

**HYDROLOGY STUDY FOR
WARRIOR 282 LLC**

**WARRIOR MINE NO. 1
P-3953
JEFFERSON COUNTY, ALABAMA**

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

**DETAILED DESIGN PLANS
BASIN 008
ATTACHMENT III-B-2(a)**

DECEMBER 23, 2011



Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com

December 23, 2011

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

RE: Warrior 282 LLC
Warrior Mine No. 1
P-3953

Dear Michael:

I hereby certify the attached detailed design plans for Basin 008 for the above referenced location 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 cursive script 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:

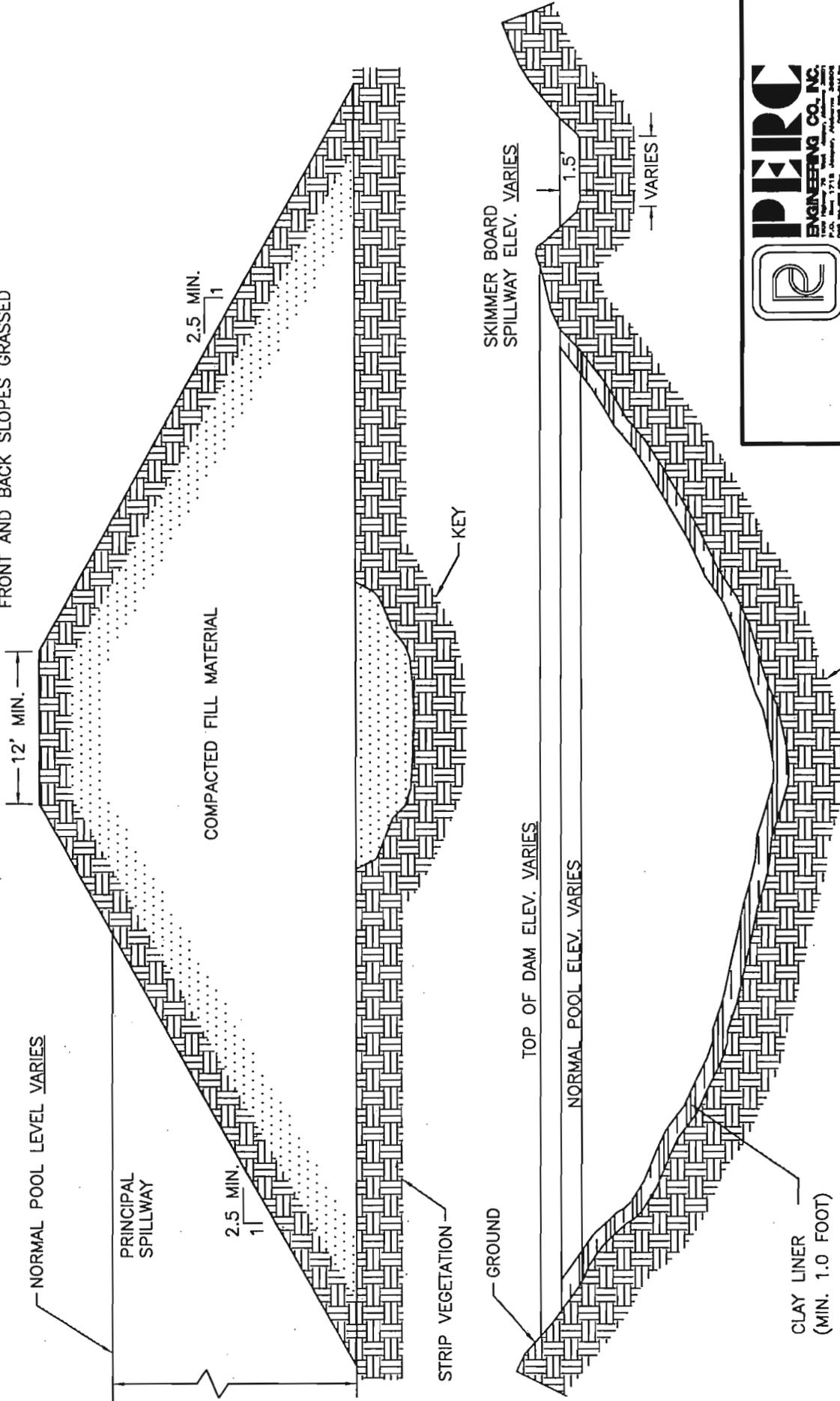
1. The top of the dam shall be no less than 12 feet wide.
2. See design sheet for maximum and minimum embankment slopes.
3. The foundation and abutments for the impounding structure shall be designed to be stable under all conditions of construction and operation of the impoundments, with a minimum static 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 or 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[1(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.

FRONT AND BACK SLOPES GRASSED



TYPICAL DAM DETAIL
NO SCALE

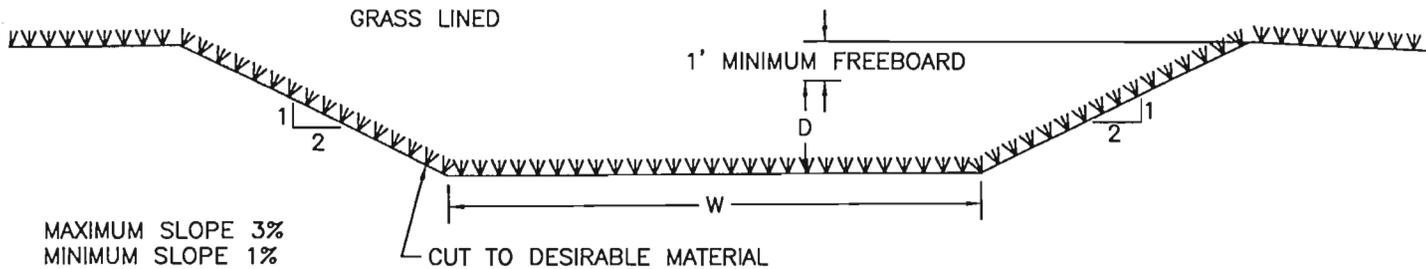
Lined with 1.0 feet (minimum) of clay material with a permeability no greater than 1×10^{-6} cm/sec up to the emergency spillway elevation to minimize infiltration and to provide a stable pool level with the clay placed in 6" lifts compacted to 95% of standard proctor.



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



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

$N(\text{LOOSE STONE OR GRASS LINED}) = 0.035$
 $A = \text{AREA}$
 $R = \text{AREA/WETTED PERIMETER}$
 $S = \text{SLOPE}$

* 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

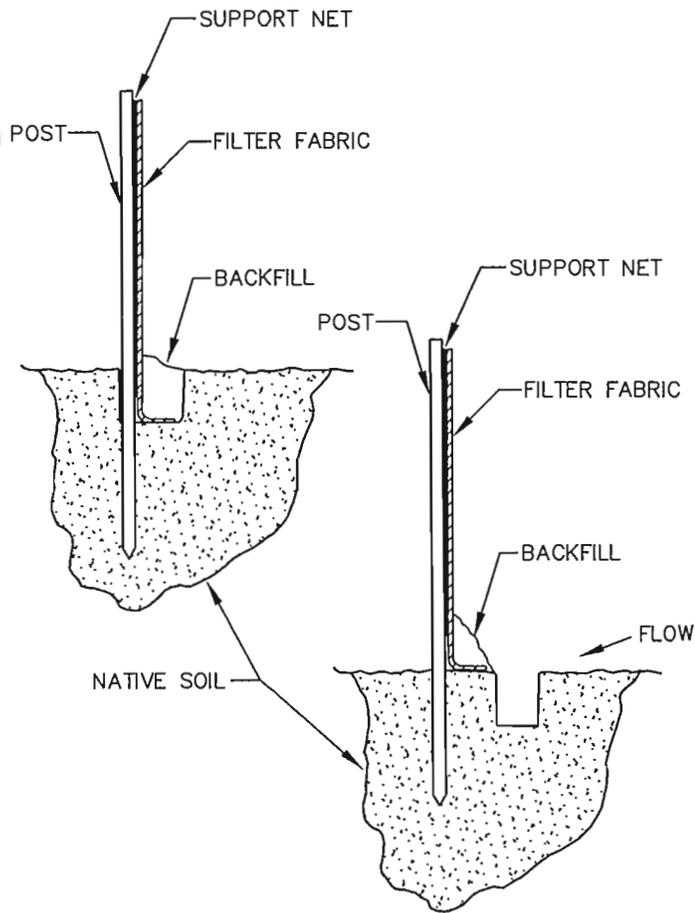
NOTES

- 1) The primary spillway of Basin 008 will consist of a 12 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 15' X 15' 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 008 is to be totally incised from elevation 408.0 down to elevation 395.0. The pool area is to be incised at 2.5H:1V at the existing ground toe elevation of the front slope of the embankment; the remaining pool area is to be incised at a 2H:1V. The material excavated from the pool area will be placed as shown on the plan view drawing and graded to drain into the pool area except for the outer slope.
- 3) Due to the Basin 008 being constructed in spoil material, it will be lined with 1.0 feet (minimum) of clay material with a permeability of no greater than 1×10^{-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

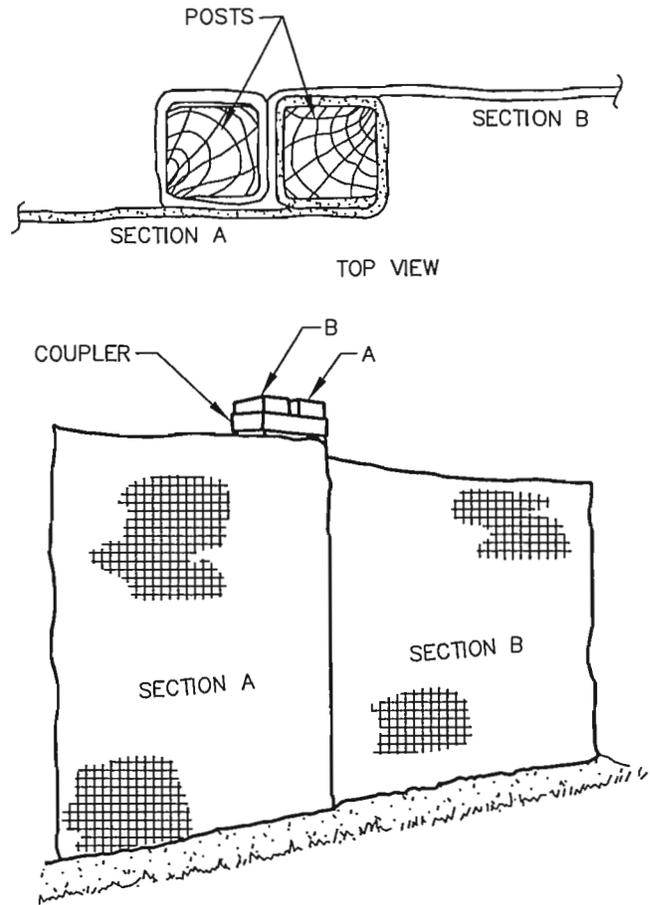
Applicant: Warrior 282 LLC
Mine Name: Warrior Mine No. 1
Permit Number: P-3953

Silt Fencing Design and Construction Specifications

1. Fence height - 3' including 6" trench flap.
2. Silt fencing will be secured into place by prefabricated wood or metal posts spaced as necessary.
3. The silt fence will have an equivalent opening size of 30-50 mesh by U.S. Standard Sieve.
4. The maximum particle size passing the silt fence will be .59 millimeter.
5. The flow rate of the silt fence will be 20 gallon per minute per square foot.
6. The silt fence will have a burst strength of 210 pound per square inch.
7. The grab tensile elongation of the silt fence will be 15%.
8. The grab tensile strength of the silt fence will be 100 pounds.
9. The silt fence will be installed by initially excavating a trench approximately 6" wide by 6" deep along the contour for the entire length of the silt fence. Upon completion of the trench, the silt fence will be stretched along the trench with the prefabricated wood or metal posts being driven into the ground approximately 1.5' deep against the upper wall of the trench. The 6" trench flap will then be placed into the trench and covered with compacted fill material.
10. Inspections of the silt fence will be made bimonthly and repair or replacement will be made promptly as required.
11. Accumulated sediment will be removed from the silt fencing when necessary to ensure the proper function of the silt fencing. Accumulated sediment will be disposed of within Coarse Refuse Area No. 1.
12. Prior to the removal of the silt fence, any silt or sediment retained by the silt fence will be seeded with a mixture of both annual and perennial grasses, fertilized, and mulched to establish a permanent and diverse vegetative cover.



TOE-IN METHOD



JOINING SECTIONS OF SILT FENCE

CONSTRUCTION SPECIFICATIONS

- 1.) SILT FENCING SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY FITTING THE ADJACENT FENCE SECTION.
- 2.) EACH SECTION OF FENCING SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 6".
- 3.) FENCING SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS AT A SPACING NOT TO EXCEED 6'.
- 4.) INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.



PERC
 ENGINEERING CO., INC.
 1808 Highway 78 West Jasper, Alabama 35501
 P.O. Box 1712 Jasper, Alabama 35502
 (205) 281-5533 Office (205) 285-3114 Fax

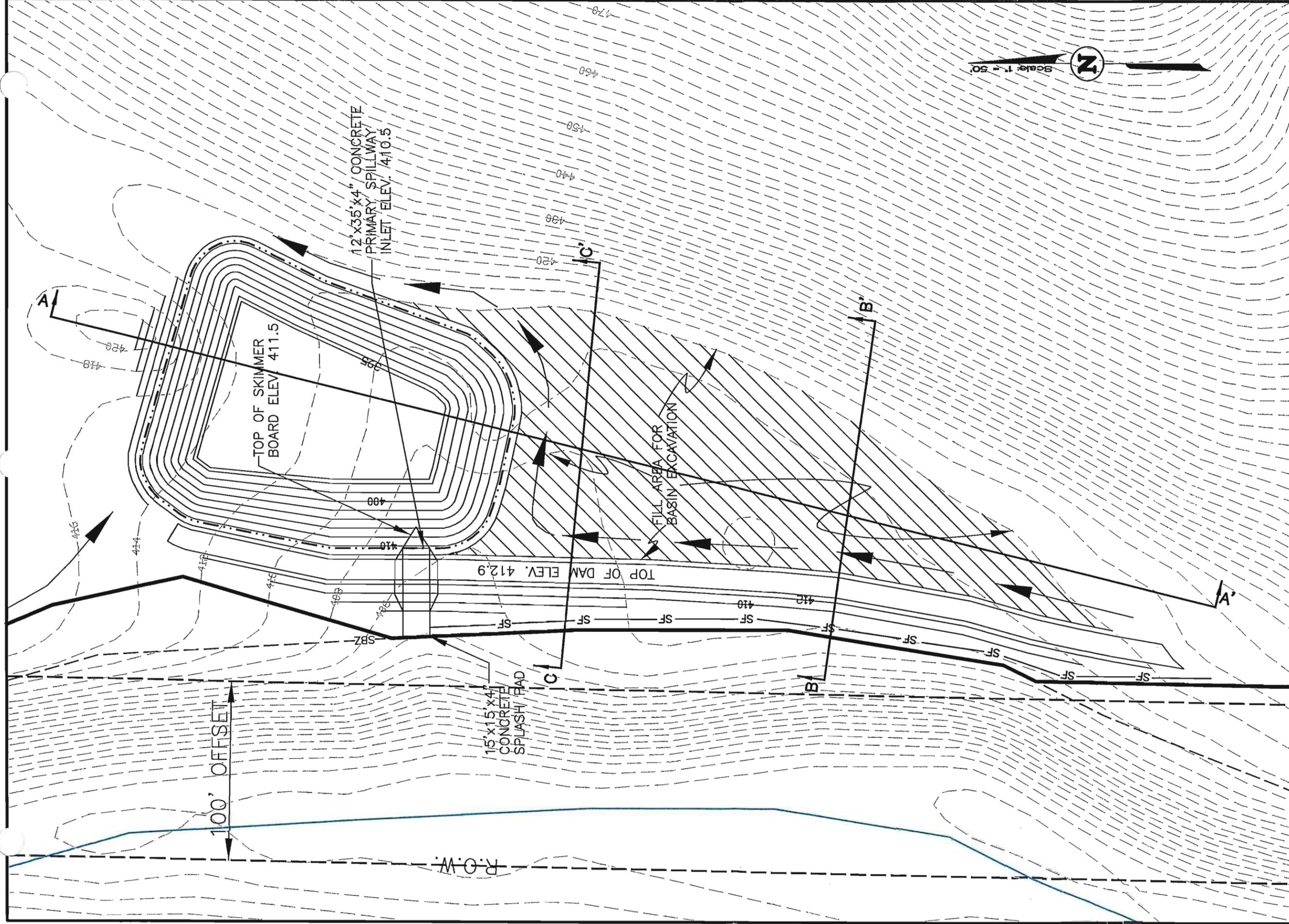
SILTFENCE TYPICAL

DRAWN BY: K.D.P.
 DWG. NAME: SILTFENC

DATE: 6-24-91

APPROVED BY: R.E.P.

SCALE: NONE



LEGEND

- > MAJOR INFLOW/DIVERSION DITCH
- - - - - NORMAL POOL LEVEL ELEV. 410.5
- - - - - EXISTING CONTOURS
- - - - - PROPOSED FINISHED GRADE
- - - - - STREAM BUFFER ZONE 100' OFFSET
- - - - - I-65 R.O.W. & 100' OFFSET
- - - - - SILT FENCING
- - - - - PERMIT BOUNDARY
- - - - - PERENNIAL STREAM

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 x 10⁻⁶ cm/sec, up to the emergency spillway elevation level to minimize infiltration and to provide a stable pool 95% of standard proctor.

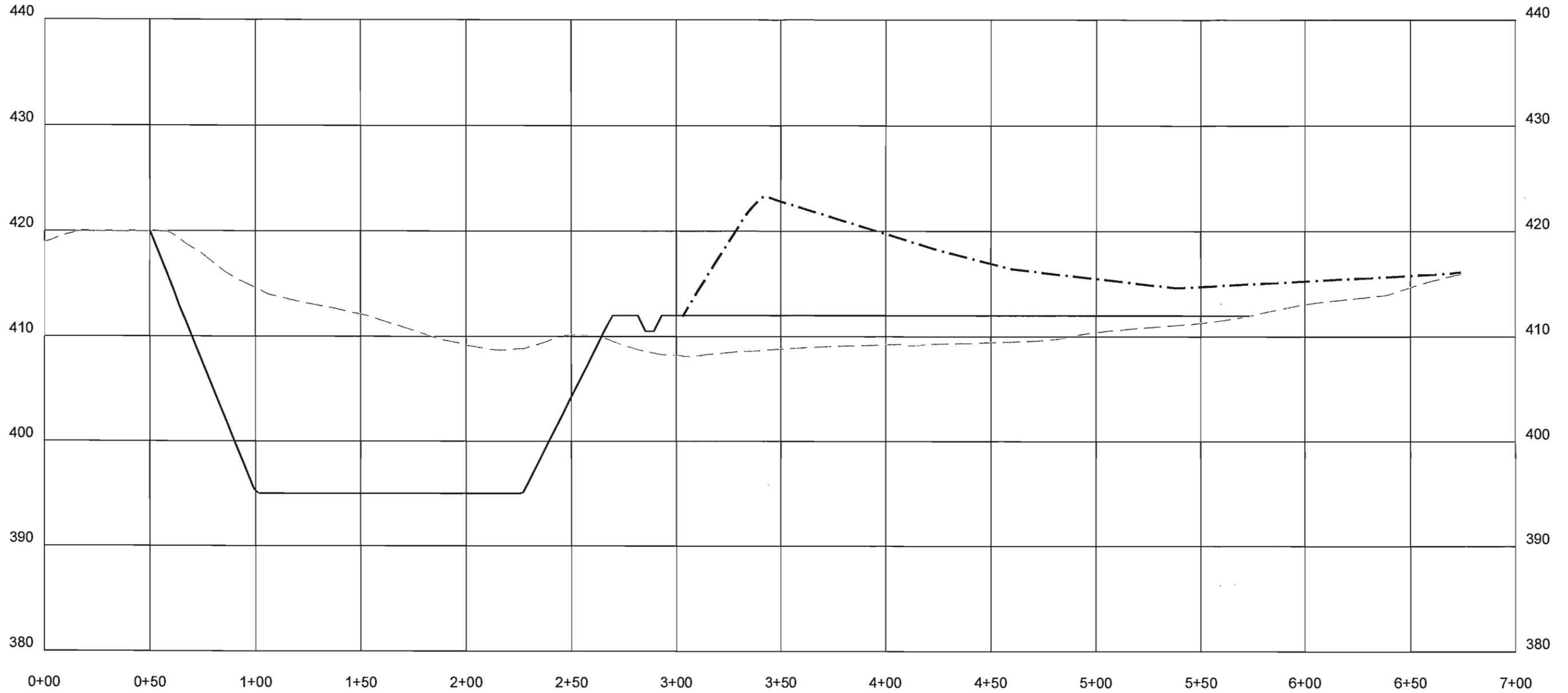


Warrior 282 LLC
Warrior Mine No. 1
P-3953
Basin 008
Plan View Drawing

DRAWN BY: J.W.T.	DATE: 12/13/2011
DWG. NAME: W282B008PV	APPROVED BY: L.G.S.
SCALE: 1" = 50'	

A

A'



LEGEND

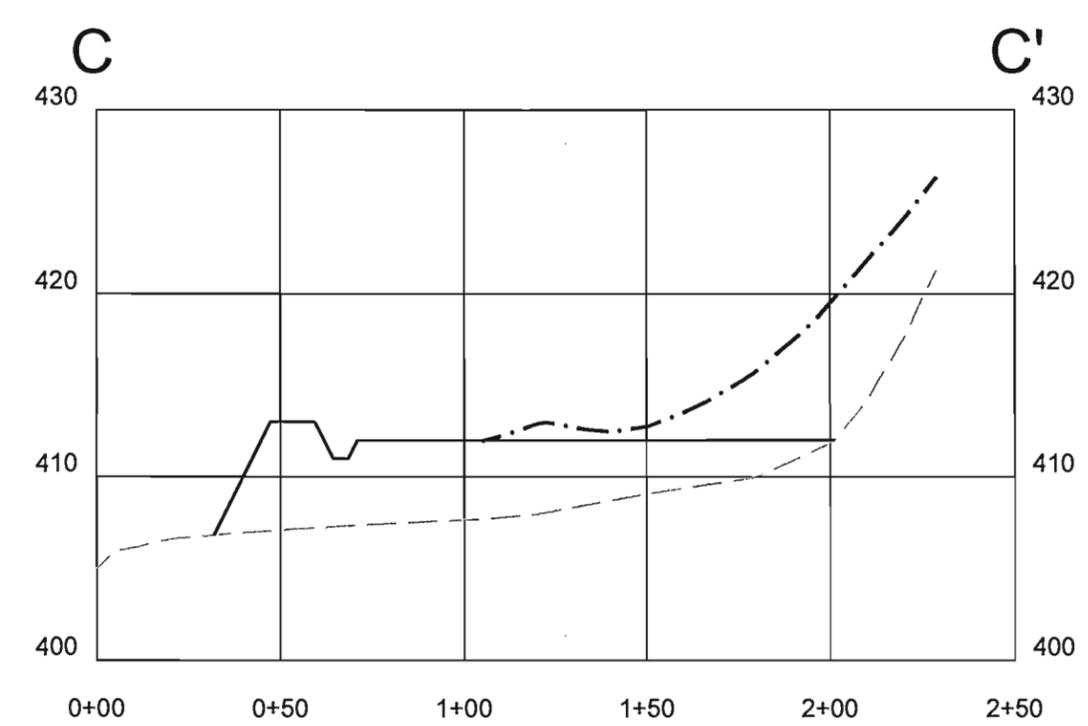
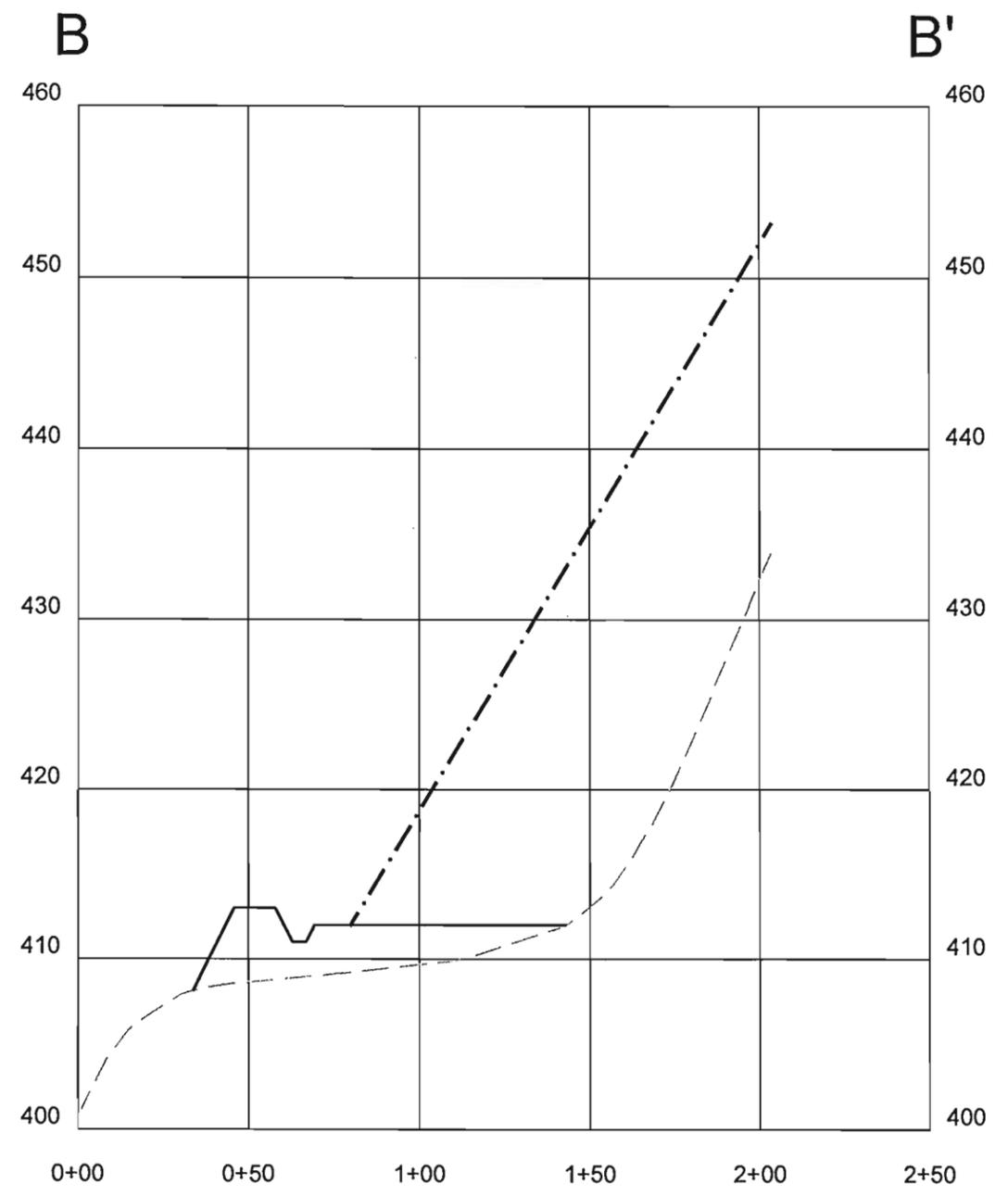
- EXISTING GRADE
- PROPOSED FINISHED GRADE (PRE-SPOIL)
- · - · - PROPOSED FINISHED GRADE (POST-SPOIL)

HORIZONTAL SCALE: 1"=50'
 VERTICAL SCALE: 1"=10'



Warrior 282 LLC
Warrior Mine No. 1
P-3953
Basin 008
Cross-Section A-A'

DRAWN BY: J.W.T.	DATE: 10/04/2012
DWG. NAME: Cross-Sections	
APPROVED BY: L.G.S.	SCALE: AS SHOWN



LEGEND

----- EXISTING GRADE

———— PROPOSED FINISHED GRADE (PRE-SPOIL)

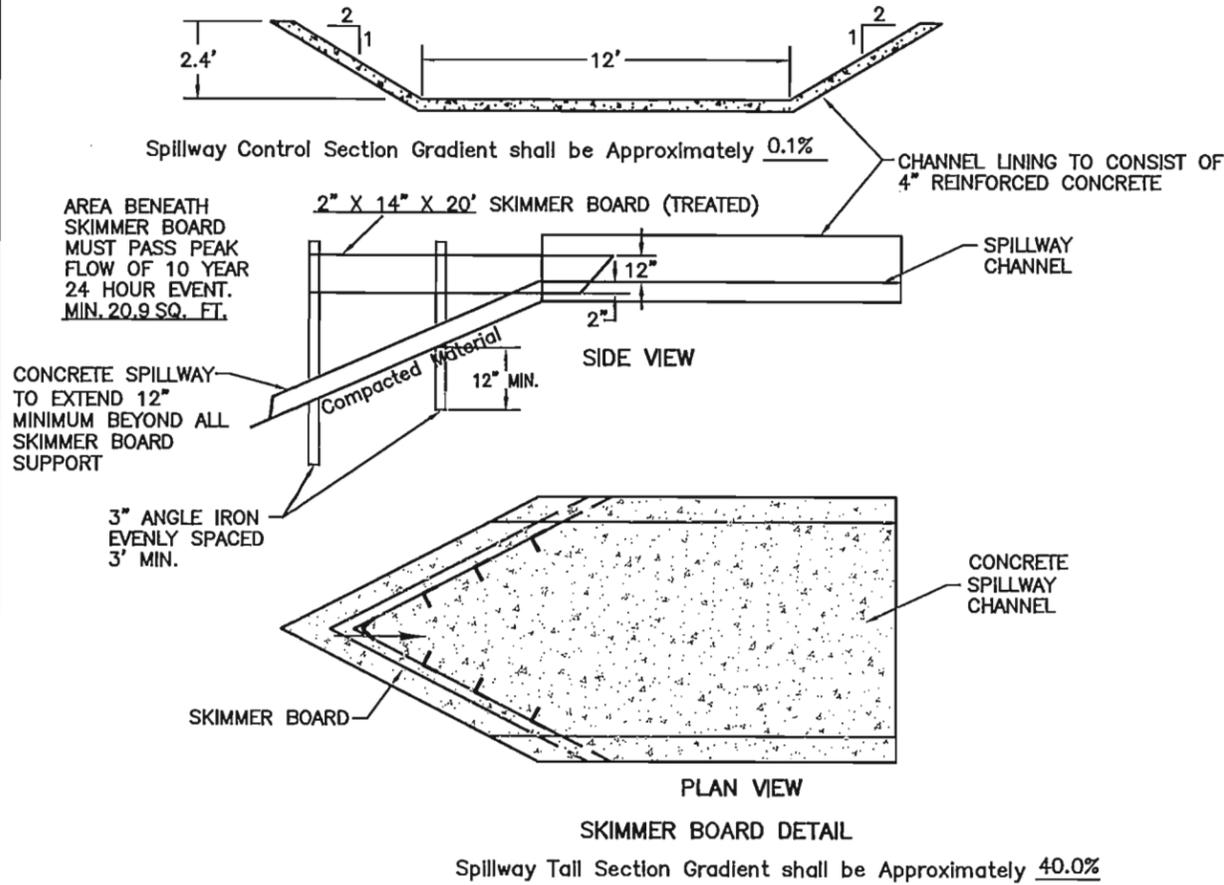
- · - · - · PROPOSED FINISHED GRADE (POST-SPOIL)

HORIZONTAL SCALE: 1"=50'

VERTICAL SCALE: 1"=10'

 <p>Warrior 282 LLC Warrior Mine No. 1 P-3953 Basin 008 Cross-Section B-B' & C-C'</p>	
DRAWN BY: J.W.T. DWG. NAME: Cross-Sections	DATE: 10/04/2012
APPROVED BY: L.G.S.	SCALE: AS SHOWN

Skimmer Board Elev. 411.5
 Spillway Elev. 410.5
 Q Out 48.82 C.F.S.
 V Out 2.34 FT/S



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.

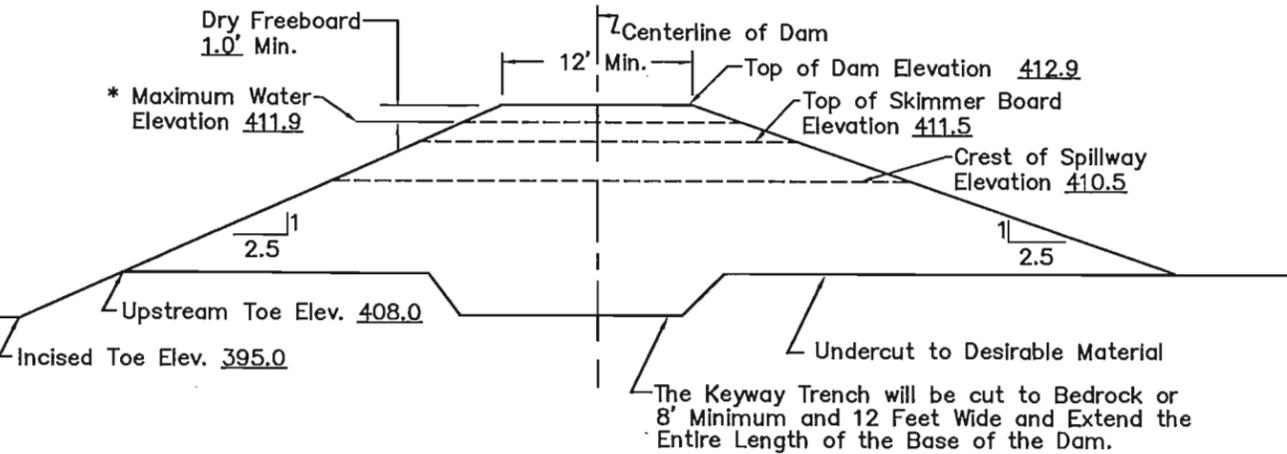
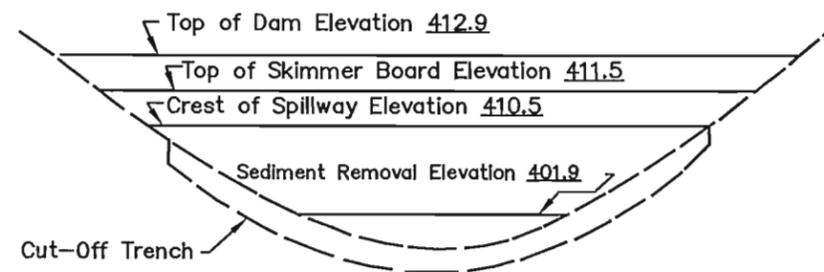
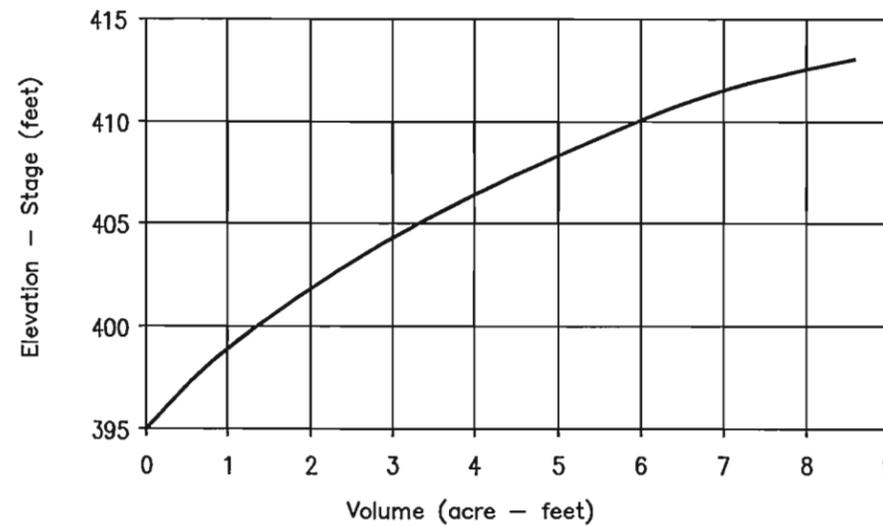
Storage Computation

Elevation (feet)	Area (acres)	Avg. Area (acres)	Interval (feet)	Storage (ac.-ft.)	Acc. Storage (ac.-ft.)
395	0.212				0.000
396	0.236	0.224	1	0.224	0.224
398	0.280	0.258	2	0.515	0.739
400	0.327	0.304	2	0.607	1.346
402	0.375	0.351	2	0.701	2.047
404	0.429	0.402	2	0.804	2.851
406	0.484	0.457	2	0.912	3.763
408	0.543	0.514	2	1.026	4.789
410	0.604	0.574	2	1.147	5.936
412	0.903	0.754	2	1.497	7.433
413	1.506	1.205	1	1.192	8.625

Key Basin Parameters

Drainage Area	21.2 Acres
Disturbed Area	20.2 Acres
Sediment Storage	2.0 Ac.-Ft.
Detention Storage	4.3 Ac.-Ft.
Normal Pool Capacity	6.3 Ac.-Ft.
Total Basin Capacity	7.4 Ac.-Ft.
Peak Inflow	57.7 C.F.S.
Peak Outflow	48.8 C.F.S.

Stage vs. Storage Curve



Typical Cross Section Along Spillway

Typical Profile Looking Downstream



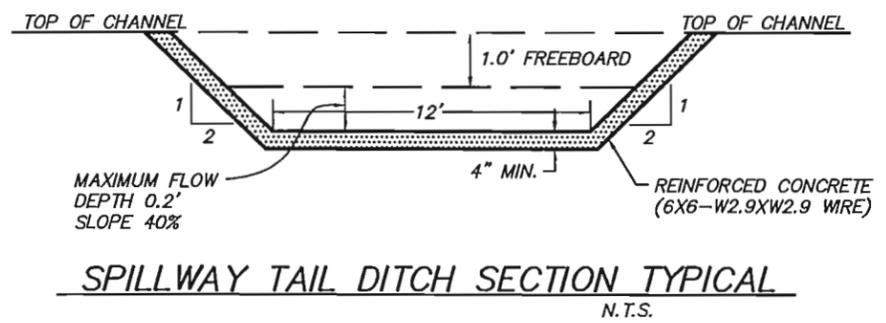
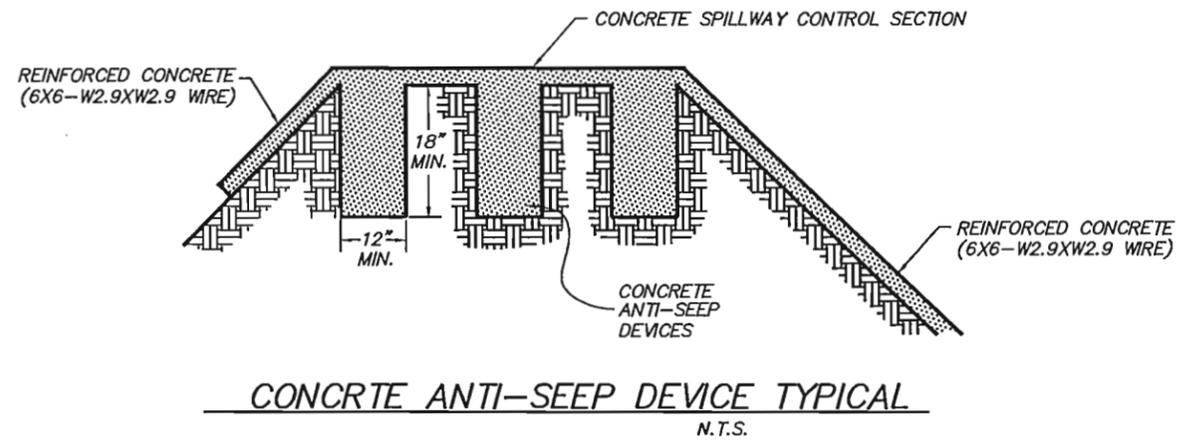
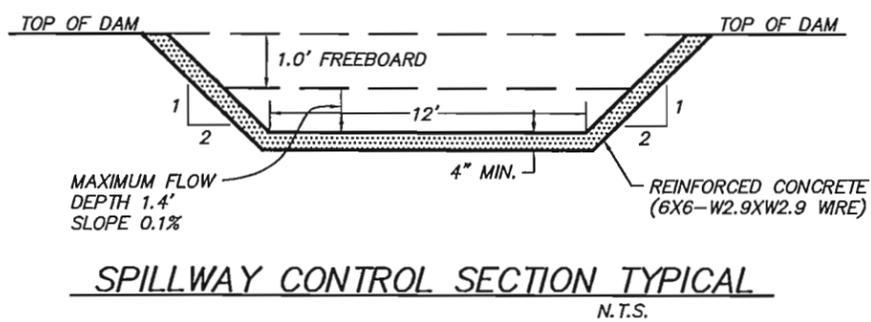
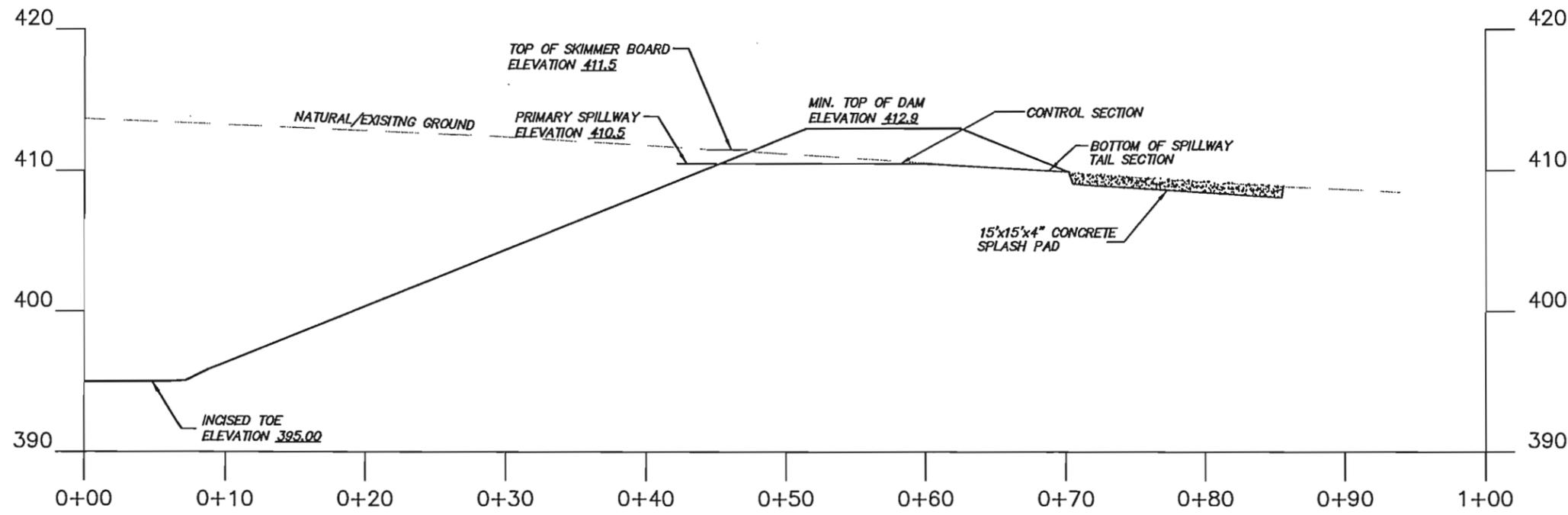
Leslie G. Stephens 10/5/2012
 Leslie G. Stephens, P.E., J.P.L.S. Date
 AL Registration. #14117-E



WARRIOR 282 LLC
 WARRIOR MINE NO. 1
 P-3953
 BASIN 008 DESIGN DETAILS

DRAWN BY: J.W.T.	DATE: 12/13/2011
DWG. NAME: W282B008DT	
APPROVED BY: L.G.S.	SCALE: NONE

0281.W282B008DT.dwg 09/19/12 15:50
 P:\Eng\05\Warrior\Warrior



WARRIOR 282 LLC
WARRIOR MINE NO. 1
P-3953
BASIN 008
DAM DETAILS

DRAWN BY: J.W.T.	DATE: 12/13/2011
DWG. NAME: W282B008DD	
APPROVED BY: L.G.S.	SCALE: AS NOTED

V:\Eng\05\Warror 282\1008\Warror 282\1008\W282B008DD.dwg 10/04/12 14:45

P-3953 Basin 008 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)
12.00	2.0:1	2.0:1	0.1	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	48.82 cfs	
Depth:	1.41 ft	2.41 ft
Top Width:	17.64 ft	21.64 ft
Velocity:	2.34 fps	
X-Section Area:	20.88 sq ft	
Hydraulic Radius:	1.141 ft	
Froude Number:	0.38	

P-3953 Basin 008 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)
12.00	2.0:1	2.0:1	40.0	0.0220	1.00		

	w/o Freeboard	w/ Freeboard
Design Discharge:	48.82 cfs	
Depth:	0.24 ft	1.24 ft
Top Width:	12.97 ft	16.97 ft
Velocity:	16.14 fps	
X-Section Area:	3.03 sq ft	
Hydraulic Radius:	0.231 ft	
Froude Number:	5.89	

Warrior 282 LLC
Warrior Mine No. 1
P-3953
Basin 008

5.9 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:	5.900 inches

Particle Size Distribution:

Size (mm)	Spoil	Topsoil
3.0000	100.000%	100.000%
2.0000	89.800%	96.700%
1.0000	78.700%	85.500%
0.5000	70.300%	74.700%
0.3000	65.000%	69.000%
0.2000	56.700%	63.800%
0.1000	46.200%	56.800%
0.0500	35.200%	51.900%
0.0300	28.400%	49.500%
0.0200	21.200%	43.300%
0.0100	13.000%	20.000%
0.0050	6.500%	13.000%
0.0030	4.900%	6.000%
0.0010	1.600%	2.000%
0.0001	0.200%	0.200%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 008

#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)	24VV (ml/l)
#1 In	21.200	21.200	27.21	6.87	2,165.4	356,154	243.93	142.43
Out			26.48	6.87	175.2	32,200	0.49	0.36

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	89.800%	100.000%
1.0000	78.700%	100.000%
0.5000	70.300%	100.000%
0.3000	65.000%	100.000%
0.2000	56.700%	100.000%
0.1000	46.200%	100.000%
0.0500	35.200%	100.000%
0.0300	28.400%	100.000%
0.0200	21.200%	100.000%
0.0100	13.000%	100.000%
0.0050	6.500%	80.328%
0.0030	4.900%	60.555%
0.0010	1.600%	19.773%
0.0001	0.200%	2.472%

Structure Detail:

Structure #1 (Pond)

Basin 008

Pond Inputs:

Initial Pool Elev:	410.50 ft
Initial Pool:	4.26 ac-ft
*Sediment Storage:	2.00 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)
410.50	12.00	2.00:1	2.00:1	10.00

Pond Results:

Peak Elevation:	411.47 ft
H'graph Detention Time:	1.05 hrs
Pond Model:	CSTRS
Dewater Time:	1.01 days
Trap Efficiency:	91.91 %

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)
401.87	0.372	0.000	0.000	Top of Sed. Storage
402.00	0.375	0.048	0.000	
402.50	0.388	0.238	0.000	
403.00	0.402	0.436	0.000	
403.50	0.415	0.640	0.000	
404.00	0.429	0.851	0.000	
404.50	0.442	1.069	0.000	
405.00	0.456	1.294	0.000	
405.50	0.470	1.525	0.000	
406.00	0.484	1.764	0.000	
406.50	0.498	2.009	0.000	
407.00	0.513	2.262	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
407.50	0.528	2.522	0.000	
408.00	0.543	2.790	0.000	
408.50	0.558	3.065	0.000	
409.00	0.573	3.348	0.000	
409.50	0.588	3.638	0.000	
410.00	0.604	3.936	0.000	
410.50	0.673	4.256	0.000	Spillway #1
411.00	0.746	4.610	2.032	12.70
411.47	0.818	4.980	26.475	11.45 Peak Stage
411.50	0.823	5.002	27.918	
412.00	0.903	5.433	59.514	
412.50	1.185	5.954	100.201	
413.00	1.506	6.625	150.727	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
401.87	0.000	0.000
402.00	0.000	0.000
402.50	0.000	0.000
403.00	0.000	0.000
403.50	0.000	0.000
404.00	0.000	0.000
404.50	0.000	0.000
405.00	0.000	0.000
405.50	0.000	0.000
406.00	0.000	0.000
406.50	0.000	0.000
407.00	0.000	0.000
407.50	0.000	0.000
408.00	0.000	0.000
408.50	0.000	0.000
409.00	0.000	0.000
409.50	0.000	0.000
410.00	0.000	0.000
410.50	0.000	0.000
411.00	2.032	2.032
411.50	27.918	27.918

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
412.00	59.514	59.514
412.50	100.201	100.201
413.00	150.727	150.727

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	20.200	0.046	0.000	0.000	81.000	F	25.66	6.375
	2	1.000	0.001	0.000	0.000	100.000	F	1.55	0.491
	Σ	21.200						27.21	6.867

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	23.00	0.9000	1.0000	1	2,165.4	374,395	256.42	152.40
	2	0.001	100.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							2,165.4	356,154	243.93	142.43

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	22.50	45.00	200.00	4.740	0.011
		8. Large gullies, diversions, and low flowing streams	10.25	125.00	1,220.00	9.600	0.035
#1	1	Time of Concentration:					0.046

Warrior 282 LLC
Warrior Mine No. 1
P-3953
Basin 008

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)	Spoil	Topsoil
3.0000	100.000%	100.000%
2.0000	89.800%	96.700%
1.0000	78.700%	85.500%
0.5000	70.300%	74.700%
0.3000	65.000%	69.000%
0.2000	56.700%	63.800%
0.1000	46.200%	56.800%
0.0500	35.200%	51.900%
0.0300	28.400%	49.500%
0.0200	21.200%	43.300%
0.0100	13.000%	20.000%
0.0050	6.500%	13.000%
0.0030	4.900%	6.000%

Size (mm)	Spoil	Topsoil
0.0010	1.600%	2.000%
0.0001	0.200%	0.200%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 008

#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	21.200	21.200	57.65	5.10	2,778.3	524,511	359.23	231.25
Out			48.82	5.10	262.4	48,665	1.28	1.13

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	89.800%	100.000%
1.0000	78.700%	100.000%
0.5000	70.300%	100.000%
0.3000	65.000%	100.000%
0.2000	56.700%	100.000%
0.1000	46.200%	100.000%
0.0500	35.200%	100.000%
0.0300	28.400%	100.000%
0.0200	21.200%	100.000%
0.0100	13.000%	100.000%
0.0050	6.500%	68.829%
0.0030	4.900%	51.886%
0.0010	1.600%	16.943%
0.0001	0.200%	2.118%

Structure Detail:

Structure #1 (Pond)

Basin 008

Pond Inputs:

Initial Pool Elev:	410.50 ft
Initial Pool:	4.26 ac-ft
*Sediment Storage:	2.00 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)
410.50	12.00	2.00:1	2.00:1	10.00

Pond Results:

Peak Elevation:	411.83 ft
H'graph Detention Time:	0.60 hrs
Pond Model:	CSTRS
Dewater Time:	0.68 days
Trap Efficiency:	90.56 %

Dewatering time is calculated from peak stage to lowest spillway

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403.50	0.415	0.640	0.000	
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404.50	0.442	1.069	0.000	
405.00	0.456	1.294	0.000	
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409.50	0.588	3.638	0.000	
410.00	0.604	3.936	0.000	
410.50	0.673	4.256	0.000	Spillway #1
411.00	0.746	4.610	2.032	12.70
411.50	0.823	5.002	27.918	3.50
411.83	0.876	5.287	48.818	0.15 Peak Stage
412.00	0.903	5.433	59.514	
412.50	1.185	5.954	100.201	
413.00	1.506	6.625	150.727	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
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406.00	0.000	0.000
406.50	0.000	0.000
407.00	0.000	0.000
407.50	0.000	0.000
408.00	0.000	0.000
408.50	0.000	0.000
409.00	0.000	0.000
409.50	0.000	0.000
410.00	0.000	0.000
410.50	0.000	0.000
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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	20.200	0.046	0.000	0.000	81.000	F	54.07	4.704
	2	1.000	0.001	0.000	0.000	100.000	F	3.58	0.399
	Σ	21.200						57.65	5.103

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	23.00	0.9000	1.0000	1	2,778.3	551,582	377.78	248.00
	2	0.001	100.00	0.01	0.0010	1.0000	1	0.0	0	0.00	0.00
	Σ							2,778.3	524,511	359.23	231.25

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	22.50	45.00	200.00	4.740	0.011
		8. Large gullies, diversions, and low flowing streams	10.25	125.00	1,220.00	9.600	0.035
#1	1	Time of Concentration:					0.046