

**HYDROLOGY STUDY FOR  
GLOBAL MET COAL CORP.**

**BLACK CREEK MINE  
P-\_\_\_\_\_  
JEFFERSON COUNTY, ALABAMA**

**BY  
PERC ENGINEERING CO., INC.  
P.O. BOX 1712  
JASPER, ALABAMA 35502**

**DETAILED DESIGN PLANS  
BASIN 002P  
ATTACHMENT III-B-2(a)**

**NOVEMBER 30, 2012**



Telephone: (205) 384-5553  
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Web Address: [www.percengineering.com](http://www.percengineering.com)

November 30, 2012

Mr. Michael Harrison, P.E.  
Alabama Surface Mining Commission  
Post Office Box 2390  
Jasper, Alabama 35502-2390

RE: Global Met Coal Corp.  
Black Creek Mine  
P-

Dear Michael:

I hereby certify the attached detailed design plans for Basin 002P 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 amended to date, and are true and correct to the best of my knowledge and belief.

If you have any questions or required additional information, please feel free to call.

Sincerely,  
PERC Engineering Co., Inc.

A handwritten signature in black ink that reads "Leslie G. Stephens".

Leslie G. Stephens, P.E., P.L.S.  
Alabama Registration No. 14117-E



## Pond Construction Criteria

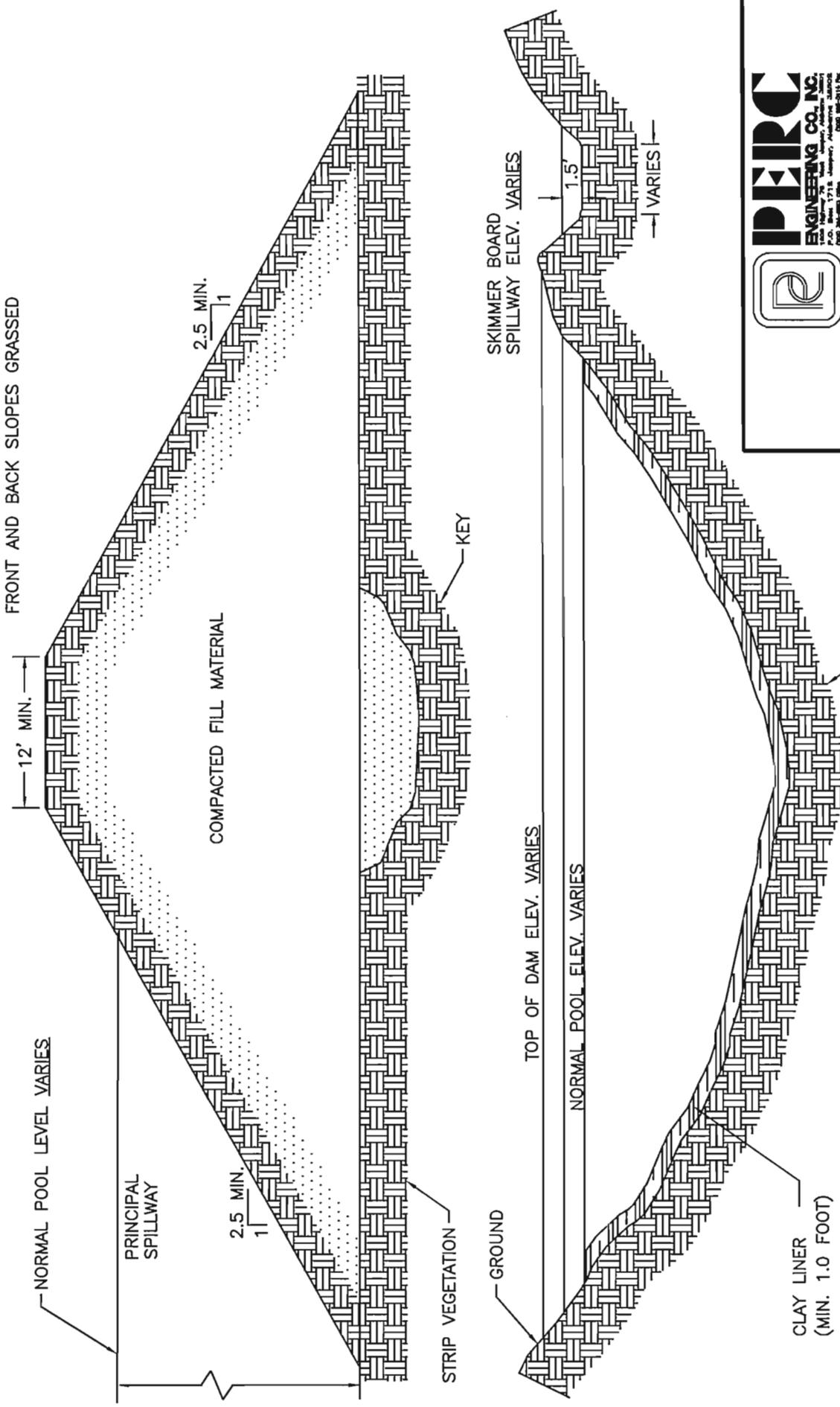
The embankment for sediment basins (temporary and permanent) shall be designed and built using the following as minimum criteria:

1. The top of the dam shall be no less than 12 feet wide.
2. See design sheet for maximum and minimum embankment slopes.
3. The foundation and abutments for the impounding structure shall be designed to be stable under all conditions of construction and operation of the impoundments, with a minimum static safety factor of 1.3 for the normal pool with steady seepage saturation conditions.
4. The dam shall be constructed with a cutoff trench based upon prudent engineering practices for the site. The cutoff shall be located on the dam centerline and be of sufficient depth to extend into a relatively impervious material from which the core of the dam shall also be constructed.
5. The embankment foundation area shall be cleared of all organic matter, all surfaces sloped to no steeper than 1v:1h, and the entire foundation surface scarified.
6. The entire embankment and cutoff trench shall be compacted to 95 percent density, based on standard proctor as outlined in ASTM.
7. The material placed in the embankment shall be free of sod, roots, stones over 6 inches in diameter, and other objectionable materials. The fill material shall be placed and spread over the entire fill area, starting at the lowest point of the foundation, in layers not to exceed 12 inches in thickness. Construction of the fill shall be undertaken only at such times that the moisture content of the fill material will permit satisfactory compaction in accordance with paragraph 5.
8. The pool area of the basin will be cleared of timber and large undergrowth.
9. The primary decant system when consisting of a pipe shall be installed according to Class C pipe installation for embankment bedding.
10. The primary decant system shall be equipped with a device, or constructed, such as to insure that subsurface withdrawal is accomplished to prevent discharge of floating solids. If a channel is used as the primary decant a skimmer shall be installed to prevent floating solids from discharging.
11. A splash pad or riprap may be required under the discharge of the primary decant system where necessary to insure that the discharge does not erode the embankment.

12. The combination primary and secondary decant system shall be designed to safely carry the expected peak flow from a 25 year - 6 hour storm. The entire emergency overflow spillway channel will be a stabilized channel and will be stabilized upon completion of construction as specified within the detailed design plans using prudent engineering measures. These measures may consist of lining the spillway with concrete or a durable rock riprap, or the spillway being constructed in consolidated non-erodible material and planted with a mixture of both annual and perennial grasses, or a combination of any or all of the above.
13. Sediment basins using a single spillway system shall be an open channel of non-erodible construction consisting of concrete, durable rock riprap or its being constructed in consolidated non-erodible material as specified in the detailed design plans.
14. The settled embankment for temporary impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 25 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff). The settled embankment for permanent impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 25 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff).
15. If basins are built in series, then the combined decant system for each shall be designed to accommodate the entire contributing drainage area.
16. The dam and all disturbed areas shall be seeded with both perennial and annual grasses, fertilized and mulched in order to insure erosion is minimized. Hay bales or riprap may be placed at the toe of the dam immediately upon completion of construction.
17. The constructed height of the dam shall be increased a minimum of 5 percent over the design height to allow for settlement over the life of the embankment.
18. Final graded slopes of the entire permanent water impoundment area shall not exceed 2.5H-1.0V to provide for adequate safety and access for proposed water users.
19. Prior to Phase II bond release, additional data concerning water quality, water quantity, depth, size, configuration, post mining land use, etc., for each proposed permanent water impoundment, shall be submitted to the Regulatory Authority for permanent water impoundment approval.
20. All sediment basins will be inspected for stability, erosion, etc. two (2) times a month until removal of the structure or release of the reclamation bond.
21. The embankment and spillway will be maintained by repairing any damage such

as erosion, slope failure or spillway damage until removal of the structure or release of the performance bond.

22. All ponds shall be examined quarterly for structural weakness, instability, erosion, or other hazardous conditions and maintenance performed as necessary. Formal inspections shall be made on an annual basis, including any reports or modifications, in accordance with 880-X-10C-.20[l(j)] of the Alabama Surface Mining Commission Regulations.
23. Sediment will be removed from each pond when the accumulated sediment reaches the sediment storage volume as shown on the detailed design sheet.
24. Upon completion of mining, successful reclamation and effluent standards being met, each sediment basin not remaining as a permanent water impoundment will be dewatered in an environmentally safe manner (such as siphoning, pumping, etc.) and reclaimed to approximate original contours by the following procedure: A permanent diversion channel (designed for a 10 year - 24 hour precipitation event) shall be cut along the outer edge of the basin to re-route drainage around the basin and back through the stabilized spillway to allow reclamation of the sediment basin. The diversion channel shall be designed and grassed as per enclosed information. (See permanent diversion for basin disposal). Upon completion of the diversion channel the back slope of the dam shall be graded to a minimum 3H to 1V slope. The dewatered sediment basin area shall be seeded with some combination of the following: Fescue, bermuda, rye grass, canary grass and willows. After seeding the area shall be mulched. Any additional sediment or embankment material not used to meet original contour, if non-toxic, shall be spread in thin layers within the permit area and vegetated as stated in the approved reclamation plan. All toxic material encountered in the basin disposal shall be buried and covered with 4 feet of non-toxic material and vegetated as stated in the approved reclamation plan.
25. A qualified registered professional engineer or other qualified professional specialist, under the direction of the professional engineer shall conduct regular inspections during construction and upon completion shall inspect each basin for certification purposes.
26. Point source discharge embankments shall be constructed and abutments keyed into desirable material if at all possible. In the event that undesirable material is encountered, addition design and construction criteria shall be submitted prior to certification.



TYPICAL DAM DETAIL  
NO SCALE

Lined with 1.0 feet (minimum) of clay material with a permeability no greater than  $1 \times 10^{-6}$  cm/sec up to the emergency spillway elevation to minimize infiltration and to provide a stable pool level with the clay placed in 6" lifts compacted to 95% of standard proctor.

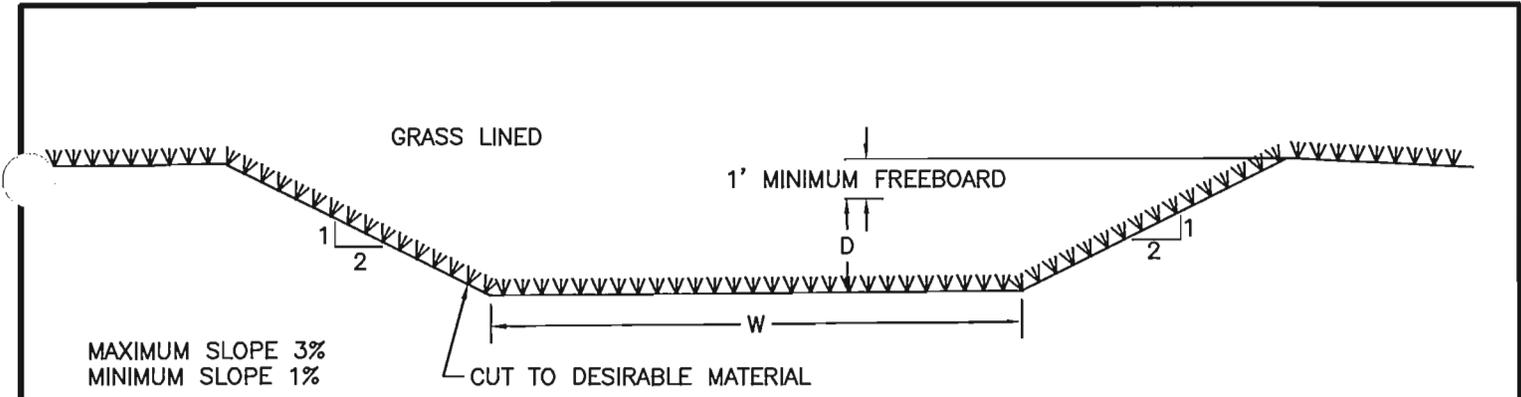


**PERC**  
ENGINEERING CO., INC.  
P.O. Box 1718, Leesport, Pennsylvania 17039  
(717) 945-8111 Fax (717) 945-8115

TYPICAL DAM DETAIL  
WITH CLAY LINER

DRAWN BY: J.W.T.	DATE: 4/10/2009
DWG. NAME: TYPICALS	
APPROVED BY: L.G.S.	SCALE: NONE

ATTACHMENT III-B-2-A



MAXIMUM SLOPE 3%  
MINIMUM SLOPE 1%

$$Q = \frac{1.49}{N} A R^{2/3} S^{1/2}$$

N(LOOSE STONE OR GRASS LINED) = 0.035  
 A = AREA  
 R = AREA/WETTED PERIMETER  
 S = SLOPE

\* GRASS LINING: FESCUE, BERMUDA, RYE GRASS

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 8.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
1-15	0.5
15-50	1.0
50-100	1.5
100-180	2.0
180-270	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 10.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0-15	0.5
15-60	1.0
60-120	1.5
120-210	2.0
210-320	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 12.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0-20	0.5
20-70	1.0
70-150	1.5
150-250	2.0
250-383	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 15.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0-20	0.5
20-90	1.0
90-180	1.5
180-300	2.0
300-450	2.5



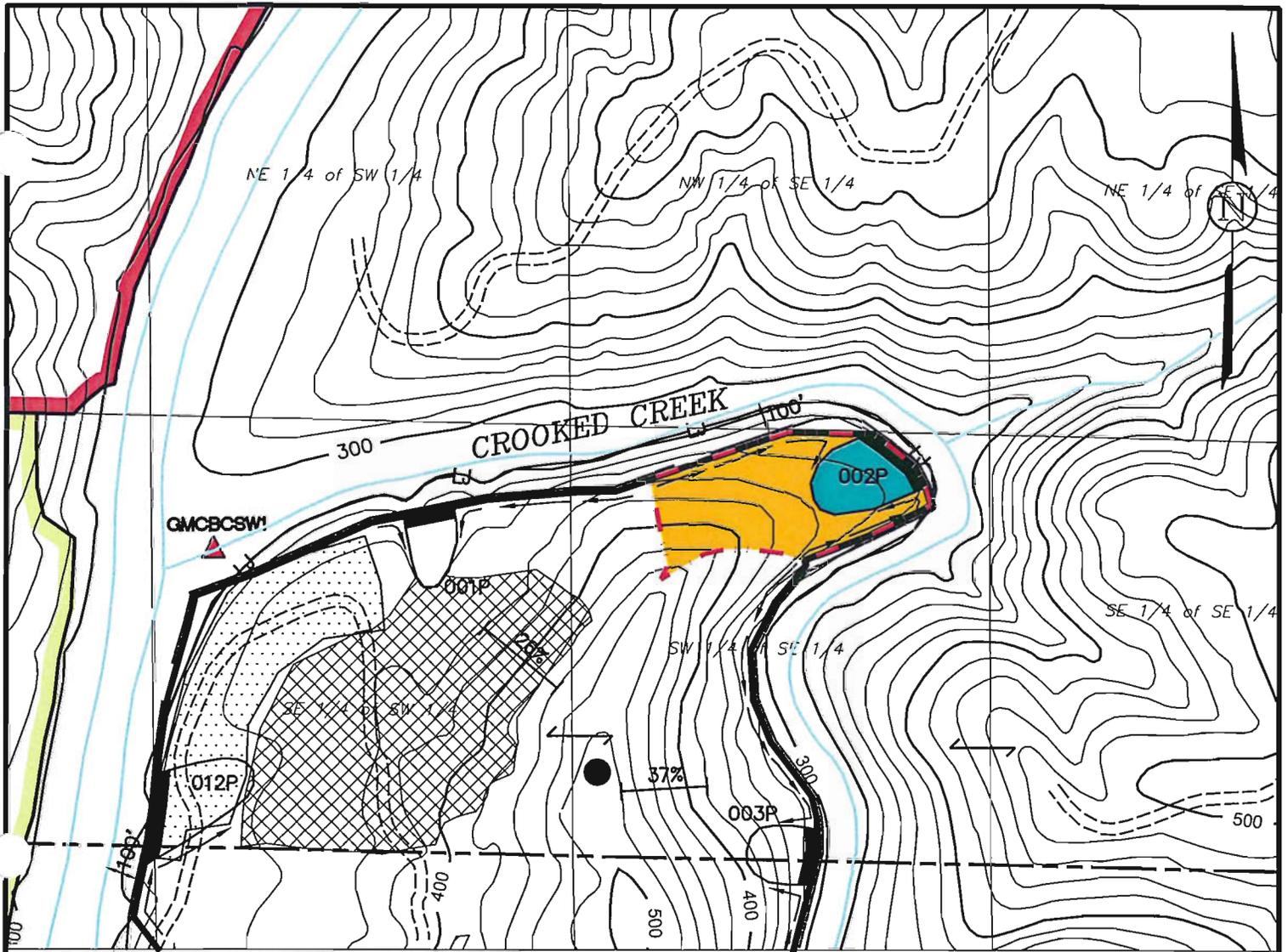
**TYPICAL PERMANENT DIVERSION  
FOR BASIN DISPOSAL**

DRAWN BY: J.W.T.	DATE: 04-16-2009
DWG. NAME: TYPICALS	
APPROVED BY: L.G.S.	SCALE: NONE

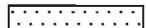
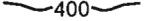
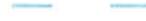
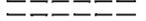
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## NOTES

- 1) The primary spillway of Basin 002P will consist of an 8 foot wide open channel lined with 4 inches of concrete reinforced with 6X6-W2.9XW2.9 concrete reinforcement wire. The channel lining will extend back to the existing drainage course. A 10' X 10' X 4" concrete splash pad reinforced with 6X6-W2.9XW2.9 welded wire fabric will be located at the exit point of the tail section of the channel.
- 2) Basin 002P is to be totally incised and given the existing/natural ground configuration the dam will be primarily excavated into virgin ground, except for the backslope which will have to be built up to reach a required slope of 2.5H:1V. Since there will be no significant fill, stability analysis has not been performed. (See Basin 002P Dam Details sheet in these Detailed Design Plans)
- 3) The normal pool area of Basin 002P will be mined through as mining progresses with the exception of the embankment and spillway system. As mining within the normal pool area of Basin 002P is being performed all surface runoff will be pumped/drained into Basin 012P. Once mining has progressed beyond the pool area of the basin and spoil placed to bring the basin to approximate finished grade, the pool area will be constructed and it will be lined with 1.0 feet (minimum) of clay material with a permeability of no greater than  $1 \times 10^{-6}$  cm/sec, up to the primary spillway elevation to minimize infiltration and to provide a stable pool level with the clay placed in 6" lifts compacted to 95% of standard proctor. (See Basin 002P Dam Details sheet in these Detailed Design Plans)



**LEGEND**

-  Permit Boundary
-  Previously Surfaced Mined By Others
-  Temporary Spoil Placement Area
-  Occupied Dwelling
-  Unoccupied Dwelling
-  Surface Contour
-  Intermittent Stream
-  Perennial Stream
-  Diversion Ditch
-  County RI (Paved Unless Otherwise Designated)
-  Road (Private Unless Otherwise Shown)
-  Sediment Basin
-  Impounded Water
-  Slope Measurements
-  Haulroad
-  Ancillary Road
-  ASMC Permit No. P-3913
-  ASMC Permit No. P-3811
-  Drainage Divide

**LANDUSE & CURVE NUMBER INFORMATION**

-  Graded and Bare, Curve Number, 81
-  Sediment Basin, Curve Number 100



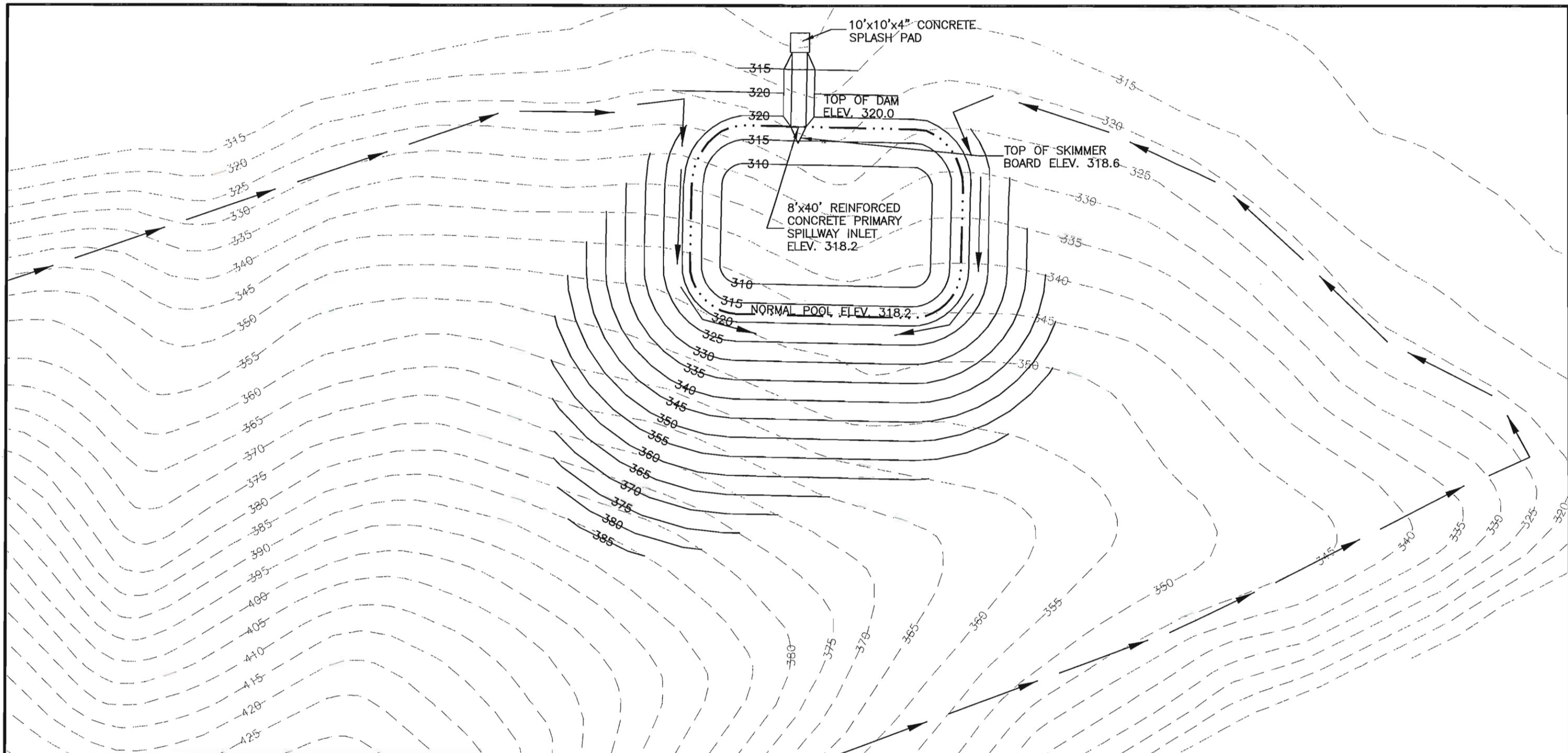
GLOBAL MET COAL CORP.  
 BLACK CREEK MINE  
 P-  
 BASIN 002P  
 ATTACHMENT III-B-2(a)

DRAWN BY: J.W.T.  
 DWG. NAME: BC002WSM

DATE: 11/06/2012

APPROVED BY: L.G.S.

SCALE: 1"=500'



- LEGEND**
- MAJOR INFLOW/DIVERSION DITCH
  - NORMAL POOL LEVEL ELEV. 318.2
  - 315- EXISTING CONTOURS
  - 310— PROPOSED FINISHED GRADE

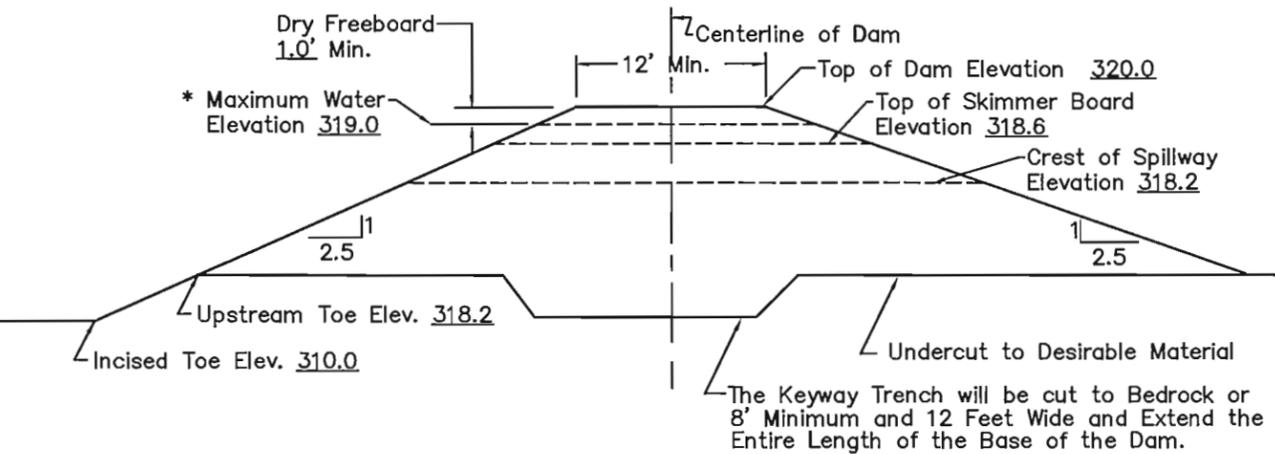
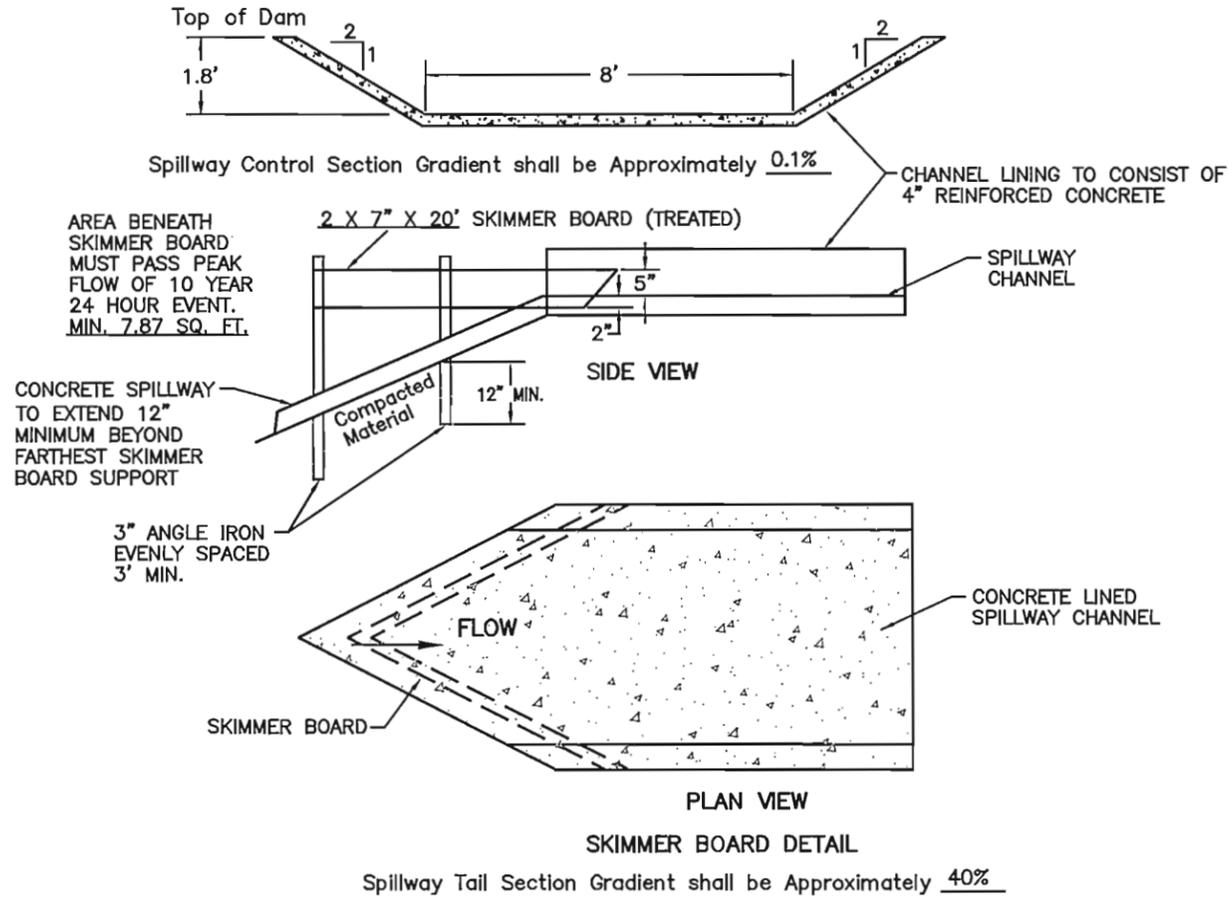
Due to the basin being constructed in spoil material, it will be lined with 1.0 feet (minimum) of clay material with a permeability of no greater than  $1 \times 10^{-6}$  cm/sec, up to the emergency spillway elevation to minimize infiltration and to provide a stable pool level with the clay placed in 6" lifts compacted to 95% of standard proctor.



**Global Met Coal Corp.  
Black Creek Mine  
P-  
Basin 002P  
Plan View Location Map**

DRAWN BY: J.W.T.	DATE: 11/05/2012
DWG. NAME: BCB002PV	
APPROVED BY: L.G.S.	SCALE: 1" = 50'

Skimmer Board Elev. 318.6  
 Spillway Elev. 318.2  
 Q Out 11.27 C.F.S.  
 V Out 1.65 FT/S

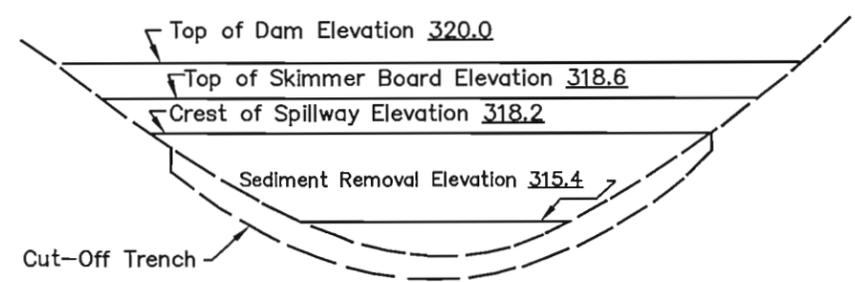
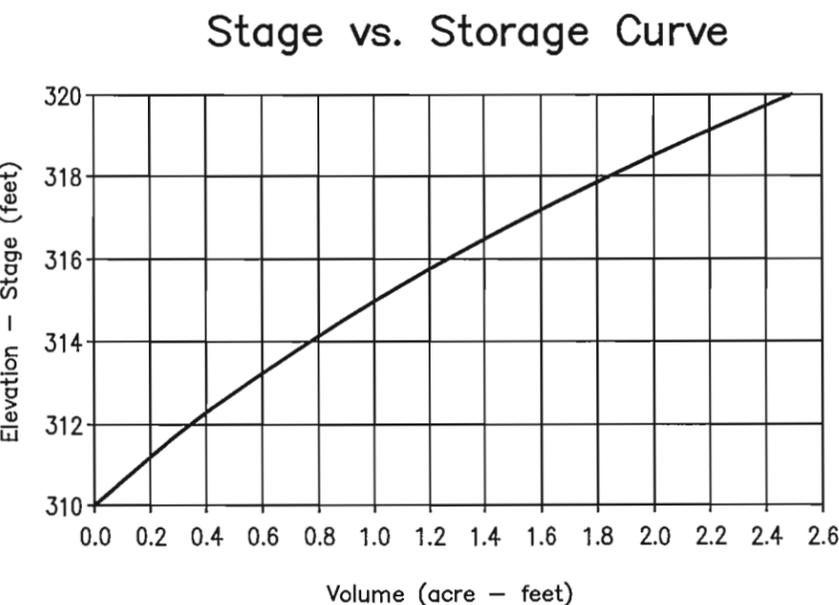


Typical Cross Section Along Spillway

\*Storm with largest peak flow Either 10 year - 24 hour event or 25 year - 6 hour event.

Notes:

- The sediment shall be removed from the basin when the accumulated sediment reaches the sediment storage volume.
- Outer slopes of embankment shall be grassed.
- Fill material shall be placed in 12" lifts and compacted to 95% of standard proctor.
- The surface beneath the embankment shall be stripped of undesirable material.
- Upon completion of mining, reclamation and maintenance of water quality standards the pond will be de-watered and reclaimed.
- See the attached pond construction criteria.
- See the attached drawings and specifications for diversions.
- Elevations are based on assumed datum.
- Channel lining within the control section of the spillway channel will extend to the maximum water elevation.



Typical Profile Looking Downstream

Storage Computation

Elevation (feet)	Area (acres)	Avg. Area (acres)	Interval (feet)	Storage (ac.-ft.)	Acc. Storage (ac.-ft.)
310	0.158	1.274	5	1.007	0.000
315	0.248	1.492	5	1.487	1.007
320	0.350				2.494

Key Basin Parameters

Drainage Area	5.7 Acres
Disturbed Area	5.2 Acres
Sediment Storage	1.1 Ac.-Ft.
Detention Storage	0.8 Ac.-Ft.
Normal Pool Capacity	1.9 Ac.-Ft.
Total Basin Capacity	2.2 Ac.-Ft.
Peak Inflow	15.7 C.F.S.
Peak Outflow	13.0 C.F.S.

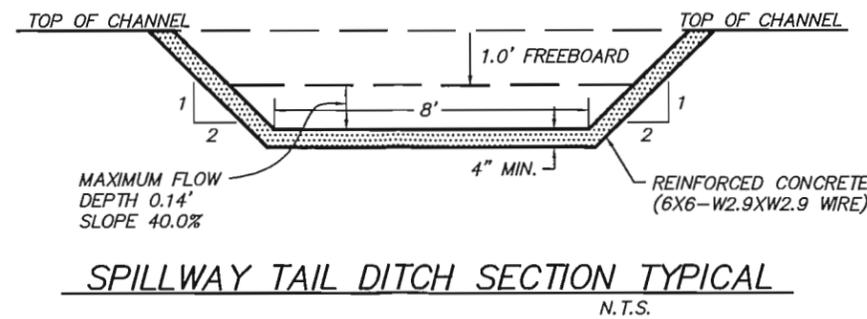
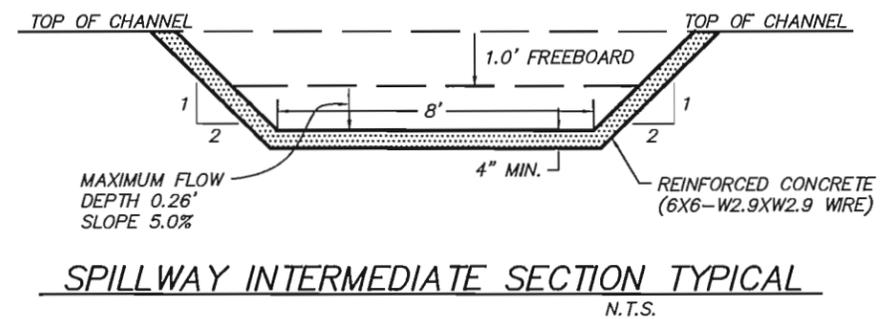
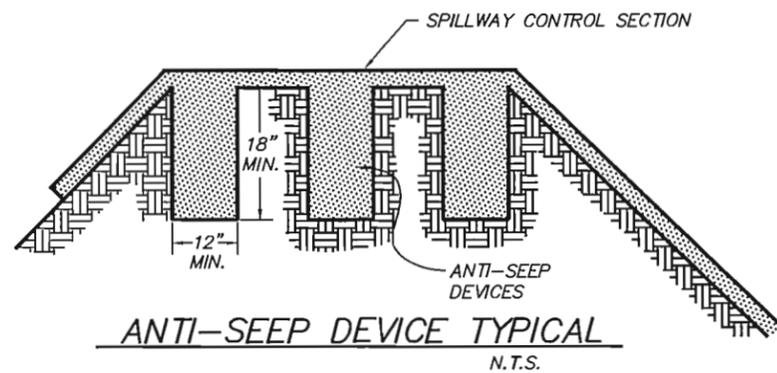
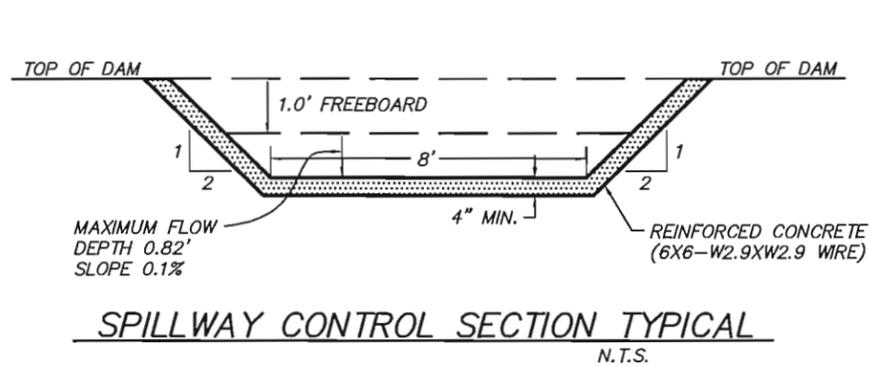
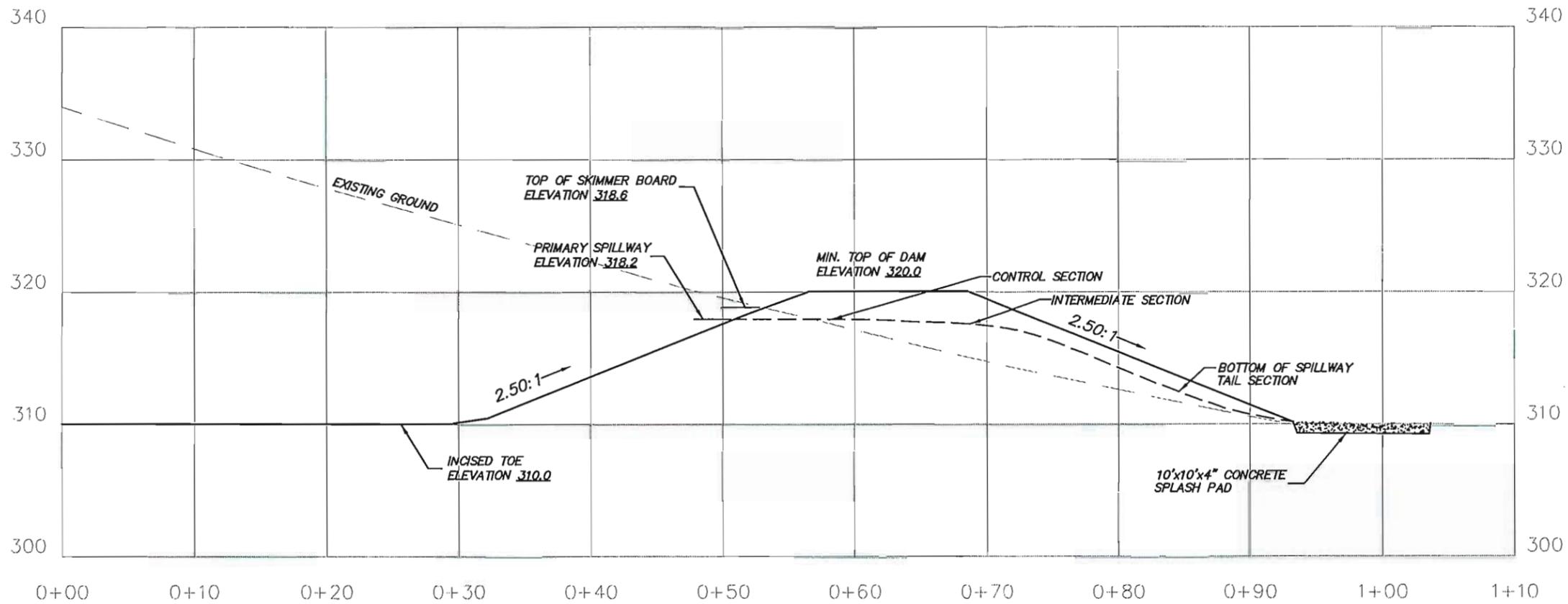


*Leslie G. Stephens* 11/30/2012  
 Leslie G. Stephens, P.E., P.L.S. Date  
 AL Registration. #14117-E



GLOBAL MET COAL CORP.  
 BLACK CREEK MINE  
 P-  
 BASIN 002P DESIGN DETAILS

DRAWN BY: J.W.T.	DATE: 11/06/2012
DWG. NAME: BCB002DT	
APPROVED BY: L.G.S.	SCALE: NONE



GLOBAL MET COAL CORP.  
BLACK CREEK MINE  
P-  
BASIN 002P  
DAM DETAILS

DRAWN BY: J.W.T.	DATE: 11/06/2012
DWG. NAME: BCB002DD	
APPROVED BY: L.G.S.	SCALE: 1"=10'

# P- Basin 002P Spillway Control Section

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)
8.00	2.0:1	2.0:1	0.1	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.98 cfs	
Depth:	0.82 ft	1.82 ft
Top Width:	11.27 ft	15.27 ft
Velocity:	1.65 fps	
X-Section Area:	7.87 sq ft	
Hydraulic Radius:	0.675 ft	
Froude Number:	0.35	

# **P- Basin 002P Spillway Intermediate Section**

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)
8.00	2.0:1	2.0:1	5.0	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.98 cfs	
Depth:	0.26 ft	1.26 ft
Top Width:	9.04 ft	13.04 ft
Velocity:	5.87 fps	
X-Section Area:	2.21 sq ft	
Hydraulic Radius:	0.241 ft	
Froude Number:	2.09	

## P- Basin 002P Spillway Tail Ditch Section

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)
8.00	2.0:1	2.0:1	40.0	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.98 cfs	
Depth:	0.14 ft	1.14 ft
Top Width:	8.56 ft	12.56 ft
Velocity:	11.21 fps	
X-Section Area:	1.15 sq ft	
Hydraulic Radius:	0.134 ft	
Froude Number:	5.38	

**Global Met Coal Corp.**

**Black Creek Mine**

**P-**

**Basin 002P**

***6.0 Inch, 10 Year-24 Hour***

***DRN 58***

JWT

PERC Engineering Co., Inc.  
PO BOX 1712  
Jasper, AL 35503

Phone: 205-384-5553  
Email: John.Taylor@percengineering.com

***General Information***

***Storm Information:***

Storm Type:	DRN58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	6.000 inches

***Particle Size Distribution:***

Size (mm)	Topsoil	Spoil
3.0000	100.000%	100.000%
2.0000	97.660%	99.130%
1.0000	90.940%	95.270%
0.5000	87.580%	89.790%
0.3000	86.240%	82.090%
0.2000	67.140%	69.340%
0.1000	48.030%	53.840%
0.0500	38.480%	38.220%
0.0300	34.660%	30.900%
0.0200	26.600%	26.680%
0.0100	18.700%	18.980%
0.0050	14.710%	12.790%
0.0030	12.600%	9.080%
0.0010	7.390%	4.950%
0.0001	0.000%	0.000%

***Structure Networking:***

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 002P

#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	5.700	5.700	7.54	1.93	605.3	358,271	228.25	131.70
Out			7.31	1.93	71.9	48,277	0.02	0.01

***Particle Size Distribution(s) at Each Structure***

***Structure #1:***

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	99.130%	100.000%
1.0000	95.270%	100.000%
0.5000	89.790%	100.000%
0.3000	82.090%	100.000%
0.2000	69.340%	100.000%
0.1000	53.840%	100.000%
0.0500	38.220%	100.000%
0.0300	30.900%	100.000%
0.0200	26.680%	100.000%
0.0100	18.980%	100.000%
0.0050	12.790%	100.000%
0.0030	9.080%	76.488%
0.0010	4.950%	41.698%
0.0001	0.000%	0.000%

### Structure Detail:

Structure #1 (Pond)

Basin 002P

Pond Inputs:

Initial Pool Elev:	318.20 ft
Initial Pool:	0.80 ac-ft
*Sediment Storage:	1.10 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)
318.20	12.00	2.00:1	2.00:1	8.00

Pond Results:

Peak Elevation:	318.58 ft
H'graph Detention Time:	0.20 hrs
Pond Model:	CSTRS
Dewater Time:	0.52 days
Trap Efficiency:	88.13 %

*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)
315.37	0.255	0.000	0.000	Top of Sed. Storage
315.50	0.257	0.033	0.000	
316.00	0.267	0.165	0.000	
316.50	0.277	0.300	0.000	
317.00	0.287	0.441	0.000	
317.50	0.297	0.587	0.000	
317.90	0.305	0.708	0.000	
318.00	0.307	0.738	0.000	
318.10	0.309	0.769	0.000	
318.20	0.311	0.800	0.000	Spillway #1
318.50	0.318	0.894	5.767	12.30
318.58	0.319	0.920	7.313	0.10 Peak Stage

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
319.00	0.328	1.056	15.379	
319.50	0.339	1.223	37.806	
320.00	0.350	1.395	69.383	

### Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
315.37	0.000	0.000
315.50	0.000	0.000
316.00	0.000	0.000
316.50	0.000	0.000
317.00	0.000	0.000
317.50	0.000	0.000
317.90	0.000	0.000
318.00	0.000	0.000
318.10	0.000	0.000
318.20	0.000	0.000
318.50	5.767	5.767
319.00	15.379	15.379
319.50	37.806	37.806
320.00	69.383	69.383

***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	5.200	0.038	0.000	0.000	81.000	F	6.75	1.681
	2	0.500	0.001	0.000	0.000	100.000	F	0.79	0.250
	<b>Σ</b>	<b>5.700</b>						<b>7.54</b>	<b>1.930</b>

***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	0.240	200.00	28.20	0.9000	1.0000	2	605.3	393,424	250.65	149.37
	2	0.001	100.00	0.01	0.0010	1.0000	2	0.0	0	0.00	0.00
	<b>Σ</b>							<b>605.3</b>	<b>358,271</b>	<b>228.25</b>	<b>131.70</b>

***Subwatershed Time of Concentration Details:***

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	34.50	69.00	200.00	5.870	0.009
		8. Large gullies, diversions, and low flowing streams	8.81	84.00	953.00	8.900	0.029
<b>#1</b>	<b>1</b>	<b>Time of Concentration:</b>					<b>0.038</b>

**Global Met Coal Corp.**

**Black Creek Mine**

**P-**

**Basin 002P**

***4.8 Inch, 25 Year-6 Hour***

***SCS 6 Hour***

JWT

PERC Engineering Co., Inc.  
PO BOX 1712  
Jasper, AL 35503

Phone: 205-384-5553  
Email: John.Taylor@percengineering.com

## General Information

### Storm Information:

Storm Type:	Rainfall Event
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Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1680
1.00	0.3840
1.50	0.6480
2.00	1.1040
2.50	2.8800
3.00	3.3600
3.50	3.7440
4.00	4.0080
4.50	4.2480
5.00	4.4400
5.50	4.6320
6.00	4.8000

Peak 30-minute Intensity: 3.552 in/hr

### Particle Size Distribution:

Size (mm)	Topsoil	Spoil
3.0000	100.000%	100.000%
2.0000	97.660%	99.130%
1.0000	90.940%	95.270%
0.5000	87.580%	89.790%
0.3000	86.240%	82.090%
0.2000	67.140%	69.340%
0.1000	48.030%	53.840%
0.0500	38.480%	38.220%
0.0300	34.660%	30.900%
0.0200	26.600%	26.680%
0.0100	18.700%	18.980%
0.0050	14.710%	12.790%
0.0030	12.600%	9.080%

---

Size (mm)	Topsoil	Spoil
0.0010	7.390%	4.950%
0.0001	0.000%	0.000%

### ***Structure Networking:***

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 002P

#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	5.700	5.700	15.71	1.41	757.2	524,583	334.21	212.32
Out			12.98	1.41	97.3	67,654	0.04	0.03

***Particle Size Distribution(s) at Each Structure***

***Structure #1:***

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	99.130%	100.000%
1.0000	95.270%	100.000%
0.5000	89.790%	100.000%
0.3000	82.090%	100.000%
0.2000	69.340%	100.000%
0.1000	53.840%	100.000%
0.0500	38.220%	100.000%
0.0300	30.900%	100.000%
0.0200	26.680%	100.000%
0.0100	18.980%	100.000%
0.0050	12.790%	99.548%
0.0030	9.080%	70.672%
0.0010	4.950%	38.527%
0.0001	0.000%	0.000%

### Structure Detail:

Structure #1 (Pond)

Basin 002P

Pond Inputs:

Initial Pool Elev:	318.20 ft
Initial Pool:	0.80 ac-ft
*Sediment Storage:	1.10 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)
318.20	12.00	2.00:1	2.00:1	8.00

Pond Results:

Peak Elevation:	318.88 ft
H'graph Detention Time:	0.20 hrs
Pond Model:	CSTRS
Dewater Time:	0.19 days
Trap Efficiency:	87.15 %

*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)
315.37	0.255	0.000	0.000	Top of Sed. Storage
315.50	0.257	0.033	0.000	
316.00	0.267	0.165	0.000	
316.50	0.277	0.300	0.000	
317.00	0.287	0.441	0.000	
317.50	0.297	0.587	0.000	
317.90	0.305	0.708	0.000	
318.00	0.307	0.738	0.000	
318.20	0.311	0.800	0.000	Spillway #1
318.50	0.318	0.894	5.767	4.20
318.88	0.326	1.016	12.982	0.40 Peak Stage
319.00	0.328	1.056	15.379	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
319.50	0.339	1.223	37.806	
320.00	0.350	1.395	69.383	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
315.37	0.000	0.000
315.50	0.000	0.000
316.00	0.000	0.000
316.50	0.000	0.000
317.00	0.000	0.000
317.50	0.000	0.000
317.90	0.000	0.000
318.00	0.000	0.000
318.20	0.000	0.000
318.50	5.767	5.767
319.00	15.379	15.379
319.50	37.806	37.806
320.00	69.383	69.383

***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	5.200	0.038	0.000	0.000	81.000	F	13.92	1.211
	2	0.500	0.001	0.000	0.000	100.000	F	1.79	0.199
	<b>Σ</b>	<b>5.700</b>						<b>15.71</b>	<b>1.410</b>

***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	0.240	200.00	28.20	0.9000	1.0000	2	757.2	576,498	367.28	241.92
	2	0.001	100.00	0.01	0.0010	1.0000	2	0.0	0	0.00	0.00
	<b>Σ</b>							<b>757.2</b>	<b>524,583</b>	<b>334.21</b>	<b>212.32</b>

***Subwatershed Time of Concentration Details:***

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	34.50	69.00	200.00	5.870	0.009
		8. Large gullies, diversions, and low flowing streams	8.81	84.00	953.00	8.900	0.029
<b>#1</b>	<b>1</b>	<b>Time of Concentration:</b>					<b>0.038</b>