

CEDAR LAKE MINING, INC.
LITTLE SPRING CREEK EAST MINE, P-3968
SEDIMENT BASIN 003
DETAILED DESIGN PLANS

Submitted by:

TASK Engineering Management Inc.
P. O. Box 660548
Birmingham, Alabama 35266
Telephone: (205) 978-5070
Email: jw-task@charter.net



STATE OF ALABAMA
SURFACE MINING COMMISSION

P.O. BOX 2390 - JASPER, ALABAMA 35502-2390
(205) 221-4130 • FAX: (205) 221-5077

July 18, 2012

Mr. Otis R. Robison, Jr.
Cedar Lake Mining, Inc.
2600 Warrior Jasper Road
Warrior, AL 35180

**RE: Little Spring Creek East Mine, P-3968
Design Plans - Sedimentation Ponds 001, 002, 003 and 004**

Dear Mr. Robison:

The design plans submitted for proposed sedimentation ponds 001, 002, 003 and 004 are hereby approved. If there are any questions, please do not hesitate to call.

Sincerely,

Gary J. Heaton
P.E.

/kb

cc: Task Engineering Management, Inc.

TASK ENGINEERING MANAGEMENT INC.

PO Box 660548
BIRMINGHAM, ALABAMA 35266
(205) 978-5070

June 11, 2012

Mr. Gary J. Heaton, P.E.
Alabama Surface Mining Commission
PO Box 2390
Jasper, Alabama 35502-2390

Re: Cedar Lake Mining, Inc.
Little Spring Creek East Mine - P-3968

Dear Mr. Heaton:

I hereby certify the enclosed detailed design plans for Sediment Basin 003 for the above referenced mine are in accordance with the Regulations of the Alabama Surface Mining Commission as adopted by Act 81-435 of December 18, 1981 and as amended to date and that the information used in the enclosed basin design plans is true and correct to the best of my knowledge and belief.

If you have any questions or need additional information, please do not hesitate to call us at (205) 978-5070.

Sincerely,



Jerry W. Williams, P.E.
Alabama Reg. No. 12739



SEDIMENT BASIN CONSTRUCTION SPECIFICATIONS

Sediment basins (temporary or permanent) will be designed and constructed using the following as minimum specifications:

1. EMBANKMENT REQUIREMENTS

- A) The minimum width of the top of the embankment will under no circumstance be less than twelve (12) feet.
- B) The embankment will have a minimum front and back slope no steeper than the slopes listed on the detailed design sheet.
- C) The foundation area of the embankment will be cleared and grubbed of all organic matter with no surface slope steeper than one (1) horizontal to one (1) vertical. The entire wet area as measured from the upstream toe of the embankment to the normal pool level, will be cleared of trees and large bush.
- D) A core will be constructed in a cutoff trench along the centerline of the embankment. The cutoff trench will be of suitable depth and width to attain relatively impervious material.
- E) The embankment construction material will be free of sod, roots, stumps, rocks, etc., which exceed six (6) inches in diameter. The embankment material will be placed in layers of twelve (12) inches or less and compacted to ninety-five (95%) percent of the standard proctor density as set forth ASTM.
- F) The embankment, foundation and abutments will be designed and constructed to be stable under normal construction and operating conditions with a minimum static safety factor of 1.3 at normal pool level with steady seepage saturation conditions.
- G) The actual constructed height of the embankment will be a minimum of five (5%) percent higher than the design height to allow for settling over the life of the embankment.
- H) The design embankment height for temporary impoundments will be a minimum of one (1) foot above the maximum water level anticipated from a ten (10) year - twenty-four (24) hour or a twenty-five (25) year - six (6) hour precipitation event (whichever is greater). The design embankment height for permanent impoundments will be minimum of one (1) foot above the maximum water level anticipated from a ten (10) year - twenty-four (24) hour or a twenty-five (25) year - six (6) hour precipitation event (whichever is greater).
- I) For embankments constructed as point source discharges, the embankment will be constructed and abutments keyed into undisturbed, virgin ground if at all possible. In the event that this cannot be achieved, additional design and construction specifications will be submitted in the Detailed Design Plans.
- J) The embankment all areas disturbed in the construction of the embankment will be seeded with a mixture of perennial and annual grasses, fertilized and mulched to prevent erosion and ensure restabilization. Hay dams, silt fences, rock check dams, etc. will be installed, where deemed necessary, as additional erosion prevention methods.

2. DISCHARGE STRUCTURE REQUIREMENTS

- A) The primary spillway will be designed to adequately carry the anticipated peak runoff from a ten (10) year - twenty-four (24) hour precipitation event. The combination primary and secondary (emergency) spillway system will be designed to safely carry the anticipated peak runoff from a twenty-five (25) year - six (6) hour precipitation event. When sediment basins are proposed in the drainage course of a public water supply, the spillway system will be designed and constructed to adequately carry the runoff from a fifty (50) year - twenty-four hour precipitation event.
- B) Channel linings for secondary (emergency) spillways will be a trapezoidal open channel constructed in natural ground and planted with a mixture of both annual and perennial grasses being predominantly fescue and bermuda. In the event the spillway cannot be constructed in natural ground, the spillway will be lined with riprap, concrete, asphalt or double rock (See Detailed Design Plans for Spillway Lining).
- C) When consisting of pipe, the primary spillway will be installed according to Class "C" pipe installation for embankment bedding.
- D) Sediment basins with a single spillway system such as a skimmer board, will be a trapezoidal open channel constructed in consolidated, nonerodible material and lined with rip-rap, concrete, asphalt or durable rock (See Detailed Design Plans for Spillway Lining).
- E) The primary spillway will be designed and constructed with device to eliminate floating solids from leaving the impoundment. This device will consist of a turned down elbow when using pipe or a skimmer system when using an open channel spillway.
- F) When necessary to prevent erosion of the embankment or discharge area, a splash pad of rip-rap, durable rock, sacrete, etc. will be installed at the discharge end of the primary spillway.
- G) The combined spillway systems, for sediment basins constructed in series, will be designed to adequately accommodate the entire drainage area.

3. INSPECTION, MAINTENANCE AND CERTIFICATION REQUIREMENTS

- A) Inspections will be conducted regularly during construction of the sediment basin by a qualified registered engineer or other qualified person under the direction of a professional engineer. Upon completion of construction, the sediment basin will be certified, by a qualified Registered Professional Engineer, to the Regulatory Authority as being constructed in accordance with the approved Detailed Design Plans.
- B) Sediment basins will be inspected semi-monthly for erosion, instability, etc., with maintenance performed as necessary, until the removal of the structure or until a Phase III Bond Release is granted.
- C) Sediment basins will be examined quarterly for structure weakness, instability, erosion, slope failure or other hazardous conditions with maintenance performed as necessary.

- D) Formal inspections will be made annually by a qualified Registered Professional Engineer or other qualified person under the direction of a Professional Engineer, including any reports or modifications, in accordance with 880-X-.20[1(j)] of the Alabama Surface Mining Regulations.
- E) Retained sediment will be removed from each sediment basin when the accumulated sediment reaches the maximum allowable sediment volume as set forth in the detailed design plans.

4. BASIN REMOVAL REQUIREMENTS

- A) Upon completion of mining, reclamation, re-stabilization and effluent standards being met, each sediment basin not proposed as a permanent water impoundment will be dewatered in a controlled manner by either pumping or siphoning. Upon successful dewatering, a determination will be made as to the retained sediment level in the basin. After determining the retained sediment level, a channel will be cut into the embankment down to the retained sediment level on the side of the embankment deemed most suitable to reach natural ground without encountering prohibiting rock. The embankment material removed from this newly constructed channel will be spread and compacted over the previous impoundment (wet area) area to prevent erosion and ensure re-stabilization. The newly constructed channel will be of adequate width (minimum thirty (30) feet) and sloped to a grade (approximately 1% to 3%) which will cause all surface drainage to travel across this area in sheet flow, minimizing the possibility of erosion. Also, where necessary, hay dams will be installed in strategic locations across the width of the channel to retain sediment and slow the water velocity to a favorable rate. Upon removal of the embankment section, all disturbed areas will be graded in such a manner to ensure slope stability, successful restabilization and to minimize erosion. All disturbed areas will be seeded with a mixture of annual and perennial grasses, fertilized and mulched. No slope, existing or created in the removal of the sediment basin, will be left on a grade that will slip or slough.

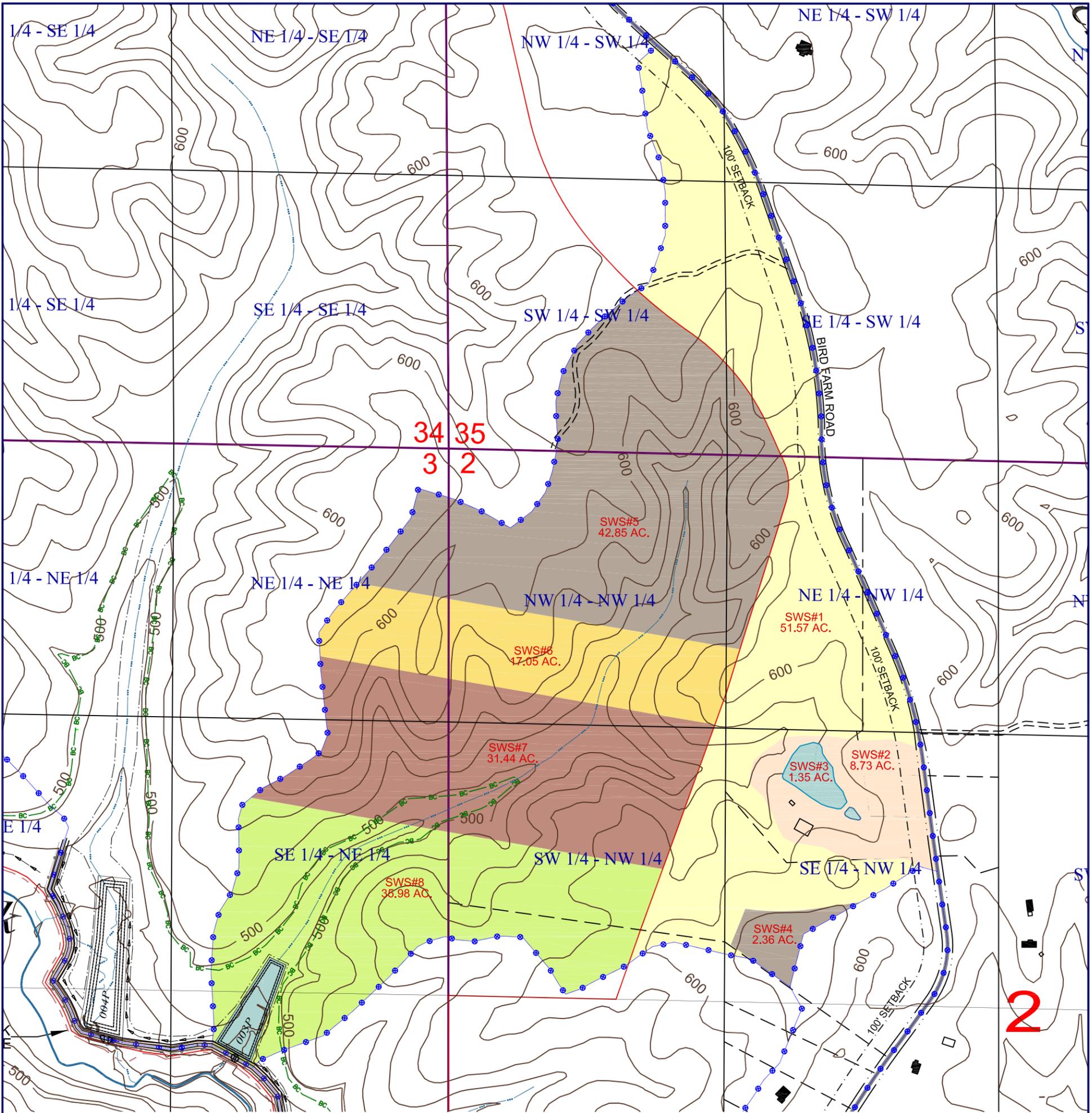
5. PERMANENT WATER IMPOUNDMENT REQUIREMENTS

- A) Prior to a request for a Phase II Bond Release, all sediment basins being left as permanent water impoundments will have supplemental data submitted to the Regulatory Authority concerning water quality, water quantity, size, depth, configuration, postmining land use, etc.
- B) Final grading slopes of the entire permanent water impoundment area will not exceed a slope of two (2) Horizontal to one (1) Vertical to provide for safety and access for future water users.

**DETAILED DESIGN PLANS
SEDIMENT BASIN 003**

Submitted by:

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CEDAR LAKE MINING, INC.
LITTLE SPRING CREEK EAST, P-3968

WATERSHED MAP
 SCALE: 1" = 500'
 CONTOUR INTERVAL: 20 FT.

SEDIMENT BASIN 003

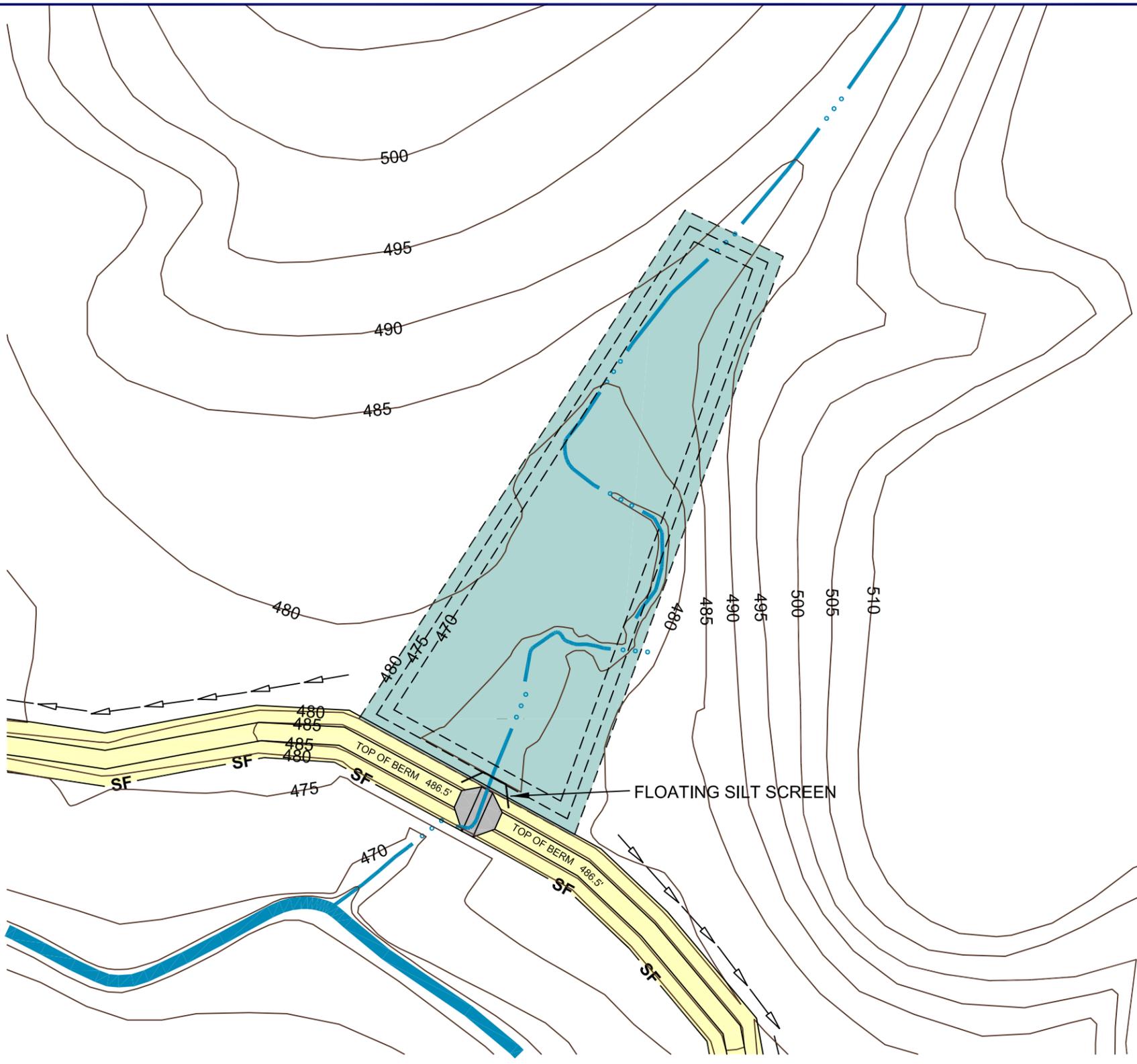


LEGEND

- | | |
|-----------------------------------|----------------------------------|
| PERMIT BOUNDARY | DRAINAGE DIVIDE |
| PREVIOUSLY SURFACE MINED | ROADSIDE DITCH |
| GRADED & BARE, CN 81 | DIVERSION DITCH |
| MINED, REVEG. 0-2 MONTHS, CN 79 | BASIN 001 SEDIMENT BASIN/OUTFALL |
| MINED, REVEG. 2-12 MONTHS, CN 74 | WATER IMPOUNDMENT |
| MINED, RECLAIMED GRASSLAND, CN 69 | |
| MOSTLY FOREST, GOOD COVER, CN 70 | |
| MOSTLY PASTURE, GOOD COVER, CN 68 | |
| PONDS/SEDIMENT BASINS, CN 100 | |



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**CEDAR LAKE MINING, INC.
LITTLE SPRING CREEK EAST, P-3968**

GENERAL PLAN VIEW

SCALE: 1" = 100'

CONTOUR INTERVAL: 5 FT.



SEDIMENT BASIN 003

UPSTREAM TOE ELEVATION: 470.00'
 SEDIMENT REMOVAL ELEVATION: 477.45'
 PRIMARY SPILLWAY ELEVATION: 480.50'
 EMERGENCY SPILLWAY ELEVATION: 480.50'
 **MAXIMUM WATER ELEVATION: 483.16'
 TOP OF DAM ELEVATION: 486.00' DESIGN
 TOP OF DAM ELEVATION: 486.50' CONSTRUCTION

PRIMARY SPILLWAY: 10' TRAPEZOIDAL CHANNEL
 CONCRETE LINED

--- 475 --- EXCAVATED CONTOURS
 ——— 475 ——— ORIGINAL CONTOURS

- DRAINAGE CONTROL BERM/ EMBANKMENT
- NORMAL POOL AREA
- CONCRETE SPILLWAY
- DIVERSIONS AND/OR MAJOR INFLOW TO BASIN
- SF SILT FENCE

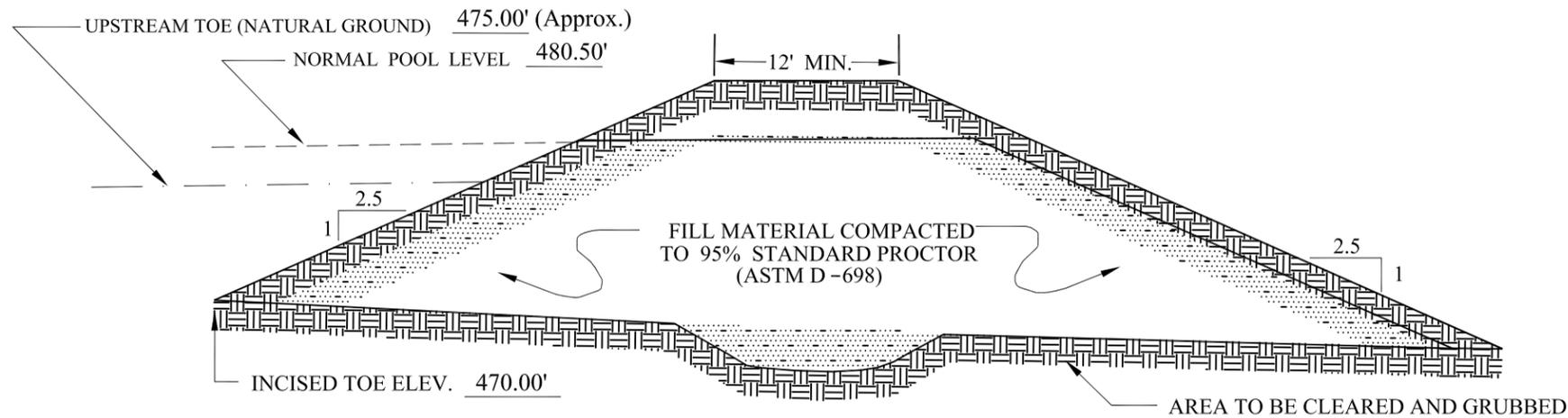
SEDIMENT BASIN 003

** 25 YEAR - 6 HOUR PRECIPITATION EVENT



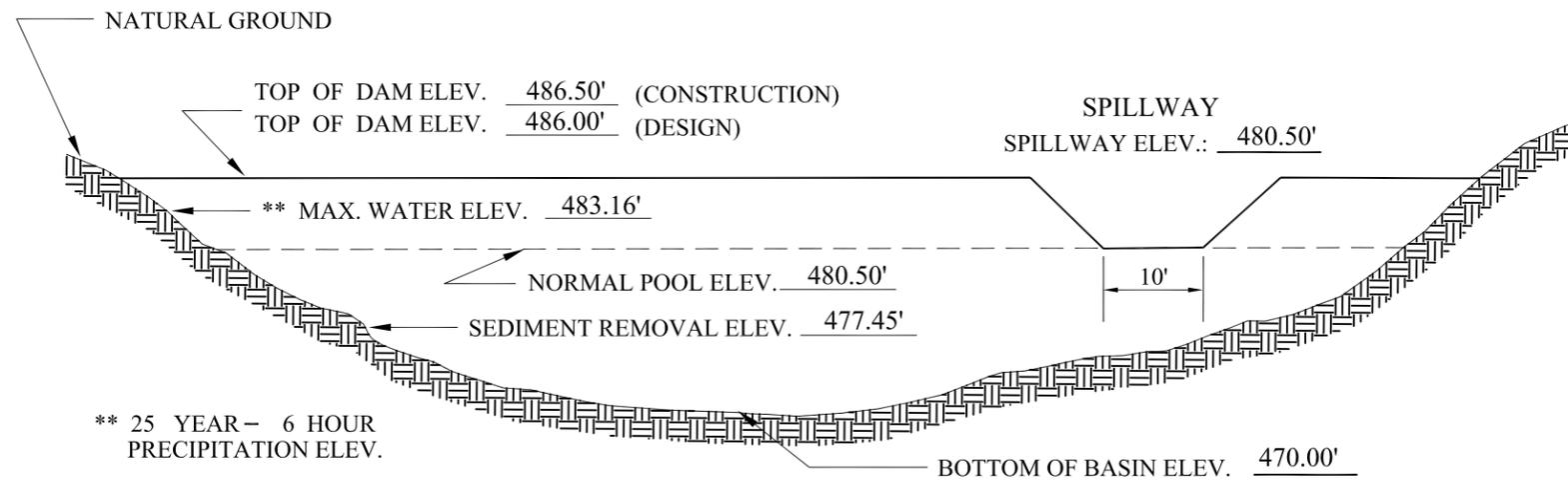
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DIVERSION BERM CROSS-SECTION



COMPANY: CEDAR LAKE MINING, INC.
 MINE NAME: LITTLE SPRING CREEK EAST
 PERMIT #: P - 3968
 BASIN I.D. #: SEDIMENT BASIN 003

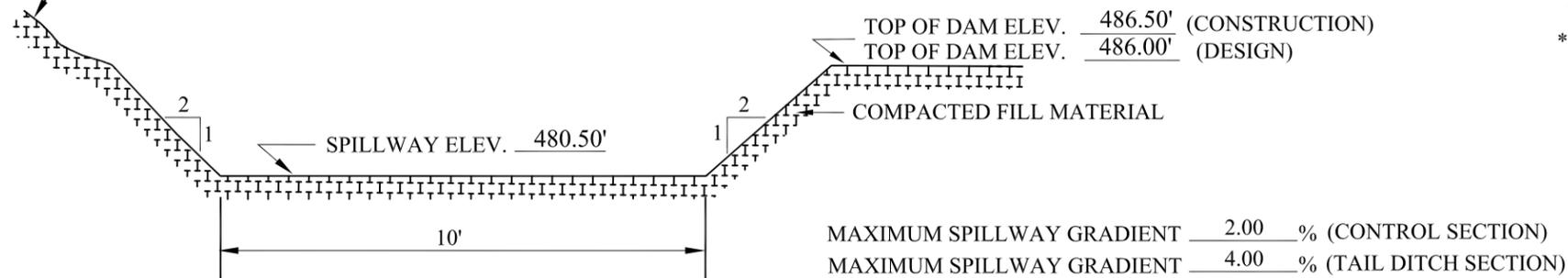
IMPOUNDMENT PROFILE



KEY BASIN PARAMETERS

DRAINAGE AREA	<u> 192.96 </u>	ACRES
DISTURBED AREA	<u> 131.31 </u>	ACRES
SEDIMENT STORAGE	<u> 9.50 </u>	AC.FT.
DETENTION STORAGE	<u> 4.78 </u>	AC.FT.
PERMANENT POOL CAPACITY	<u> 14.28 </u>	AC.FT.
* TOTAL BASIN STORAGE CAPACITY	<u> 18.40 </u>	AC.FT.
** PEAK INFLOW	<u> 258.16 </u>	C.F.S.
** PEAK OUTFLOW	<u> 162.55 </u>	C.F.S.

EMERGENCY SPILLWAY



NOTE: ALL ELEVATIONS ASSUMED.

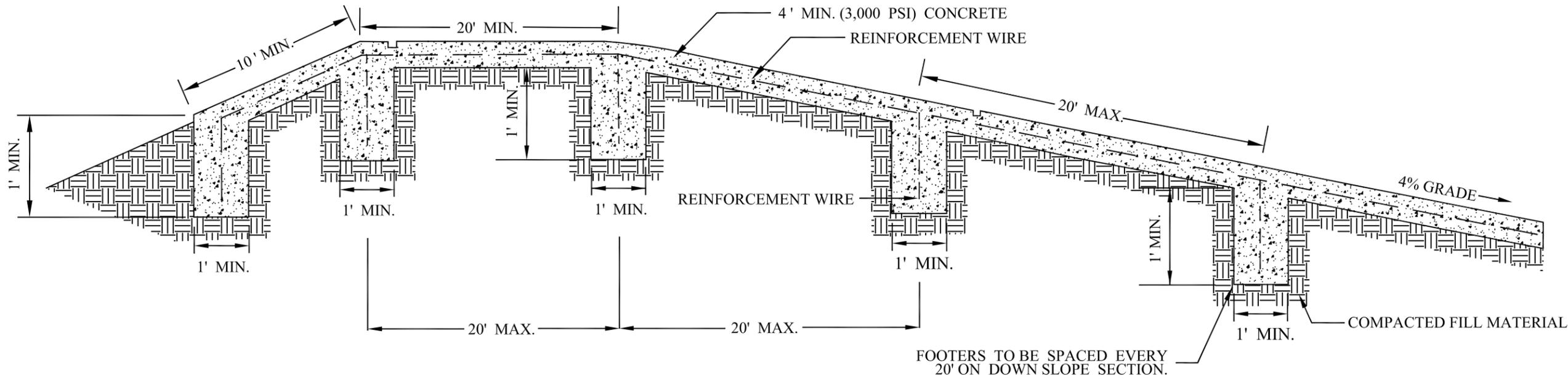
- * 10 YEAR - 24 HOUR PRECIPITATION EVENT.
- ** 25 YEAR - 6 HOUR PRECIPITATION EVENT.

SEE TYPICAL SPILLWAY PROFILE SHEET, SPILLWAY CONTROL SECTION AND TAIL DITCH DESIGN FOR CHANNEL LINING REQUIREMENTS

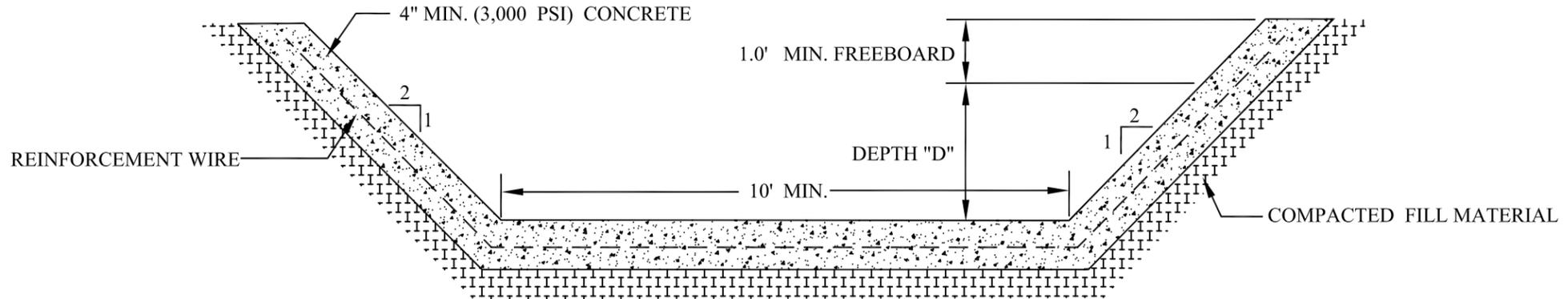


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BASIN 003 TYPICAL SPILLWAY PROFILE



TYPICAL SPILLWAY CROSS - SECTION

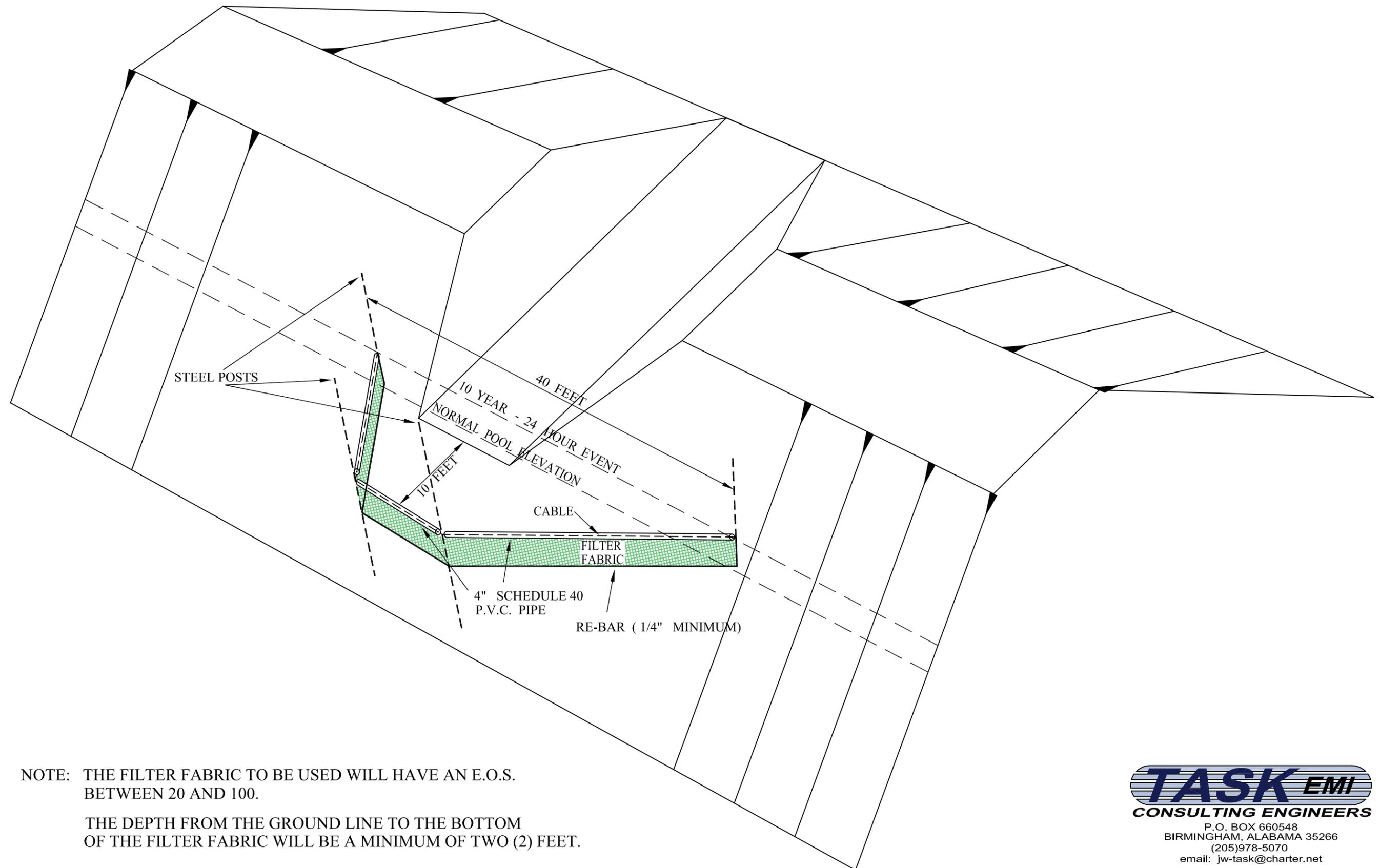


MINIMUM SPILLWAY DEPTH "D"	= <u>1.31</u> FEET (CONTROL SECTION)
MINIMUM SPILLWAY DEPTH "D"	= <u>1.07</u> FEET (TAIL DITCH SECTION)
TOTAL SPILLWAY DEPTH "D+1"	= <u>2.31</u> FEET (CONTROL SECTION)
TOTAL SPILLWAY DEPTH "D+1"	= <u>2.07</u> FEET (TAIL DITCH SECTION)



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FLOATING SILT FENCE SUBSURFACE WITHDRAWAL DEVICE



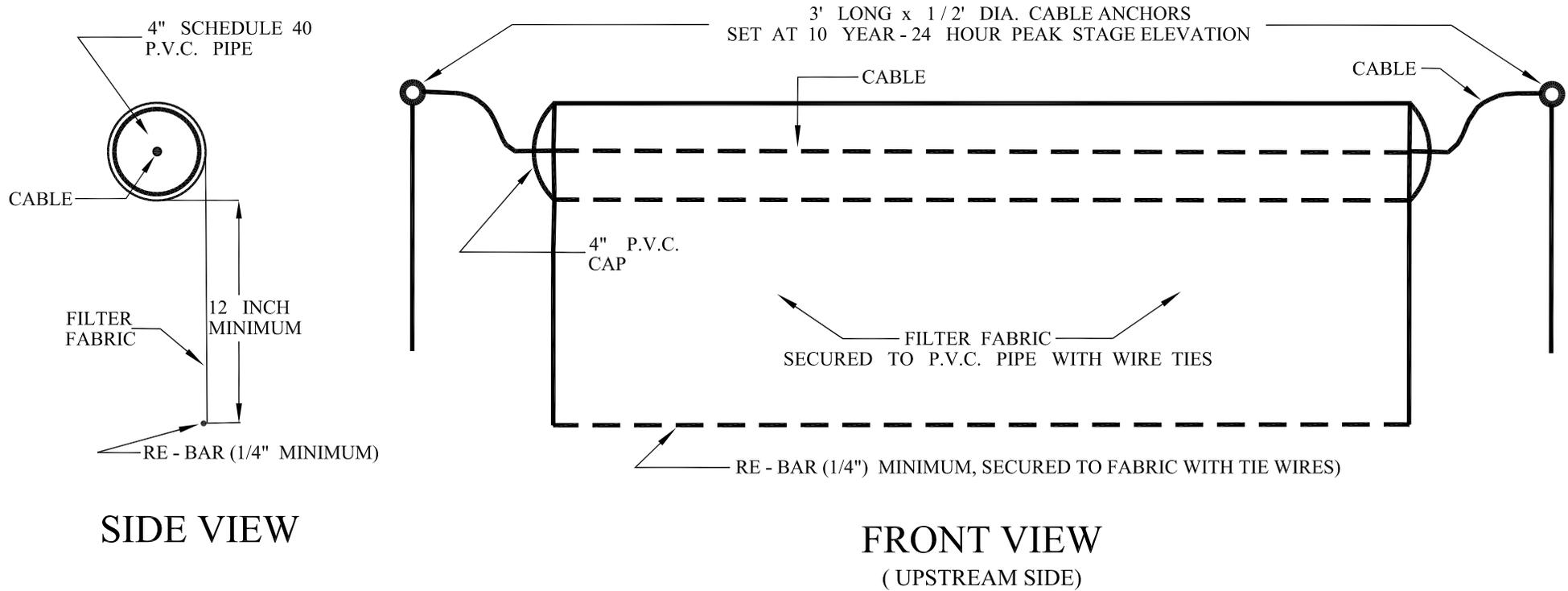
NOTE: THE FILTER FABRIC TO BE USED WILL HAVE AN E.O.S. BETWEEN 20 AND 100.

THE DEPTH FROM THE GROUND LINE TO THE BOTTOM OF THE FILTER FABRIC WILL BE A MINIMUM OF TWO (2) FEET.

TASK EMI
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FLOATING SILT FENCE SUBSURFACE WITHDRAWAL DEVICE



NOTE: THE FILTER FABRIC TO BE USED WILL HAVE AN E.O.S. BETWEEN 20 AND 100.
THE DEPTH FROM THE GROUND LINE TO THE BOTTOM OF THE FILTER
WILL BE A MINIMUM OF TWO (2) FEET.

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**SPILLWAY CHANNEL SPECIFICATIONS
SEDIMENT BASIN 003**

The entire control section and tail ditch section of the emergency spillway will be cut into the compacted fill of the embankment and lined with a minimum of four (4) inches of reinforced concrete. All concrete will be reinforced with 10 gauge, 6"X 6" welded wire mesh. Fibermesh may be added to the concrete for additional strength, however, the addition of fibermesh shall not be used in place of the required 6"X 6" welded wire.

The gradient of the control section of the emergency spillway will not exceed two (2%) percent. The gradient of the tail ditch section of the emergency spillway will not exceed four (4%) percent.

The control section and tail ditch section of the emergency spillway will extend from the inner face of the embankment, past the centerline of the embankment and be carried out well beyond the downstream slope of the embankment.

The control section of the emergency spillway will be a minimum of 3.66 feet as measured vertically, allowing 2.66 feet for the maximum anticipated flow and 1.0 feet of dry freeboard. The tail ditch section of the emergency spillway will be a minimum of 2.07 feet as measured vertically, allowing 1.07 feet for the maximum anticipated flow and 1.0 feet of dry freeboard. There will be a transition zone of at least twenty (20') feet in length between the control section and the tail section. The minimum depth at the beginning of the transition will be 2.31 feet and 2.07 feet at the end of the transition. The flow line of the spillway will be smoothed at the transition to avoid abrupt changes in the flow line slope.

See enclosed SEDCAD 4.0 spillway tail ditch section design and attached Plan Sheet cross-section for the minimum and maximum emergency spillway construction requirements.

BASIN 003 SPILLWAY DESIGN

Material: Concrete, Rubble

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
10.00	2.0:1	2.0:1	2.0	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	162.55 cfs	
Depth:	1.31 ft	2.31 ft
Top Width:	15.24 ft	19.24 ft
Velocity:	9.84 fps	
X-Section Area:	16.51 sq ft	
Hydraulic Radius:	1.042 ft	
Froude Number:	1.67	

BASIN 003 SPILLWAY DESIGN

Material: Concrete, Rubble

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
10.00	2.0:1	2.0:1	4.0	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	162.55 cfs	
Depth:	1.07 ft	2.07 ft
Top Width:	14.30 ft	18.30 ft
Velocity:	12.45 fps	
X-Section Area:	13.05 sq ft	
Hydraulic Radius:	0.882 ft	
Froude Number:	2.30	

BASIN 003

Elevation-Area-Capacity Table

Elevation (ft)	Area (ac)	Capacity (ac-ft)
470.00	1.080	0.000
471.00	1.130	1.105
472.00	1.181	2.260
473.00	1.233	3.467
474.00	1.286	4.726
475.00	1.340	6.039
476.00	1.396	7.406
477.00	1.453	8.830
478.00	1.511	10.312
479.00	1.570	11.852
480.00	1.630	13.452
480.50	1.647	14.271
481.00	1.664	15.099
482.00	1.697	16.779
483.00	1.731	18.493
484.00	1.765	20.242
485.00	1.800	22.024

**HYDROLOGY AND SEDIMENTOLOGY PREDICTION
10 YEAR - 24 HOUR PRECIPITATION EVENT
SEDIMENT BASIN 003**

Submitted by:

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P. O. Box 660548
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Cedar Lake Mining, Inc.
Little Spring Creek East Mine
Sediment Basin No. 3

DRN-58

10 Year 24 Hour Event, 5.80 In.

Jerry W. Williams, P.E.

TASK Engineering Management Inc.
P.O. Box 660548
Birmingham, Alabama 35226

Phone: 205-978-5070
Email: jw-task@charter.net

General Information

Storm Information:

Storm Type:	DRN 58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	5.800 inches

Particle Size Distribution:

Size (mm)	TOPSOIL	SPOIL
3.0000	99.000%	97.000%
2.0000	97.000%	93.000%
1.0000	93.000%	77.000%
0.5000	87.000%	59.000%
0.3000	77.000%	48.000%
0.2000	63.000%	42.000%
0.1000	46.000%	34.000%
0.0500	26.000%	27.000%
0.0300	13.000%	23.000%
0.0200	11.000%	19.000%
0.0100	7.000%	15.000%
0.0050	5.000%	9.000%
0.0030	4.000%	7.000%
0.0010	2.000%	4.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Sediment Basin No. 3

#1
<i>Pond</i>

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	192.960	192.960	146.39	42.00	2,532.4	90,950	61.26	30.00
	Out			136.82	41.99	380.9	13,941	0.48	0.25

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	97.179%	100.000%
2.0000	93.276%	100.000%
1.0000	77.407%	100.000%
0.5000	59.379%	100.000%
0.3000	48.359%	100.000%
0.2000	42.346%	100.000%
0.1000	34.282%	100.000%
0.0500	27.172%	100.000%
0.0300	23.101%	100.000%
0.0200	19.085%	100.000%
0.0100	15.059%	100.000%
0.0050	9.039%	60.091%
0.0030	7.031%	46.741%
0.0010	4.016%	26.700%

Structure Detail:

Structure #1 (Pond)

Sediment Basin No. 3

Pond Inputs:

Initial Pool Elev:	480.50 ft
Initial Pool:	4.78 ac-ft
*Sediment Storage:	9.50 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
480.50	20.00	2.00:1	2.00:1	10.00

Pond Results:

Peak Elevation:	482.94 ft
H'graph Detention Time:	0.83 hrs
Pond Model:	CSTRS
Dewater Time:	0.78 days
Trap Efficiency:	84.96 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
477.45	1.479	0.000	0.000	Top of Sed. Storage
478.00	1.511	0.819	0.000	
479.00	1.570	2.359	0.000	
480.00	1.630	3.959	0.000	
480.50	1.647	4.778	0.000	Spillway #1
481.00	1.664	5.606	1.830	5.47*
482.00	1.697	7.286	53.905	12.05
482.94	1.729	8.900	136.820	1.15 Peak Stage
483.00	1.731	9.001	141.972	
484.00	1.765	10.749	270.364	
485.00	1.800	12.532	441.772	

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
477.45	0.000	0.000
478.00	0.000	0.000
479.00	0.000	0.000
480.00	0.000	0.000
480.50	0.000	0.000
481.00	1.830	1.830
482.00	53.905	53.905
483.00	141.972	141.972
484.00	270.364	270.364
485.00	441.772	441.772

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	51.570	1.026	0.209	0.377	70.000	S	17.50	7.602
	2	8.730	0.219	0.165	0.372	68.000	M	5.88	1.439
	3	1.350	0.016	0.168	0.373	100.000	F	2.05	0.652
	4	2.360	0.135	0.155	0.389	81.000	F	2.78	0.701
	5	42.850	0.119	0.184	0.345	81.000	F	53.25	13.200
	6	17.050	0.030	0.137	0.355	79.000	M	20.36	4.968
	7	31.440	0.135	0.072	0.343	74.000	M	26.15	6.424
	8	35.980	0.164	0.000	0.000	69.000	M	25.77	6.231
	9	1.630	0.010	0.000	0.000	100.000	F	2.48	0.787
	Σ	192.960						146.39	42.004

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.320	400.00	7.80	0.0060	1.0000	1	6.7	995	0.68	0.45
	2	0.320	400.00	6.40	0.0030	1.0000	1	0.5	479	0.35	0.20
	3	0.001	400.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	4	0.240	100.00	1.00	0.9000	1.0000	2	4.3	7,840	5.25	2.98
	5	0.240	200.00	12.40	0.9000	1.0000	2	2,321.8	208,848	140.77	81.96
	6	0.320	200.00	11.40	0.1400	1.0000	2	145.1	37,346	25.17	14.33
	7	0.320	200.00	8.50	0.0500	1.0000	2	45.3	9,134	5.99	3.39
	8	0.320	200.00	10.00	0.0100	1.0000	2	11.3	2,363	1.55	0.87
	9	0.001	200.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	Σ							2,532.4	90,950	61.26	30.00

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	0.78	6.12	780.01	0.220	0.984
		8. Large gullies, diversions, and low flowing streams	3.98	36.00	905.00	5.980	0.042
#1	1	Time of Concentration:					1.026
#1	2	3. Short grass pasture	1.55	11.00	710.00	0.990	0.199
		8. Large gullies, diversions, and low flowing streams	6.49	37.00	570.00	7.640	0.020
#1	2	Time of Concentration:					0.219

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	3	8. Large gullies, diversions, and low flowing streams	6.67	31.00	465.00	7.740	0.016
#1	3	Time of Concentration:					0.016
#1	4	5. Nearly bare and untilled, and alluvial valley fans	0.46	1.50	327.00	0.670	0.135
#1	4	Time of Concentration:					0.135
#1	5	5. Nearly bare and untilled, and alluvial valley fans	4.23	22.00	520.00	2.050	0.070
		8. Large gullies, diversions, and low flowing streams	6.19	83.00	1,340.00	7.460	0.049
#1	5	Time of Concentration:					0.119
#1	6	5. Nearly bare and untilled, and alluvial valley fans	9.73	18.00	185.00	3.110	0.016
		8. Large gullies, diversions, and low flowing streams	11.93	65.00	545.00	10.360	0.014
#1	6	Time of Concentration:					0.030
#1	7	3. Short grass pasture	9.29	65.00	700.00	2.430	0.080
		8. Large gullies, diversions, and low flowing streams	2.60	25.00	960.00	4.840	0.055
#1	7	Time of Concentration:					0.135
#1	8	2. Minimum tillage cultivation	14.62	95.00	650.00	1.910	0.094
		8. Large gullies, diversions, and low flowing streams	1.58	15.00	950.00	3.760	0.070
#1	8	Time of Concentration:					0.164

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	2	8. Large gullies, diversions, and low flowing streams	2.69	79.00	2,935.00	4.920	0.165
#1	2	Muskingum K:					0.165
#1	3	8. Large gullies, diversions, and low flowing streams	2.80	85.00	3,040.00	5.010	0.168
#1	3	Muskingum K:					0.168
#1	4	8. Large gullies, diversions, and low flowing streams	3.99	134.00	3,360.00	5.990	0.155
#1	4	Muskingum K:					0.155
#1	5	8. Large gullies, diversions, and low flowing streams	1.59	40.00	2,510.00	3.780	0.184
#1	5	Muskingum K:					0.184
#1	6	8. Large gullies, diversions, and low flowing streams	1.93	40.00	2,070.00	4.170	0.137
#1	6	Muskingum K:					0.137
#1	7	8. Large gullies, diversions, and low flowing streams	1.55	15.00	970.00	3.730	0.072
#1	7	Muskingum K:					0.072

**HYDROLOGY AND SEDIMENTOLOGY PREDICTION
25 YEAR - 6 HOUR PRECIPITATION EVENT
SEDIMENT BASIN 003**

Submitted by:

TASK Engineering Management Inc.
P. O. Box 660548
Birmingham, Alabama 35266
Telephone: (205) 978-5070
Email: jw-task@charter.net

Cedar Lake Mining, Inc.
Little Spring Creek East Mine
Sediment Basin No. 3

SCS-6 HOUR

25 Year 6 Hour Event, 4.90 In.

Jerry W. Williams, P.E.

TASK Engineering Management Inc.
P.O. Box 660548
Birmingham, Alabama 35226

Phone: 205-978-5070
Email: jw-task@charter.net

General Information

Storm Information:

Storm Type:	SCS 6 HOUR
Design Storm:	25 yr - 6 hr
Rainfall Depth:	4.900 inches

Particle Size Distribution:

Size (mm)	TOPSOIL	SPOIL
3.0000	99.000%	97.000%
2.0000	97.000%	93.000%
1.0000	93.000%	77.000%
0.5000	87.000%	59.000%
0.3000	77.000%	48.000%
0.2000	63.000%	42.000%
0.1000	46.000%	34.000%
0.0500	26.000%	27.000%
0.0300	13.000%	23.000%
0.0200	11.000%	19.000%
0.0100	7.000%	15.000%
0.0050	5.000%	9.000%
0.0030	4.000%	7.000%
0.0010	2.000%	4.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Sediment Basin No. 3

#1 Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	192.960	192.960	258.16	32.11	3,697.3	190,549	128.26	54.37
	Out			162.55	32.11	609.1	22,842	2.03	1.25

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	97.160%	100.000%
2.0000	93.238%	100.000%
1.0000	77.530%	100.000%
0.5000	59.511%	100.000%
0.3000	48.447%	100.000%
0.2000	42.412%	100.000%
0.1000	34.362%	100.000%
0.0500	27.269%	100.000%
0.0300	23.189%	100.000%
0.0200	19.158%	100.000%
0.0100	15.117%	91.757%
0.0050	9.074%	55.075%
0.0030	7.058%	42.839%
0.0010	4.032%	24.472%

Structure Detail:

Structure #1 (Pond)

Sediment Basin No. 3

Pond Inputs:

Initial Pool Elev:	480.50 ft
Initial Pool:	4.78 ac-ft
*Sediment Storage:	9.50 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
480.50	20.00	2.00:1	2.00:1	10.00

Pond Results:

Peak Elevation:	483.16 ft
H'graph Detention Time:	0.70 hrs
Pond Model:	CSTRS
Dewater Time:	1.75 days
Trap Efficiency:	83.52 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
477.45	1.479	0.000	0.000		Top of Sed. Storage
478.00	1.511	0.819	0.000		
479.00	1.570	2.359	0.000		
480.00	1.630	3.959	0.000		
480.50	1.647	4.778	0.000		Spillway #1
481.00	1.663	5.606	1.830	35.25	
482.00	1.697	7.286	53.905	3.55	
483.00	1.731	9.000	141.972	3.05	
483.16	1.737	9.280	162.552	0.15	Peak Stage
484.00	1.765	10.748	270.364		
485.00	1.800	12.531	441.772		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
477.45	0.000	0.000
478.00	0.000	0.000
479.00	0.000	0.000
480.00	0.000	0.000
480.50	0.000	0.000
481.00	1.830	1.830
482.00	53.905	53.905
483.00	141.972	141.972
484.00	270.364	270.364
485.00	441.772	441.772

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	51.570	1.026	0.209	0.377	70.000	S	18.13	5.635
	2	8.730	0.219	0.165	0.372	68.000	M	7.87	1.055
	3	1.350	0.016	0.168	0.373	100.000	F	6.34	0.551
	4	2.360	0.135	0.155	0.389	81.000	F	6.03	0.549
	5	42.850	0.119	0.184	0.345	81.000	F	135.64	10.344
	6	17.050	0.030	0.137	0.355	79.000	M	50.29	3.858
	7	31.440	0.135	0.072	0.343	74.000	M	44.06	4.864
	8	35.980	0.164	0.000	0.000	69.000	M	38.18	4.593
	9	1.630	0.010	0.000	0.000	100.000	F	7.65	0.665
	Σ	192.960						258.16	32.114

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.320	400.00	7.80	0.0060	1.0000	1	5.8	959	0.61	0.48
	2	0.320	400.00	6.40	0.0030	1.0000	1	0.5	532	0.38	0.26
	3	0.001	400.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	4	0.240	100.00	1.00	0.9000	1.0000	2	5.7	12,370	8.15	5.05
	5	0.240	200.00	12.40	0.9000	1.0000	2	3,416.5	350,174	236.03	147.60
	6	0.320	200.00	11.40	0.1400	1.0000	2	208.9	66,214	44.63	26.35
	7	0.320	200.00	8.50	0.0500	1.0000	2	51.9	12,173	7.69	4.94
	8	0.320	200.00	10.00	0.0100	1.0000	2	11.9	2,921	1.84	1.19
	9	0.001	200.00	0.01	0.0001	1.0000	1	0.0	0	0.00	0.00
	Σ							3,697.3	190,549	128.26	54.37

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	0.78	6.12	780.01	0.220	0.984
		8. Large gullies, diversions, and low flowing streams	3.98	36.00	905.00	5.980	0.042
#1	1	Time of Concentration:					1.026
#1	2	3. Short grass pasture	1.55	11.00	710.00	0.990	0.199
		8. Large gullies, diversions, and low flowing streams	6.49	37.00	570.00	7.640	0.020
#1	2	Time of Concentration:					0.219

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	3	8. Large gullies, diversions, and low flowing streams	6.67	31.00	465.00	7.740	0.016
#1	3	Time of Concentration:					0.016
#1	4	5. Nearly bare and untilled, and alluvial valley fans	0.46	1.50	327.00	0.670	0.135
#1	4	Time of Concentration:					0.135
#1	5	5. Nearly bare and untilled, and alluvial valley fans	4.23	22.00	520.00	2.050	0.070
		8. Large gullies, diversions, and low flowing streams	6.19	83.00	1,340.00	7.460	0.049
#1	5	Time of Concentration:					0.119
#1	6	5. Nearly bare and untilled, and alluvial valley fans	9.73	18.00	185.00	3.110	0.016
		8. Large gullies, diversions, and low flowing streams	11.93	65.00	545.00	10.360	0.014
#1	6	Time of Concentration:					0.030
#1	7	3. Short grass pasture	9.29	65.00	700.00	2.430	0.080
		8. Large gullies, diversions, and low flowing streams	2.60	25.00	960.00	4.840	0.055
#1	7	Time of Concentration:					0.135
#1	8	2. Minimum tillage cultivation	14.62	95.00	650.00	1.910	0.094
		8. Large gullies, diversions, and low flowing streams	1.58	15.00	950.00	3.760	0.070
#1	8	Time of Concentration:					0.164

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	2	8. Large gullies, diversions, and low flowing streams	2.69	79.00	2,935.00	4.920	0.165
#1	2	Muskingum K:					0.165
#1	3	8. Large gullies, diversions, and low flowing streams	2.80	85.00	3,040.00	5.010	0.168
#1	3	Muskingum K:					0.168
#1	4	8. Large gullies, diversions, and low flowing streams	3.99	134.00	3,360.00	5.990	0.155
#1	4	Muskingum K:					0.155
#1	5	8. Large gullies, diversions, and low flowing streams	1.59	40.00	2,510.00	3.780	0.184
#1	5	Muskingum K:					0.184
#1	6	8. Large gullies, diversions, and low flowing streams	1.93	40.00	2,070.00	4.170	0.137
#1	6	Muskingum K:					0.137
#1	7	8. Large gullies, diversions, and low flowing streams	1.55	15.00	970.00	3.730	0.072
#1	7	Muskingum K:					0.072