

**HYDROLOGY STUDY FOR
GLOBAL MET COAL CORPORATION**

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

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

**PRIMARY ROAD DESIGN PLANS
HAULROADS 1P, 2P, 3P, 4P AND 5P
ATTACHMENT III-B-5**

NOVEMBER 15, 2012



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

November 15, 2012

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

RE: Global Met Coal Corporation
Black Creek Mine
P-

Dear J. Michael:

I hereby certify the attached detailed design plans for Primary Roads 1P, 2P, 3P, 4P and 5P for the above referenced mine are in accordance with current prudent engineering practices and the Regulations of the Alabama Surface Mining Commission 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



**SPECIFICATIONS FOR THE CONSTRUCTION, MAINTENANCE
AND RECLAMATION OF PRIMARY ROADS**

1. Primary roads shall be designed by or under the direction of a registered professional engineer in accordance with the Alabama Surface Mining Commission rules and regulations and prudent engineering practice.
2. Each roadway embankment will be designed and constructed so as to have a minimum static safety factor of 1.3.
3. To the extent possible, roads will be located on ridges or on the most stable available slopes to prevent or minimize erosion, downstream sedimentation and flooding in an effort to prevent adverse effects to fish, wildlife and related environmental values.
4. To the extent possible, roads will be located above the sediment basins to be constructed for the mining operation in an effort to control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area and to comply with State and Federal water quality standards applicable to receiving waters and avoid the alteration of the normal flow of water in streambeds or drainage channels while preventing or controlling damage to public or private property. Where it is not possible or is impractical to locate roads in this manner, sediment control devices such as silt fencing, hay bale check dams and rock filter check dams will be used as necessary to maintain water quality. No fording of intermittent or perennial streams will be conducted unless specifically approved by the Alabama Surface Mining Commission as temporary routes to be used during road construction.
5. Prior to construction, the roadway will be cleared, grubbed and will have the topsoil removed. The clearing limits will be kept to the minimum necessary to accommodate the roadbed and associated ditch construction.
6. Roads will be constructed of suitable compacted subgrade material. The material will be free of sod, roots, stones over 12 inches in diameter, and other objectionable materials. The material will be placed and spread over the entire fill area, starting at the lowest point in layers not to exceed 12 inches in thickness. The material will be compacted to 95 percent of the density, based on standard proctor as outlined in ASTM.

7. Primary roads will have a minimum width of eighteen feet and a maximum width necessary to accommodate the largest equipment traveling the road.
8. Roadbeds will be cut to consolidated non-erodible material or will be surfaced with durable non-toxic, non-acid forming substances. The wearing surface will consist of durable sandstone, chert, crushed limestone, crushed concrete, crushed asphalt, red rock, ironore refuse, gravel, or other durable non-toxic, non-acid forming material approved by the Regulatory Authority. The wearing surface will be placed on the roadbed to a depth of four inches.
9. No sustained grades will exceed ten percent unless deemed necessary, in which case appropriate sediment control facilities will be constructed. If grades in excess of fifteen percent are required, cross drains, ditch relief drains and road drainways will be located at a minimum distance of three-hundred feet.
10. Roads will be constructed so as to have adequate drainage utilizing ditches, culverts, cross drains and ditch relief drains designed to safely pass the peak runoff from a ten year, six hour precipitation event. Drainage pipes and culverts shall be installed as designed and will be maintained in a free and operating condition to prevent and control erosion at inlets and outlets. Culverts have been designed to support the load of the heaviest equipment to travel the road and are based on the Handbook of Steel Drainage and Highway Construction Products by the American Iron and Steel Institute and the equipment specifications. Drainage ditches will be constructed and maintained in accordance with the approved design to prevent uncontrolled drainage over the road surface and embankment. Roads will not be located in the channel of an intermittent or perennial stream unless specifically approved by the Alabama Surface Mining Commission. Additionally, no relocation and/or alteration of an intermittent or perennial stream will be done unless specifically approved by the Alabama Surface Mining Commission. In the event that it becomes evident that any drainage structures including culverts, bridges and/or low water crossings will be required in order to cross an intermittent or perennial stream, the structure will be designed and constructed in accordance with Alabama Surface Mining Commission requirements and prudent engineering practice and the approval of the design(s) will be acquired prior to the commencement of construction. Hay bale check

dams and silt fences will be used at strategic locations when necessary to control sediment runoff. Immediately upon completion of construction, the side slopes of the road embankments and/or cuts will be fertilized, seeded with annual and perennial grasses and mulch will be added to aid in the prevention of erosion and to enhance seed germination. The seed mix will consist of, but is not limited to, some combination of the following species: bermuda grass, fescue, lespedeza, rye grass, brown top millet, clover and vetch. The particular species to be planted will vary with the planting season at the time of seed application. Upon completion of construction of each phase of the roadway the construction will be certified to the Alabama Surface Mining Commission as having been done in accordance with the approved plans for the roadway and associated facilities.

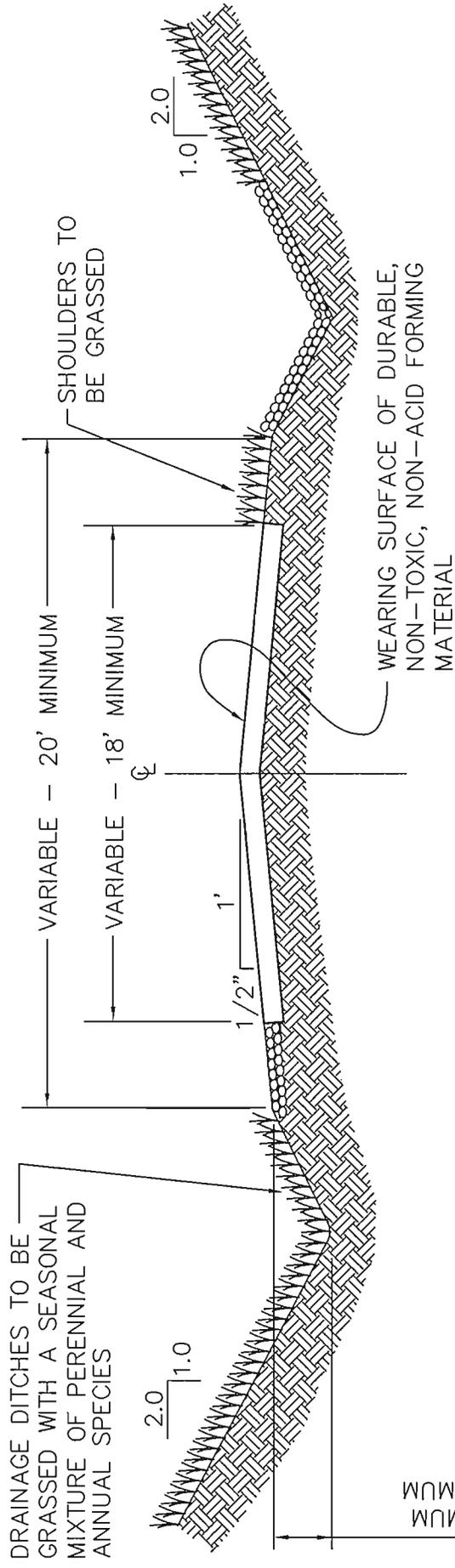
11. Routine maintenance will be required to assure that the road continually meets performance standards and will consist of periodic grading, resurfacing, dust suppression and maintenance of sediment control facilities. Dust suppression will consist of the application of water, chemical binders and/or other dust suppressants. No oil will be utilized in this process. Spot seeding, fertilizing and mulching will be performed as necessary to improve vegetative cover on roadway slopes. A road damaged by a catastrophic event shall be repaired as soon as practicable after the damage has occurred.

12. Roads not to be retained as part of the post mine land use shall be reclaimed in accordance with the approved reclamation plan for this permit as soon as practicable after they are no longer needed as part of the mining and reclamation operation, using the following procedures:
 - a. The road will be closed to traffic.
 - b. All bridges, culverts and other drainage structures not approved as part of the post mine land use will be removed.
 - c. All road surfacing materials that are not compatible with the post mine land use or revegetation requirements will be properly disposed of on-site or removed from the site for re-use.
 - d. Roadway cut and fill slopes shall be regraded and reshaped to be compatible with the post mine land use and to compliment the natural drainage pattern of the surrounding terrain.
 - e. The natural drainage patterns shall be protected from surface runoff and erosion utilizing the installation of dikes and/or cross drains as necessary.

- f. The roadbed shall be ripped or scarified as necessary, the topsoil or substitute or approved growing medium shall be replaced and revegetated in accordance with the approved reclamation plan for this permit.
13. The drawings and data contained in the specific design plans illustrate typical roadbed configurations for primary roads as well as site specific design of drainage structures, stability analysis and ditch sections.

TYPICAL HAUL ROAD CUT SECTION

NO SCALE



TYPICAL CUT SECTION
PRIMARY HAUL ROAD

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

DATE: 2-3-97

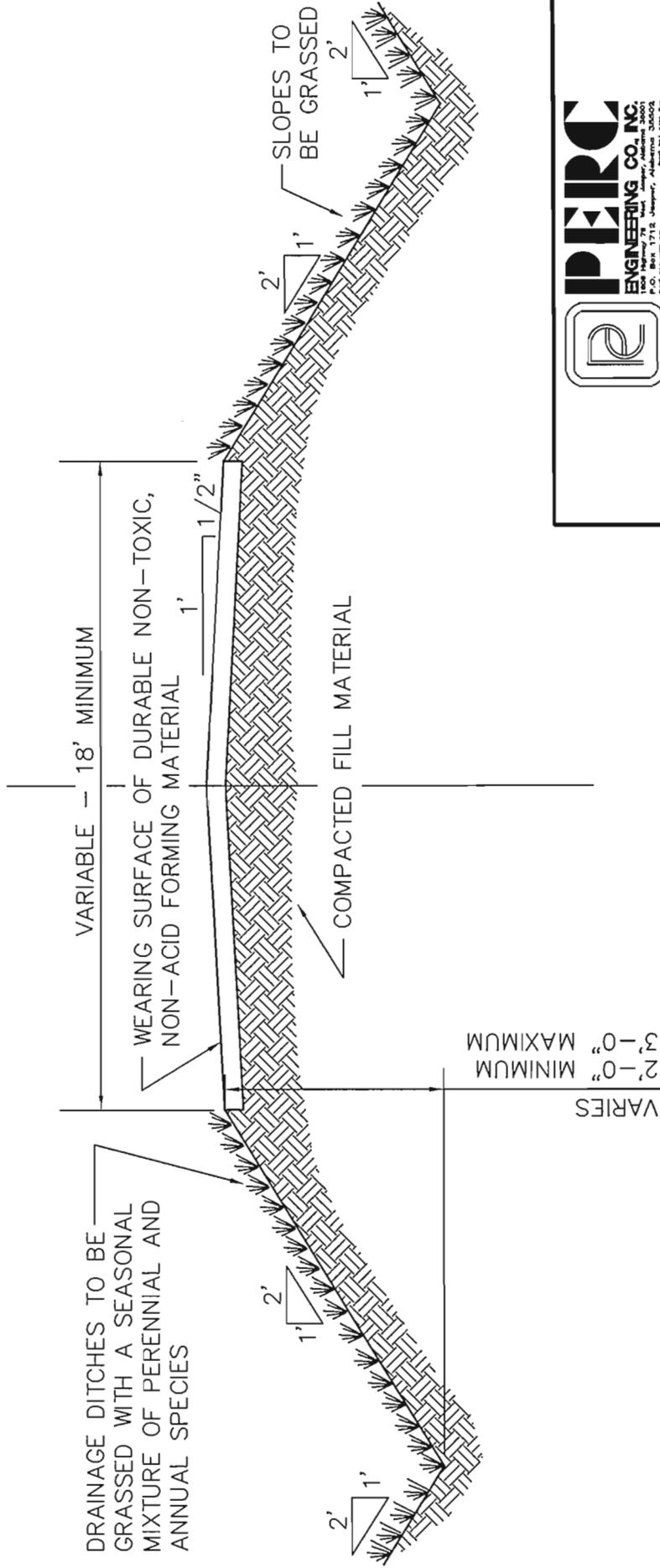
APPROVED BY: S.R.I.

SCALE: NONE

ATTACHMENT III - B. - 5.

TYPICAL HAUL ROAD FILL SECTION

NO SCALE



PERC
ENGINEERING CO. INC.
1001 HOLMES BLVD.
P.O. Box 1712, Jasper, Alabama 35002
(205) 281-6661, Fax (205) 281-6661

TYPICAL FILL SECTION
PRIMARY HAUL ROAD

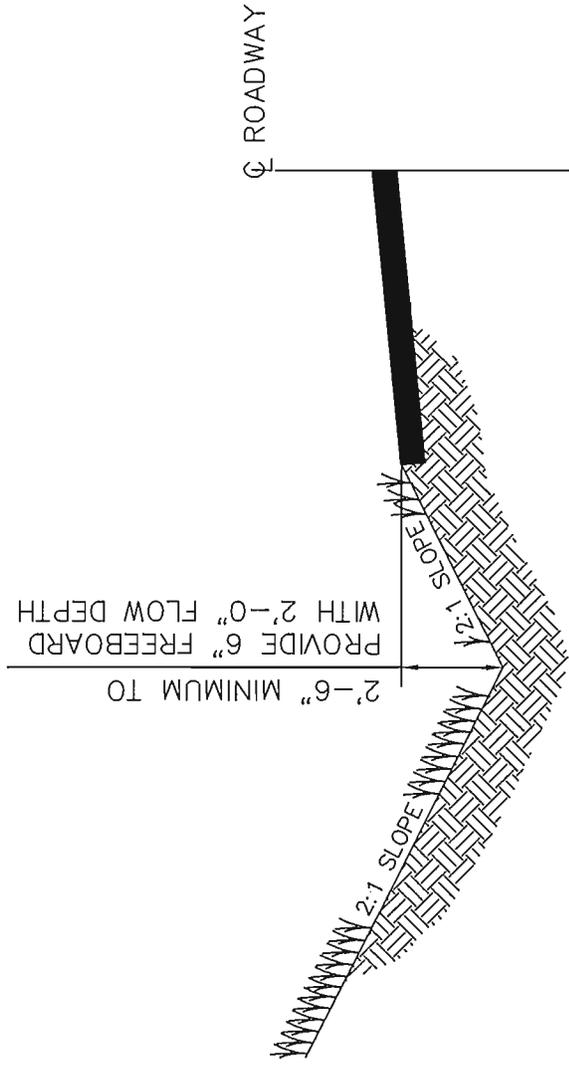
DRAWN BY: K.D.P.
DWG. NAME: TYPHAULF

DATE: 2-3-97

APPROVED BY: S.R.I.

SCALE: NONE

ATTACHMENT III. - B. - 5.



MINIMUM DITCH GRADIENT = 1%
 MAXIMUM DITCH GRADIENT = 5%

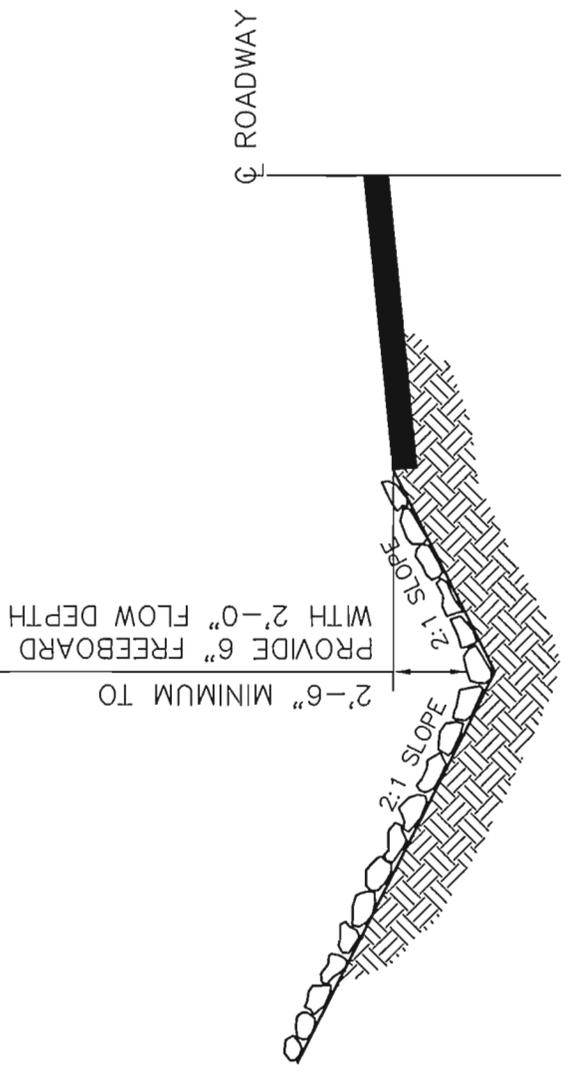
DITCH CHANNEL TO BE VEGETATED WITH
 A MIXTURE OF BERMUDA GRASS, FESCUE,
 AND LESPEDEZA TO CONFORM TO CLASS
 "D" RETARDANT CLASS.



TYPICAL PRIMARY ROADWAY DITCH
 CROSS SECTION

DRAWN BY: K.D.P.
 DWG. NAME: PRIMROAD
 APPROVED BY: R.E.P.

DATE: 2-4-97
 SCALE: NONE



DITCH GRADIENT 5% TO 10%

DITCH CHANNEL TO BE LINED WITH NON-ERODIBLE NON-TOXIC, NON-ACID FORMING SANDSTONE OR LIMESTONE RIP-RAP. THE RIP-RAP WILL BE "CLASS 1" RIP-RAP AND HAVE A MINIMUM THICKNESS OF 12".

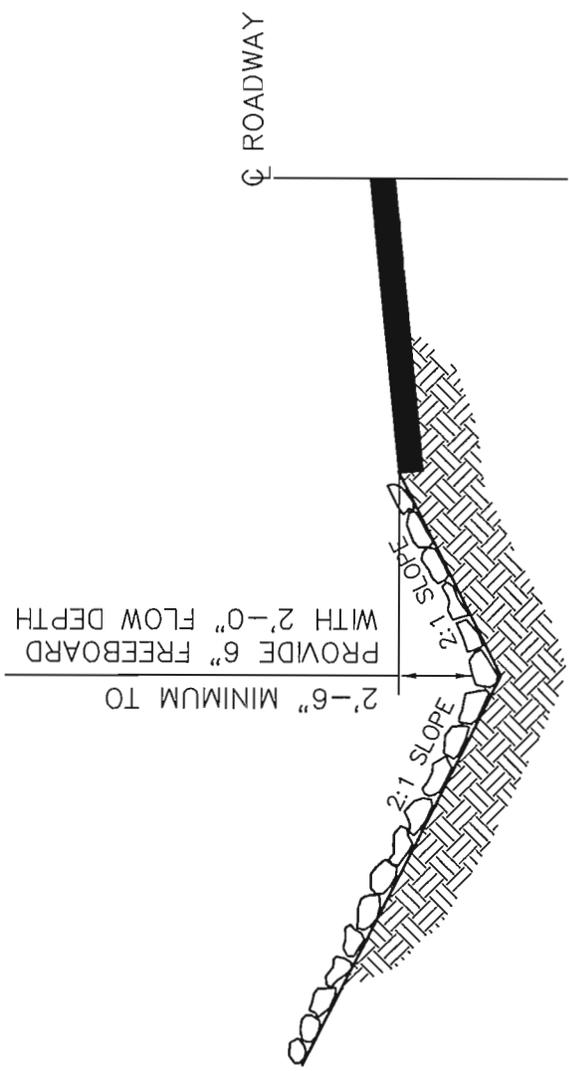


PERC
ENGINEERING CO., INC.
 1700 Highway 78 West, Highway 78
 P.O. Box 1712, Jasper, Alabama 36002
 (205) 281-4411, Inc.

TYPICAL PRIMARY ROADWAY DITCH
 CROSS SECTION

DRAWN BY: S.D.M.
 DWG. NAME: PRIMRD1
 APPROVED BY: L.G.S.

DATE: 11/8/2011
 SCALE: NONE



DITCH CHANNEL TO BE LINED WITH NON-ERODIBLE
 NON-TOXIC, NON-ACID FORMING SANDSTONE OR
 LIMESTONE RIP-RAP. THE RIP-RAP WILL BE "CLASS 2"
 RIP-RAP AND HAVE A MINIMUM THICKNESS OF 16".



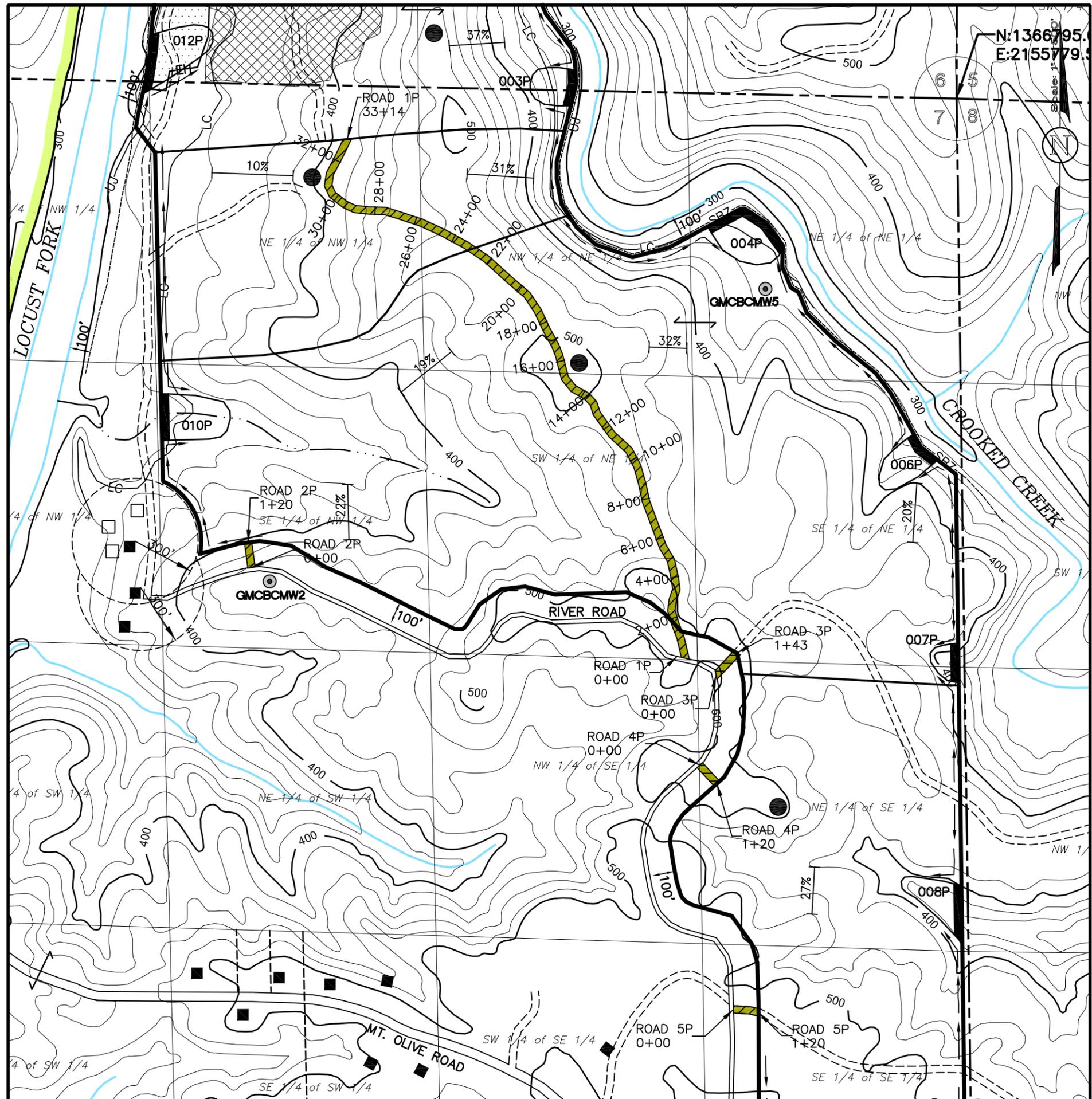
TYPICAL PRIMARY ROADWAY DITCH
 CROSS SECTION

DRAWN BY: S.D.M. DWG. NAME: PRIMRD2	DATE: 11/8/2011
APPROVED BY: L.G.S.	SCALE: NONE

NOTES

- 1) Due to there being no significant cut or fill, no stability analysis is required.
- 2) A stop sign will be placed 15' from the edge of pavement of the County road for the out going lane.

N:1366795.
E:2155779.



LEGEND

	PERMIT BOUNDARY		ASMC PERMIT NO. P-3546
	SURFACE CONTOUR		ASMC PERMIT NO. P-3913
	PREVIOUSLY SURFACED MINED BY OTHERS		ASMC PERMIT NO. P-3811
	OCCUPIED DWELLING		PROPERTY LINE OTHER THAN FORTY LINE
	UNOCCUPIED DWELLING		MINERAL OWNERSHIP LINE OTHER THAN FORTY LINE
	DRAINAGE COURSE		EXISTING HIGHWALL
	INTERMITTENT STREAM		CURRENT HIGHWALL
	PERENNIAL STREAM		CURRENT HIGHWALL
	DIVERSION DITCH		SLOPE MEASUREMENTS
	COUNTY ROAD (PAVED UNLESS OTHERWISE DESIGNATED)	N:1361366.01	ALABAMA WEST ZONE NAD83 STATE PLANE
	ROAD (PRIVATE UNLESS OTHERWISE SHOWN)	E:2155855.48	COORDINATES IN FEET
	MONITORING WELLS		
	SURFACE WATER MONITORING SITE		
	LAND HOOK, CONVEYS SURFACE-MINERAL OWNERSHIP		
	SEDIMENT BASIN		
	IMPOUNDED WATER		
	PRIMARY ROAD		
	ANCILLARY ROAD		
	COAL STOCKPILES		
	INDICATES MINERAL OWNERSHIP		
	INDICATES SURFACE OWNERSHIP		
	INDICATES SURFACE AND MINERAL OWNERSHIP		
	TEMPORARY EXCESS SPOIL AREA		

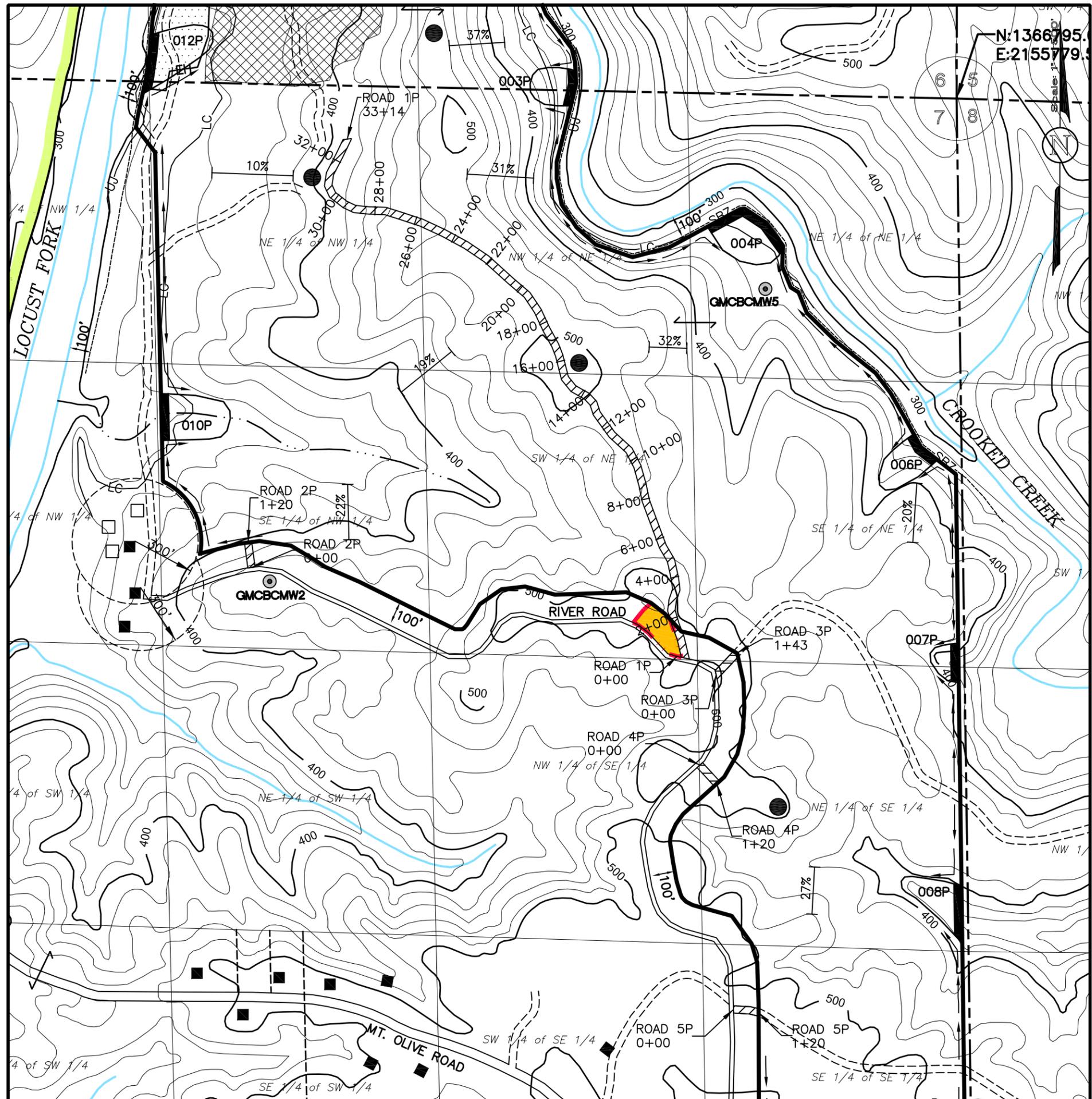


**Attachment III-B-5
Primary Road Location Map
P-3973
Global Met Coal Corporation
Black Creek Mine**

DRAWN BY: J.W.T.	DATE: 11/15/2012
DWG. NAME: GMCCBCPRLM	
APPROVED BY: L.G.S.	SCALE: 1"=500'

V:\Health_Franks\Mines\Global_Met\ASMC_Permit_Application\GMCCBCPRLM.dwg 01/10/13 16:17

N:1366795.
E:2155779.



LEGEND

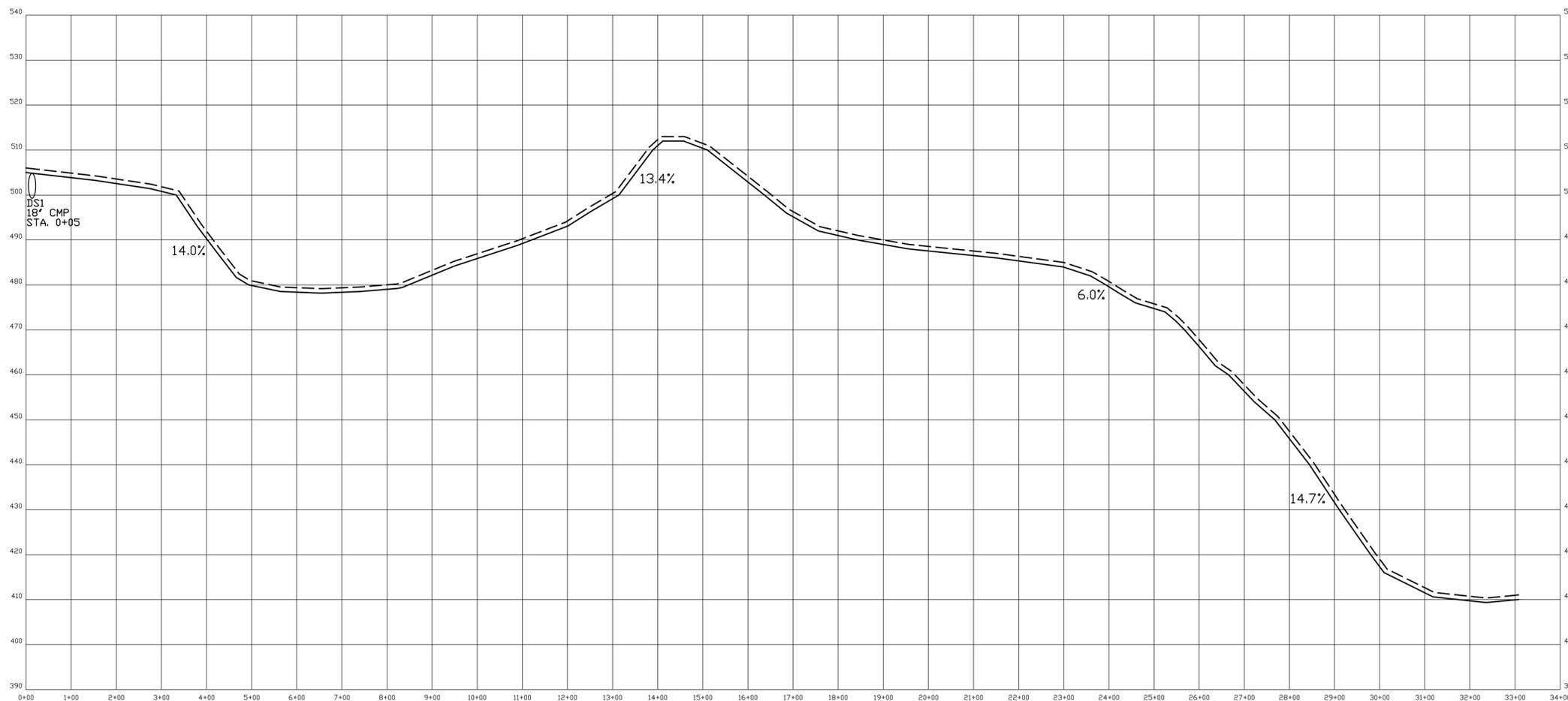
- | | | | |
|-------|---|--|---|
| | PERMIT BOUNDARY | | ASMC PERMIT NO. P-3546 |
| | SURFACE CONTOUR | | ASMC PERMIT NO. P-3913 |
| | PREVIOUSLY SURFACED MINED BY OTHERS | | ASMC PERMIT NO. P-3811 |
| | OCCUPIED DWELLING | | PROPERTY LINE OTHER THAN FORTY LINE |
| | UNOCCUPIED DWELLING | | MINERAL OWNERSHIP LINE OTHER THAN FORTY LINE |
| | DRAINAGE COURSE | | EXISTING HIGHWALL |
| | INTERMITTENT STREAM | | CURRENT HIGHWALL |
| | PERENNIAL STREAM | | CURRENT HIGHWALL |
| | DIVERSION DITCH | | SLOPE MEASUREMENTS |
| | COUNTY ROAD (PAVED UNLESS OTHERWISE DESIGNATED) | | ALABAMA WEST ZONE NAD83 STATE PLANE COORDINATES IN FEET |
| | ROAD (PRIVATE UNLESS OTHERWISE SHOWN) | | |
| | MONITORING WELLS | | |
| | SURFACE WATER MONITORING SITE | | |
| | LAND HOOK, CONVEYS SURFACE-MINERAL OWNERSHIP | | |
| | SEDIMENT BASIN | | |
| | IMPOUNDED WATER | | |
| | PRIMARY ROAD | | |
| | ANCILLARY ROAD | | |
| | COAL STOCKPILES | | |
| (M) | INDICATES MINERAL OWNERSHIP | | GRADED & BARE, CURVE NUMBER, 81 |
| (S) | INDICATES SURFACE OWNERSHIP | | WATERSHED DIVIDE |
| (FEE) | INDICATES SURFACE AND MINERAL OWNERSHIP | | |
| | TEMPORARY EXCESS SPOIL AREA | | |



**Attachment III-B-5
Watershed Map
P-3973
Global Met Coal Corporation
Black Creek Mine**

DRAWN BY: S.D.M.	DATE: 11/15/2012
DWG. NAME: GMCCBCPRLM	
APPROVED BY: L.G.S.	SCALE: 1"=500'

V:\Steve Miles\Steve Docs\Mines\Global Met\Haulroads\GMCCBCPRMS.dwg 01/10/13 16:13

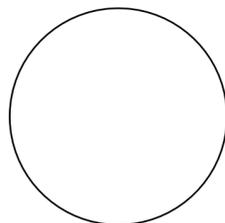


PRIMARY ROAD 1P

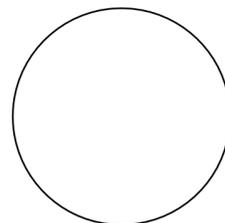
———— EXISTING GRADE
 - - - - - PROPOSED GRADE

NOTES:
 1. FINISHED GRADES SHOWN HEREON MAY VARY FROM BETWEEN 0% AND 17%.

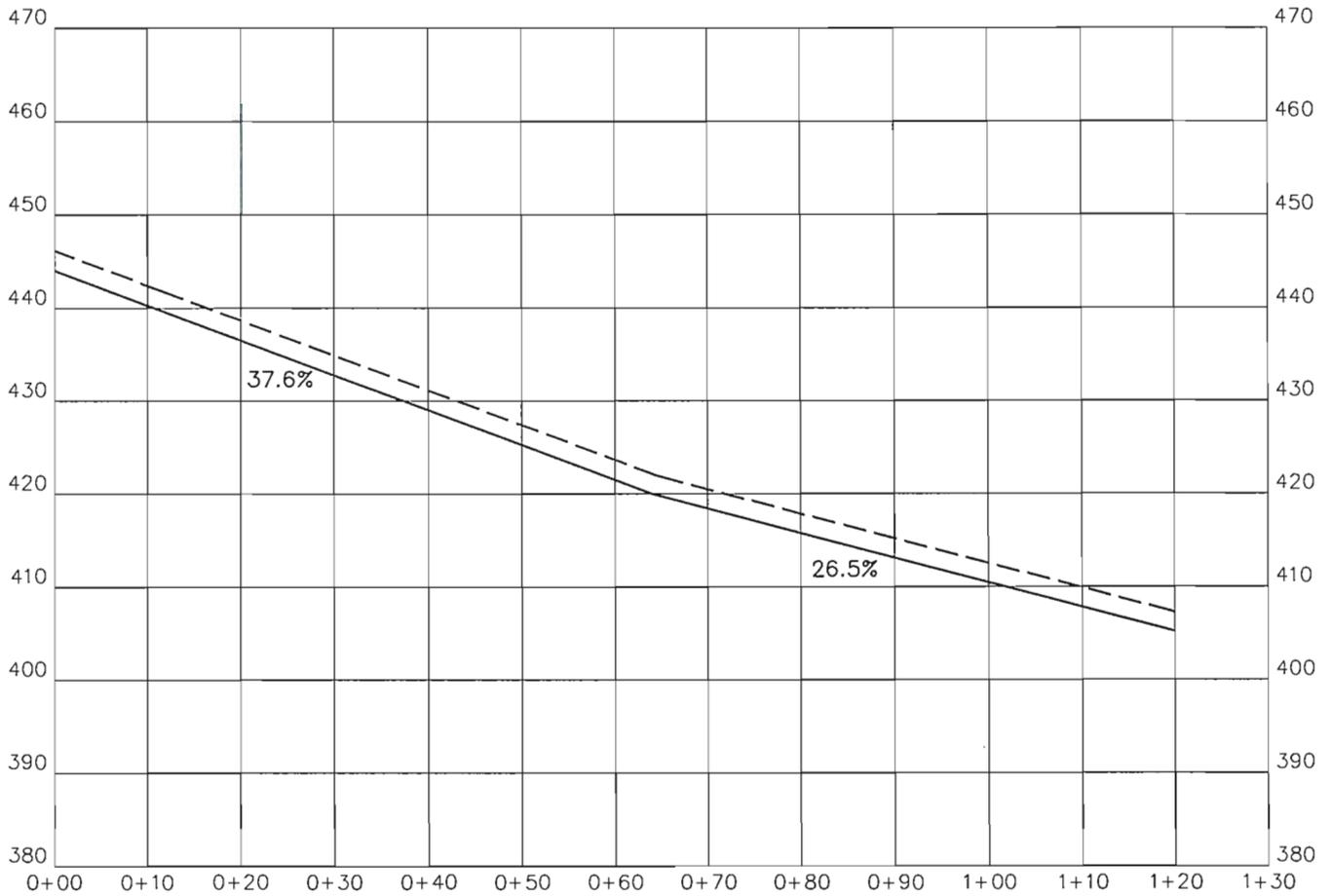
C:\Users\msh\OneDrive\Documents\Projects\Black Creek Mine\11/15/12\11-15-12.dwg



drawn by: S.D.M.
 dwg name: GMBCHR1P
 scale: H: 1"=200' V: 1"=20'
 date: 11/15/2012



GLOBAL MET COAL CORPORATION
BLACK CREEK MINE
P-
HAUL ROAD 1P PROFILE



Primary Road 2P

_____ EXISTING GRADE
 - - - - - PROPOSED GRADE

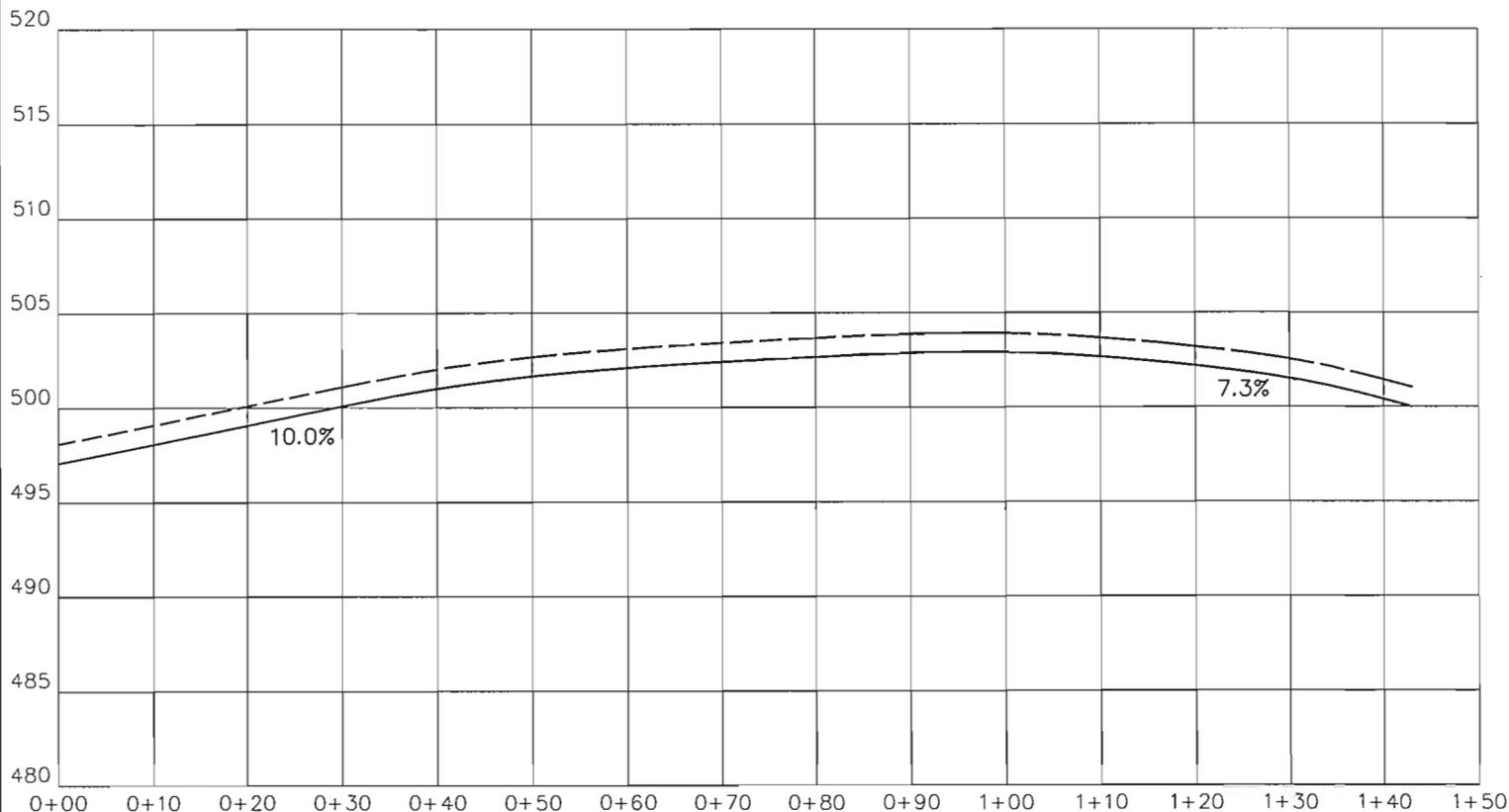
NOTES:

1. FINISHED GRADES SHOWN HEREON MAY VARY FROM BETWEEN 0% AND 17%.



GLOBAL MET COAL CORPORATION
BLACK CREEK MINE
P-
HAUL ROAD 2P PROFILE

DRAWN BY: S.D.M.	DATE: 11/14/2012
DWG. NAME: GMBCHR2P	
APPROVED BY: L.G.S.	SCALE: H: 1"=20' V: 1"=20'



Primary Road 3P

_____ EXISTING GRADE
 - - - - - PROPOSED GRADE

NOTES:

1. FINISHED GRADES SHOWN HEREON MAY VARY FROM BETWEEN 0% AND 17%.



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 1608 Highway 78 West Jasper, Alabama 35501
 P.O. Box 1712 Jasper, Alabama 35502
 (205) 384-5503 Office (205) 384-9491 Fax

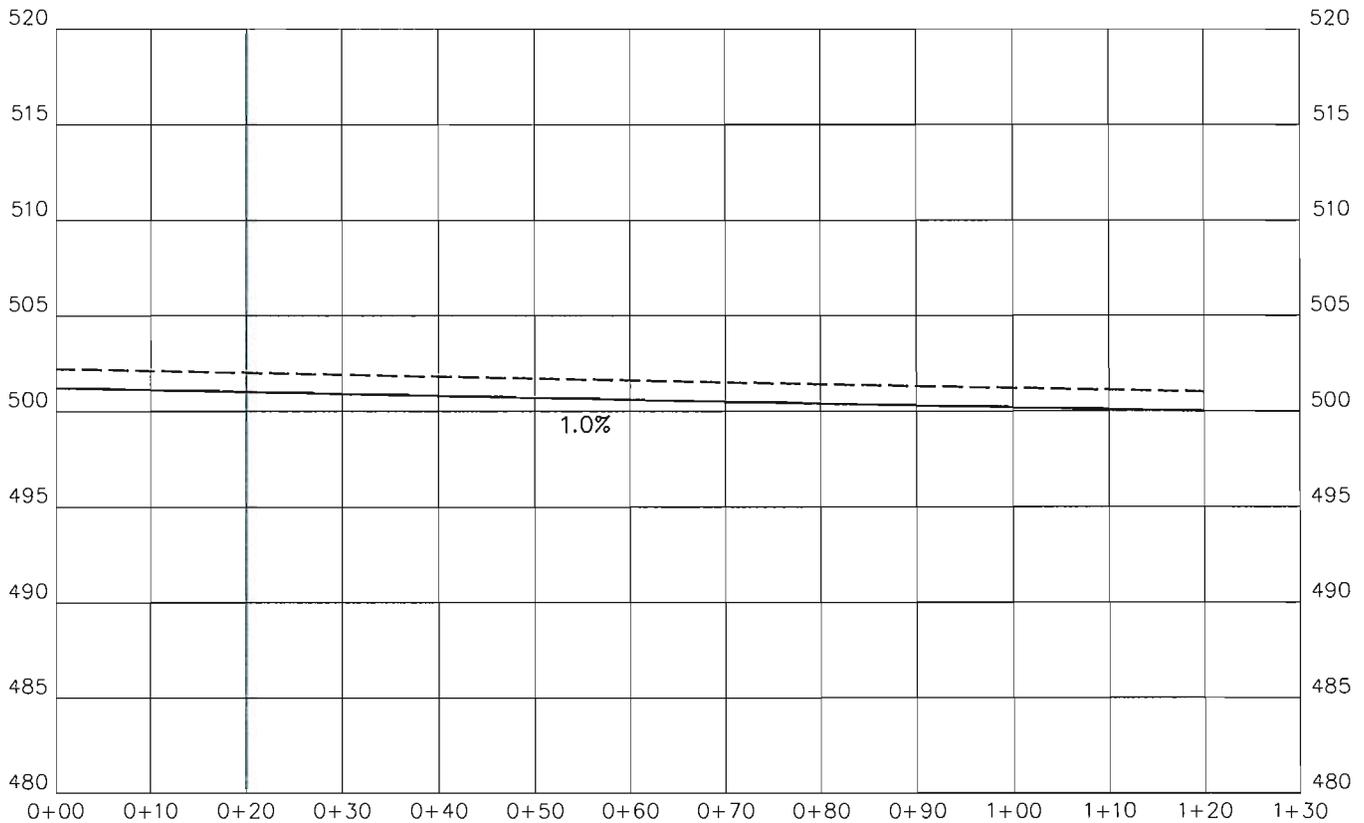
**GLOBAL MET COAL CORPORATION
 BLACK CREEK MINE
 P-
 HAUL ROAD 3P PROFILE**

DRAWN BY: S.D.M.
 DWG. NAME: GMBCHR3P

DATE: 11/14/2012

APPROVED BY: L.G.S.

SCALE: H: 1"=20'
 V: 1"=10'



Primary Road 4P

_____ EXISTING GRADE
 - - - - - PROPOSED GRADE

NOTES:

1. FINISHED GRADES SHOWN HEREON MAY VARY FROM BETWEEN 0% AND 17%.



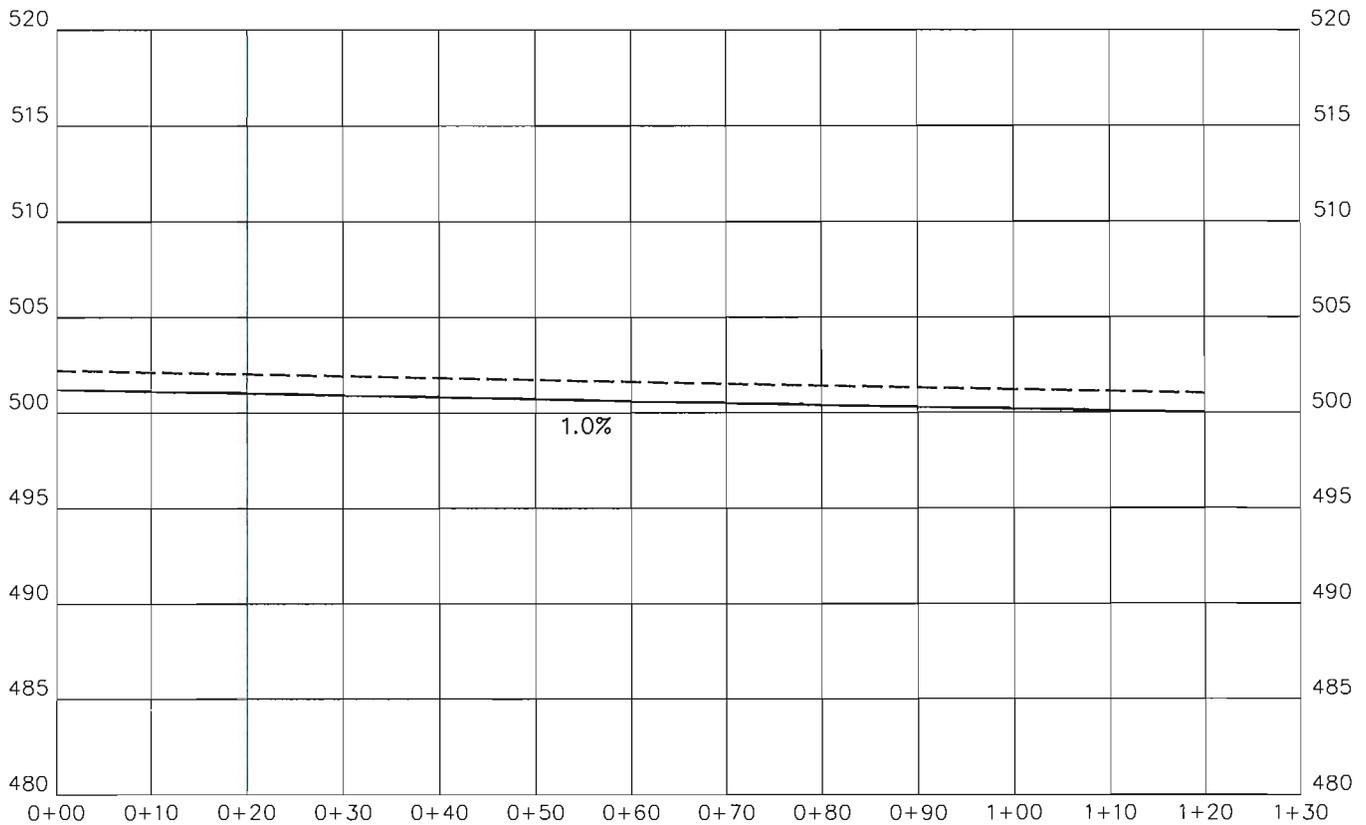
GLOBAL MET COAL CORPORATION
BLACK CREEK MINE
P-
HAUL ROAD 4P PROFILE

DRAWN BY: S.D.M.
 DWG. NAME: GMBCHR4P

DATE: 11/14/2012

APPROVED BY: L.G.S.

SCALE: H: 1"=20'
 V: 1"=10'



Primary Road 5P

_____ EXISTING GRADE
 - - - - - PROPOSED GRADE

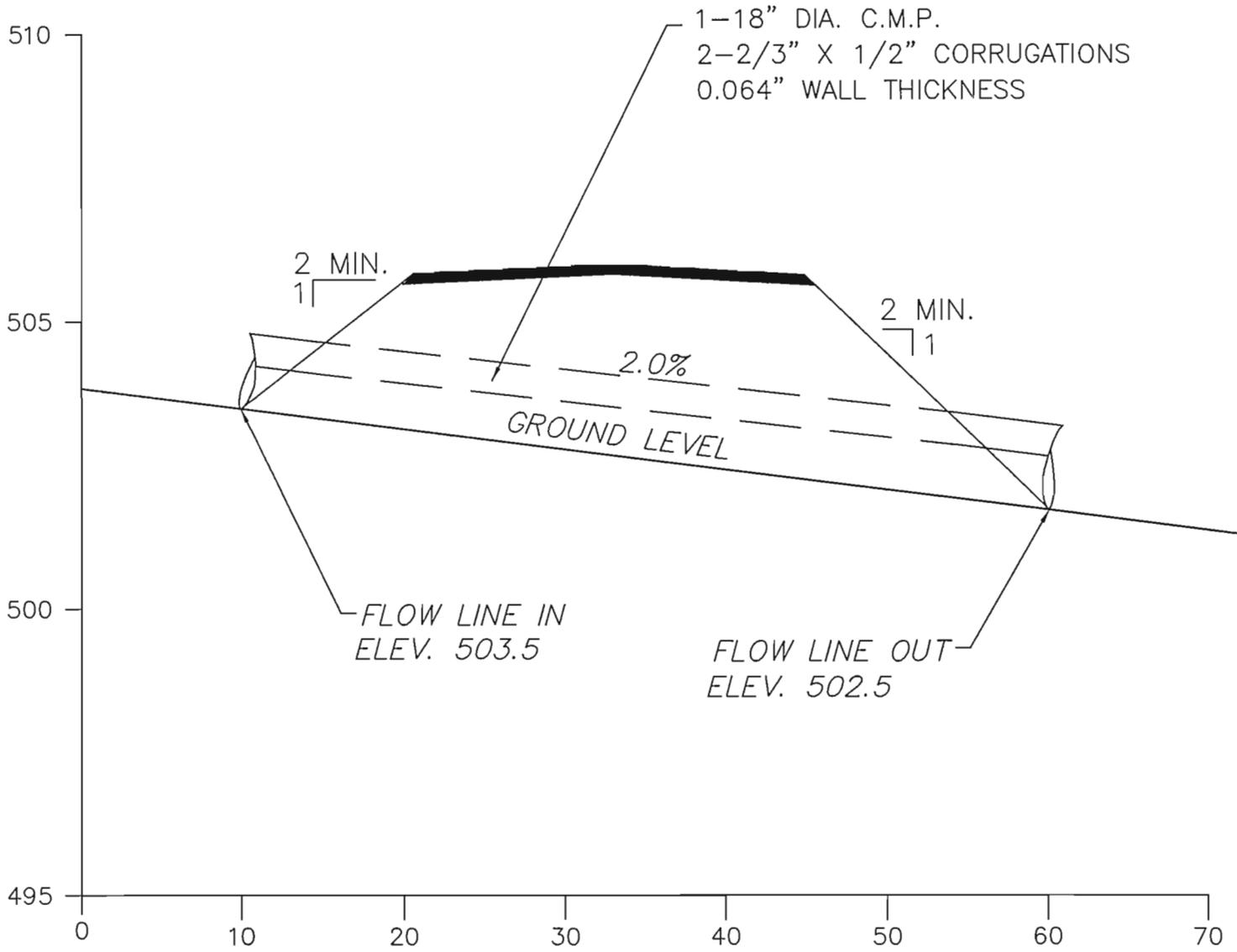
NOTES:

1. FINISHED GRADES SHOWN HEREON MAY VARY FROM BETWEEN 0% AND 17%.



GLOBAL MET COAL CORPORATION
BLACK CREEK MINE
P-
HAUL ROAD 5P PROFILE

DRAWN BY: S.D.M.	DATE: 11/14/2012
DWG. NAME: GMBCHR5P	
APPROVED BY: L.G.S.	SCALE: H: 1"=20' V: 1"=10'



Hydraulics Information

Drainage Area = 0.61 Acres
 10 YR.-6 HR., Q = 1.4 C.F.S.
 Maximum Water Elev. = 505
 Minimum Fill Elev. = 506
 Minimum Freeboard = 1'
 Maximum Allowable Cover 18" C.M.P. 166'
 Minimum Allowable Cover 18" C.M.P. = 1'
 Wall Thickness = 0.064"
 Minimum Freeboard = 1'



GLOBAL MET COAL CORPORATION
BLACK CREEK MINE
P-
PRIMARY ROAD 1P CROSS SECTION
DS1 0+05

DRAWN BY: S.D.M	DATE: 11/15/2012
DWG. NAME: GMBCHRRCS	
APPROVED BY: L.G.S.	SCALE: AS NOTED

V:\Steve Miles\Draws\Draws\Mines\Global Met\Hydraulics\GMBCHRRCS.dwg 11/15/12 13:14

Global Met Coal Corporation
Black Creek Mine
P-
Drainage Structure DS-1
Station 0+05

4.3 Inches, 10 Year - 6 Hour
SCS 6 Hour Event

SDM

PERC Engineering Co., Inc.
1606 Highway 78 West
Jasper, AL 35501

Phone: (205) 384-5553
Email: smiles@percengineering.com

General Information

Storm Information:

Storm Type:	Rainfall Event
-------------	----------------

Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1510
1.00	0.3440
1.50	0.5810
2.00	0.9890
2.50	2.5800
3.00	3.0100
3.50	3.3540
4.00	3.5910
4.50	3.8060
5.00	3.9780
5.50	4.1500
6.00	4.3000

Peak 30-minute Intensity: 3.182 in/hr

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Culvert	#1	==>	End	0.000	0.000	Drainage Structure DS-1

#1
Culvert

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.610	0.610	1.39	0.12

Structure Detail:

Structure #1 (Culvert)

Drainage Structure DS-1

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
50.00	2.00	0.0160	1.50	0.00	0.90

Culvert Results:

Design Discharge = 1.39 cfs

Minimum pipe diameter: 1 - 8 inch pipe(s) required

USE 18" CMP

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	0.610	0.032	0.000	0.000	81.000	F	1.39	0.120
Σ		0.610						1.39	0.120

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	6.67	20.00	300.00	2.580	0.032
#1	1	Time of Concentration:					0.032

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	12.82	100.00	780.00	10.740	0.020
#1	1	Muskingum K:					0.000