COSTS										
		Mobilization/Demobilization (5%)			Average from 2000 OSM Reclamation Bond Amount Calculation Handbook and DOGM recommended						24,263	
		Contingencies (4%)			Average from 2000 OSM Reclamation Bond Amount Calculation Handbook						19,410	
		Engineering Redesign Fee (2.5%)			Minimum from 2000 OSM Reclamation Bond Amount Calculation Handbook						12,131	
		Contractor Profit and Overhead (10%)										48,526
		Reclamation Management Fee (2.0% of inflated direct costs)			From 2000 OSM Reclamation Bond Amount Calculation Handbook						11,399	
		Total Indirect Costs										115,729
		Subtotal Reclamation Cost										600,985
		Escalation - 17.45% (3.27%/yr over 5 yrs.)										104,872
											Preparation Plant Reclamation Cost	705,857
		REFUSE PILE RECLAMATION COST										
		Refuse Pile Earthwork			Nelson Construction Bid						940,387	
		Refuse Pile Drainage Controls			Nelson Construction Bid						130,000	
		Refuse Pile Revegetation			Nelson Construction Bid						142,318	
		Refuse Pile Mobilization/Demobilization			Nelson Construction Bid						52,527	
											Refuse Pile Reclamation Sub-total	1,265,232
											Winter Discount	160,624
											Refuse Pile Reclamation Total	1,104,608
		TOTAL RECLAMATION COST										1,810,465

WILLOW CREEK MINE - PREPARATION PLANT PMLUC RECLAMATION OPTION BOND ESTIMATE

Permit No.	Item No.	Description	Quantity	Unit	Material Cost		Equipment Cost		Labor Cost		Project Cost	
					Per Unit	Total	Per Unit	Total	Per Unit	Total	Per Unit	Total
		TOPSOIL DISTRIBUTION										
		SCHOOL HOUSE CANYON REFUSE PILE										
		HAULING TOPSOIL FROM GRAVEL CANYON										
		Total topsoil backfill equals 42,795 CY										
		10,639 CY for clean coal stockpile slope and 32,156 excess topsoil not used for covering the refuse pile										
	3	Cat 988F Front End Loader,										
		Excavation and loading of 42,795 CY or 100% of topsoil	0.6	MONTH			12710.00	7626			12710.00	7626
		FEL operating cost including operator (Dataquest bluebook 3Q02 pg 9-27)	115.0	HRS					78.80	9062	78.80	9062
	4	Hauling with 15 CY truck										
		Hauling of 42,795 CY or 100% of topsoil (assume 25 trucks)	0.6	MONTH			89750.00	53850			89750.00	53850
		truck operating cost assuming one round trip per hour (Dataquest bluebook 2Q03 pg 20-1)	2860.0	HRS					59.49	170141	59.49	170141
	5	Cat D8R Dozer contouring without Ripper										
		Contouring of 42,795 CY or 100% of topsoil	0.5	MONTH			13620.00	6810			13620.00	6810
		Dozer operating cost assuming a 150' haul including operator (Dataquest bluebook 3Q02 pg 9-43)	90.0	HRS					87.35	7861	87.35	7861
	6	Surveying, 2 person crew (01107-700-0950)	6	DAY					500.00	3000.00	500.00	3,000
		TOPSOIL DISTRIBUTION TOTAL										258,351

Production and rental rates assume 5 10-hour work days per week and 21 work days per month. Rental time has been rounded up to the nearest quarter month or greater.

The operating costs are based on the hours needed by the equipment to move the specified amount of material. Some double handling of the material is assumed.

Rental and operation rates for the front end loader, dozers, excavator, and trucks were obtained from Wayne Western of the Utah Division of Oil Gas and Mining.

Dozer production for excavation and ripping obtained from the Caterpillar Performance Handbook Edition 30. Excavation production for a D8R dozer assuming a 300' haul is 325 CY/hr

Dozer production for a D8R dozer with a 150' haul for contouring is an average of 500 CY/hr given varying slopes, based on the Caterpillar Performance Handbook.

Excavator production for a 345BL excavator assuming a 75% efficiency is 450 CY/hr for loading trucks and excavating channels

The production for the 988F FEL is 540 CY/hr assuming 83% efficiency for the prep plant area work and 390 CY/hr assuming 60% efficiency for loading topsoil. (CAT performance handbook)

The production for 15 CY trucks assumes 4 round trips per hour or 60 CY/hr/truck for the prep plant area. The cost calc. assumes 4 trucks operating at the same time to keep the excavator efficient

The production for 15 CY trucks hauling topsoil from Gravel Canyon is 1 round trip per hour. 25 trucks are required to keep the FEL at least 60% efficient

The top 2' of backfill will not be compacted. Hence only 60% of fill is assumed to be compacted by a sheepsfoot compactor

Surveying is not required full time. Assume that 6 days of surveying by a 2 man crew for the topsoil handling and 10 days for rough grading, is needed.

The reclamation time table states it will take 24 months to reclaim the mine facilities and prep plant areas. This calculation assumes 12 months will be spent to reclaim the prep plant area.

The foreman, pickup and water truck for the entire project has been accounted for in the earthwork section of the bond calculation.

Costs associated with the reclamation of Gravel Canyon, other than moving the topsoil are accounted for in the Gravel Canyon Bond calculation.

