

**BIRMINGHAM COAL & COKE CO., INC.
OLD UNION NO. 2 MINE, P-3____
ATTACHMENT III-B-3**

BIRMINGHAM COAL & COKE CO., INC.

OLD UNION NO. 2 MINE

P-39--

DETAIL DESIGN PLANS

DIVERSION 003

ALABAMA SURFACE MINING COMMISSION

prepared by:

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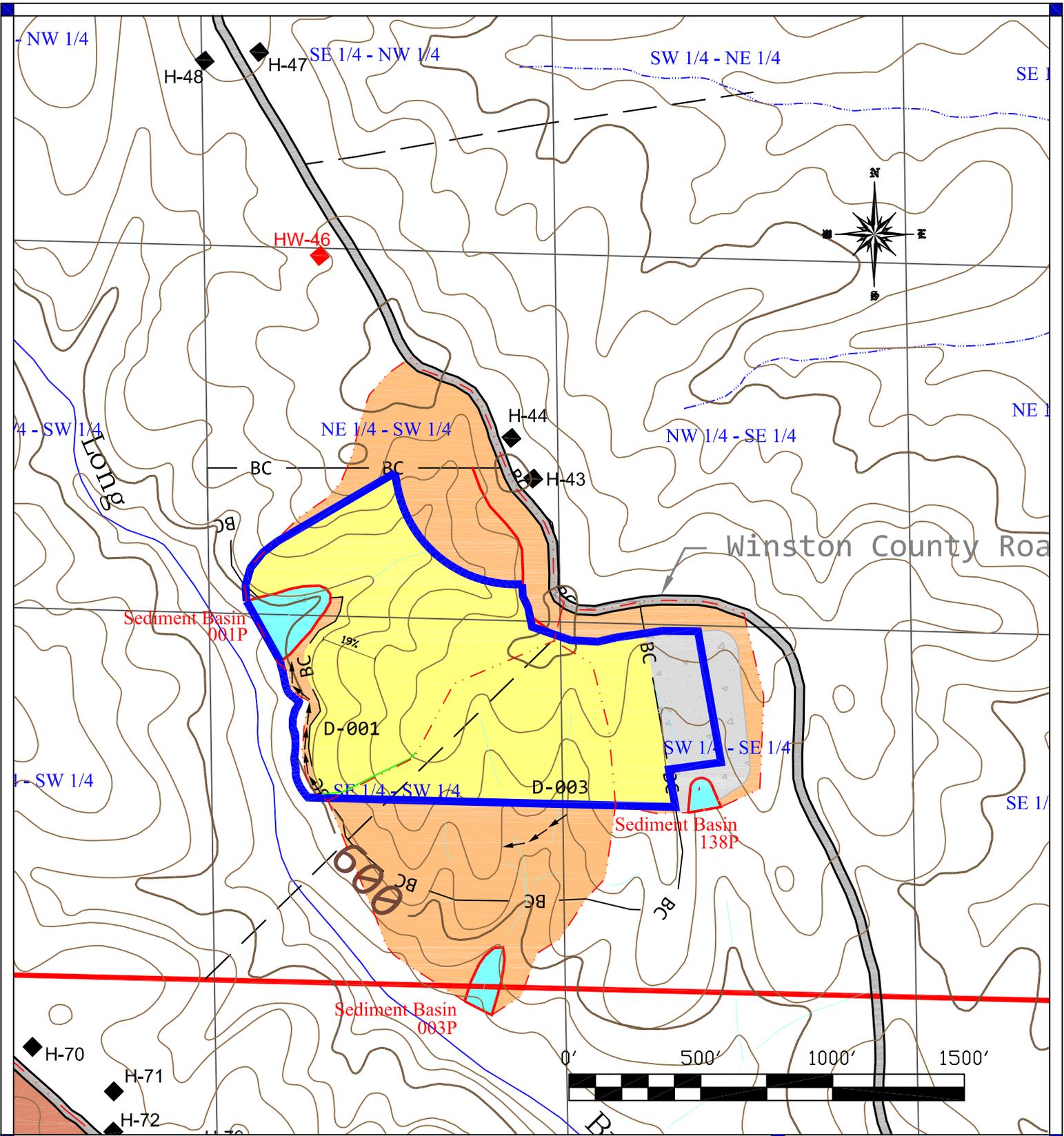
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INTRODUCTION:

The Diversion Ditch is designed to capture and re-route any stormwater run-off to approved and certified Sediment Basins throughout the project. This diversion is necessary to ensure all run-off from disturbance due to the mining process will not leave the site without the proper treatment through sedimentation. See the attached **Watershed Map** for the locations of this structure. Diversion 003 was designed for a 10 year 6 hour event as permanent diversions.

Diversion Ditch 003 is located within the SE/SW and the SW/SE of Section 33, Township 11 South, Range 9 West, all in Winston County, Alabama. This diversion runs from the northeast to southwest direction for two hundred fifty seven (257) feet until it ends at a natural drain that drains to Basin 003P.



DRAWN BY:
J.R.W.
04/04/2012

APPROVED BY:
J.D.M.
04/04/2012

SCALE:
1" = 500'

SHEET:
1 OF 1

**BIRMINGHAM COAL & COKE, INC
OLD UNION NO. 2 MINE**

WATERSHED MAP LEGEND

PUBLIC ROAD	PERMIT BOUNDARY
SEDIMENT BASIN	PREVIOUSLY DISTURBED, CN 75
DRAINAGE DIVIDE	FOREST, GOOD COVER, CN 70
DIVERSION DITCH	PASTURE, GOOD COVER, CN 74
DRAINAGE COURSE	GRADE & BARE, CN 81

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**DIVERSION DITCH AND DIVERSION BERM
DESIGN AND CONSTRUCTION SPECIFICATIONS**

- 1) Temporary diversions will be designed and constructed to adequately carry the runoff from a 2 Year - 6 Hour precipitation event.
- 2) Permanent diversions will be designed and constructed to adequately carry the runoff from a 10 Year - 6 Hour precipitation event.
- 3) Permanent diversions will be designed and constructed with gently sloping banks stabilized with appropriate vegetation.
- 4) All diversions will be designed, constructed and maintained, using the best technology currently available, whereas additional contribution of suspended solids to stream-flow and to runoff outside the permit area is prevented.
- 5) Maintenance of appropriate gradient, channel lining, revegetation, roughness structures, detention basins, etc. will be used, when necessary, as sediment control measures for these diversions.
- 6) Diversions will not be constructed on existing land slides nor be located so as to increase the potential for land slides.
- 7) Temporary diversions will be removed and the affected area regraded, topsoiled (if required) and revegetated in accordance with Rules 880-X-10C-.10, 880-X-10C-.11, 880-X-10C-.52 thru 880-X-10C-.57 and 880-X-10C-.58, 880-X-10C-.60 and 880-X-10C-.62, when no longer needed.
- 8) Channel linings, for diversions with slopes of three (3%) percent or less, will consist of a mixture of both annual and perennial grasses being predominantly fescue and bermuda. Channel linings, for diversions with slopes greater than three (3%) percent, will consist of riprap or other non-erodible material or cut into non-erodible material.
- 9) Adequate freeboard will be provided for protection for transition of flows and critical areas such as swales and curves along the entire diversion length.
- 10) At discharge points, where diversions intersect with natural streams or exit velocities of the diversion are greater than that of the receiving streams, energy dissipaters will be installed when deemed necessary.

**DIVERSION DITCH AND DIVERSION BERM
DESIGN AND CONSTRUCTION SPECIFICATIONS
(continued)**

- 11) Topsoil removed from the diversion area (if required) will be handled in accordance with Rules 880-X-10C-.07 thru 880-X-10C-.11.
- 12) Excess material excavated in the construction of the diversion, not needed for diversion channel geometry or the regrading of the channel, will be disposed of in accordance with Rule 880-X-10C-.36.
- 13) Diversions will not be designed or constructed to divert water into underground mines without written approval from the Regulatory Authority.
- 14) The entire area in which a diversion berm is proposed will be cleared and grubbed of all organic material, scarified, and no surface slopes will be left steeper than 1V:1H.
- 15) Diversion berms will be constructed with desirable material, free of sod, stones, roots, limbs, etc. over six (6") inches in diameter. This material will be spread in layers no greater than twelve (12") inches in thickness and compacted to ninety five (95%) percent of the standard proctor density, as outlined in ASTM, until the design height is reached.
- 16) Upon completion of construction of diversion ditches or diversion berms, all disturbed areas will be seeded with a mixture of both annual and perennial grasses, fertilized, and mulched in order to minimize erosion and ensure restabilization.
- 17) All diversions (berms or ditches) will be examined quarterly for erosion, instability, structural weakness, or other hazardous conditions and maintenance performed as necessary.

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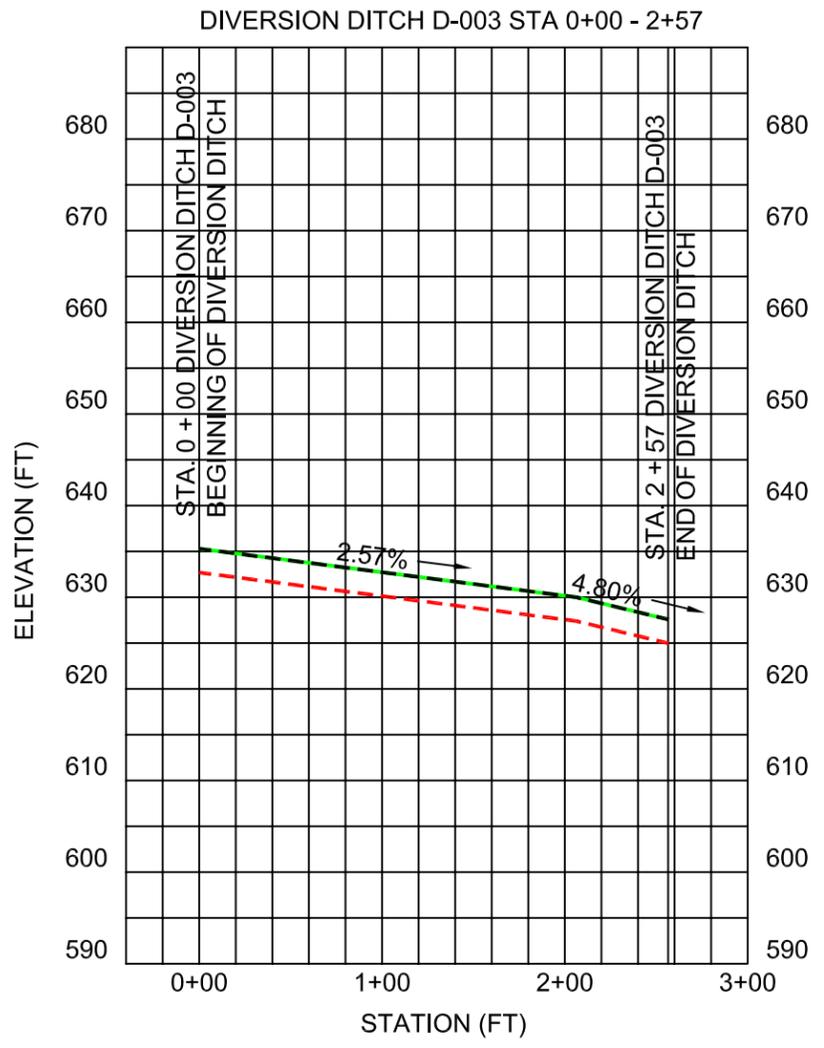
Diversion 003

DESIGN INFORMATION

Diversion	Station	Drainage Area (ac)	Peak Flow (cfs)	Stability Class	% Slope	Velocity (fps)	Capacity Class	Flow Depth (ft)	Depth with Freeboard (ft)
D-003	0+00 – 2+57	4.92	11.16	D	4.8	4.50	B	1.60	2.60

Diversion 003 is two hundred fifty seven (257) feet in total length. See attached [watershed map](#) for diversion location and drainage area. Diversion 003 will be a vegetated triangular ditch with 2:1 side slopes for the entire length of the diversion. See attached [plan / profile](#) for the existing grade and proposed grade along the diversion centerline. The channel will be lined with a grass mixture of Fescue, Bermuda and Rye Grasses.

See attached SedCad4 runs (Sta. [0+00 – 2+57](#)) for the peak flow from the 10 year 6 hour event.

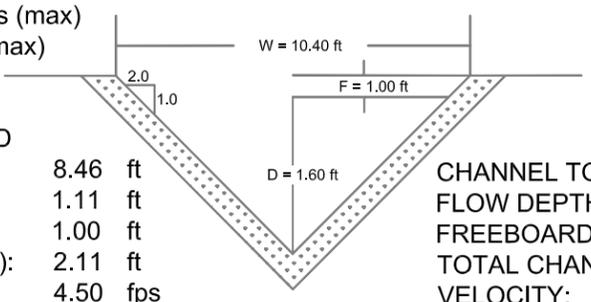


— EXISTING GRADE H SCALE: 1" = 100'
 - - - TOP OF DITCH V SCALE: 1" = 20'
 - - - BOTTOM OF DITCH

DIVERSION DITCH D-003 CROSS-SECTION
 TRIANGULAR VEGETATED CHANNEL 0+00 - 2+57

DISCHARGE: 11.16 cfs (max)
 CHANNEL SLOPE: 4.8 % (max)
 LIMITING VELOCITY: 5.0 fps

STABILITY CLASS D
 CHANNEL TOP WIDTH (W): 8.46 ft
 FLOW DEPTH (D): 1.11 ft
 FREEBOARD (F): 1.00 ft
 TOTAL CHANNEL DEPTH (D + F): 2.11 ft
 VELOCITY: 4.50 fps



CAPACITY CLASS B
 CHANNEL TOP WIDTH (W): 10.40 ft
 FLOW DEPTH (D): 1.60 ft
 FREEBOARD (F): 1.00 ft
 TOTAL CHANNEL DEPTH (D + F): 2.60 ft
 VELOCITY: 2.18 ft

Grass Lining will be a mixture of Fescue, Bermuda and Rye Grasses

Birmingham Coal & Coke, Inc
 Old Union #2 Mine, P-39--

DIVERSION D-003
PROFILE

DRAWN BY: Z.B.W. 06/08/2011	APPROVED BY: J.D.M. 06/08/2011	SCALE: H: 1" = 100' V: 1" = 20'	SHEET: 1 OF 1
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Birmingham Coal & Coke Company,
Inc.
Old Union No. 2, P-39--
Diversion Ditch D-003 Sta. 0+00 -
2+57

J. David McGehee, PE/LS

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General Information

Storm Information:

Storm Type:	SCS 6HOUR
Design Storm:	10 yr - 6 hr
Rainfall Depth:	4.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Vegetated Triangular Diversion Ditch D-003 Sta. 0+00 - 2+57

#1 Chan'

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	4.920	4.920	11.16	0.89

Structure Detail:

Structure #1 (Vegetated Channel)

Vegetated Triangular Diversion Ditch D-003 Sta. 0+00 - 2+57

Triangular Vegetated Channel Inputs:

Material: Grass mixture

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.0:1	2.0:1	4.8	D, B	1.00			5.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	11.16 cfs		11.16 cfs	
Depth:	1.11 ft	2.11 ft	1.60 ft	2.60 ft
Top Width:	4.46 ft	8.46 ft	6.40 ft	10.40 ft
Velocity:	4.50 fps		2.18 fps	
X-Section Area:	2.48 sq ft		5.12 sq ft	
Hydraulic Radius:	0.498 ft		0.716 ft	
Froude Number:	1.06		0.43	
Roughness Coefficient:	0.0456		0.1196	

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	4.230	0.048	0.013	0.391	81.000	F	10.21	0.807
	2	0.690	0.015	0.000	0.000	70.000	M	0.95	0.084
	Σ	4.920						11.16	0.892

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	6.23	22.00	353.00	2.490	0.039
		8. Large gullies, diversions, and low flowing streams	11.99	41.00	342.00	10.380	0.009
#1	1	Time of Concentration:					0.048
#1	2	5. Nearly bare and untilled, and alluvial valley fans	28.42	27.00	95.00	5.330	0.004
		8. Large gullies, diversions, and low flowing streams	4.28	11.00	257.00	6.200	0.011
#1	2	Time of Concentration:					0.015

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	8. Large gullies, diversions, and low flowing streams	4.10	12.00	293.00	6.070	0.013
#1	1	Muskingum K:					0.013