

**OAK GROVE RESOURCES, LLC**

**OAK GROVE MINE  
P-3937 REVISION R-40  
JEFFERSON COUNTY, ALABAMA**

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

**DETAILED DESIGN PLANS  
PRIMARY ROAD 025P  
ATTACHMENT III-B-5**

**DECEMBER 4, 2013**



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

December 4, 2013

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

RE: Oak Grove Resources, LLC  
Oak Grove Mine  
P-3232 Revision R-40

Dear Gary:

I hereby certify the attached Detailed Design Plans for Primary Road 025P for the above referenced mine is 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.

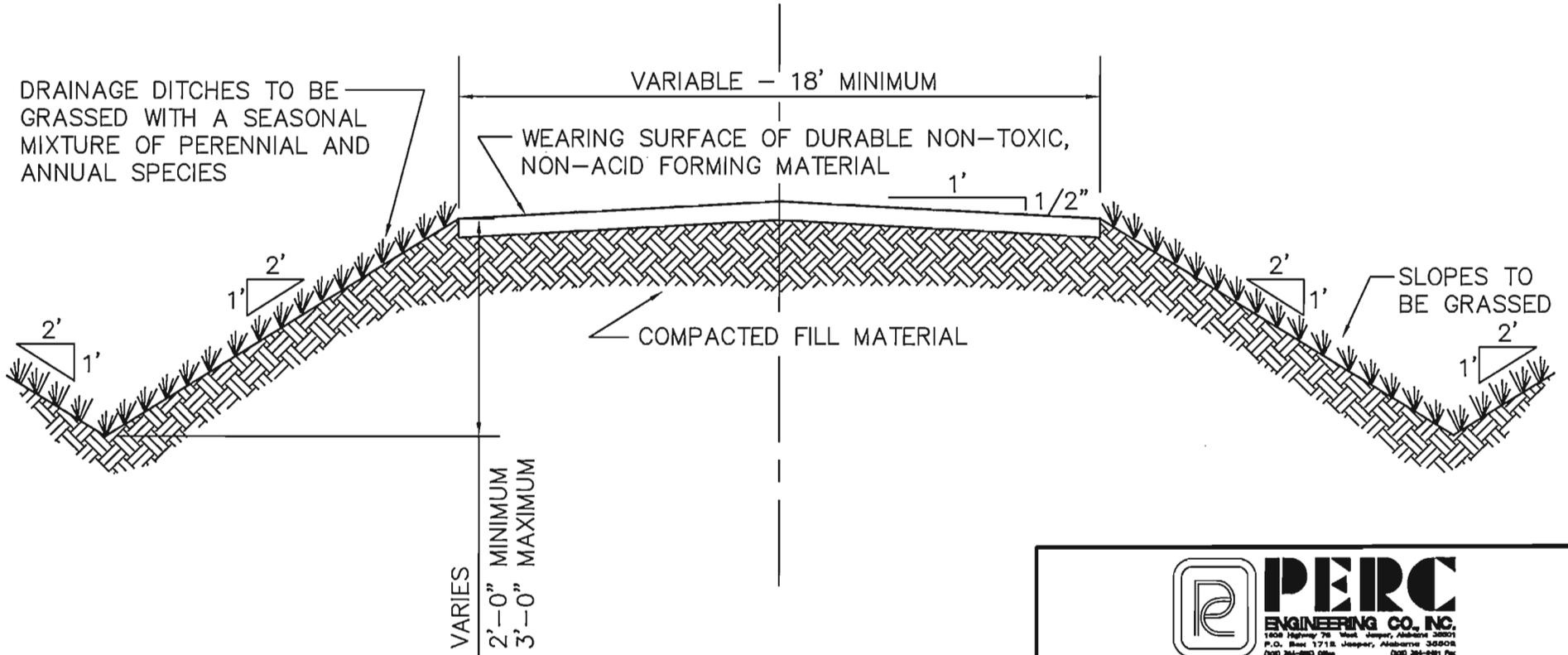
9. No sustained grades will exceed ten percent unless deemed necessary, in which case appropriate sediment control facilities will be constructed. If grades in excess of fifteen percent are required, cross drains, ditch relief drains and road drainways will be located at a minimum distance of three-hundred 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 PRIMARY ROAD FILL SECTION

NO SCALE



## TYPICAL FILL SECTION PRIMARY ROAD

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

DATE: 2-3-97

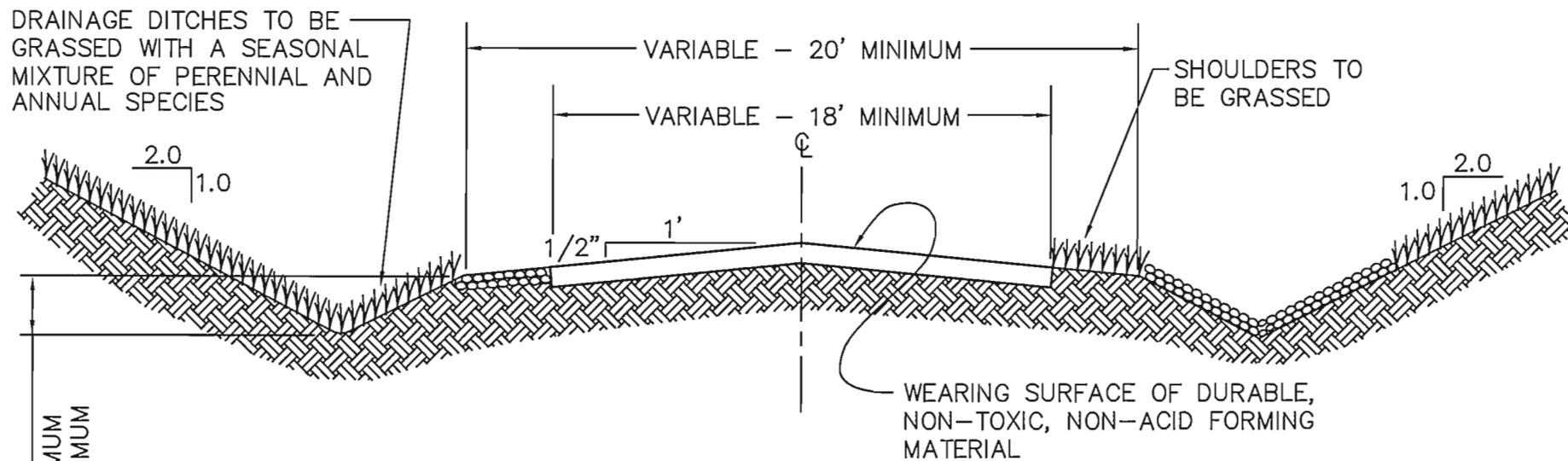
APPROVED BY: S.R.I.

SCALE: NONE

ATTACHMENT III.-B.-5.

# TYPICAL PRIMARY ROAD CUT SECTION

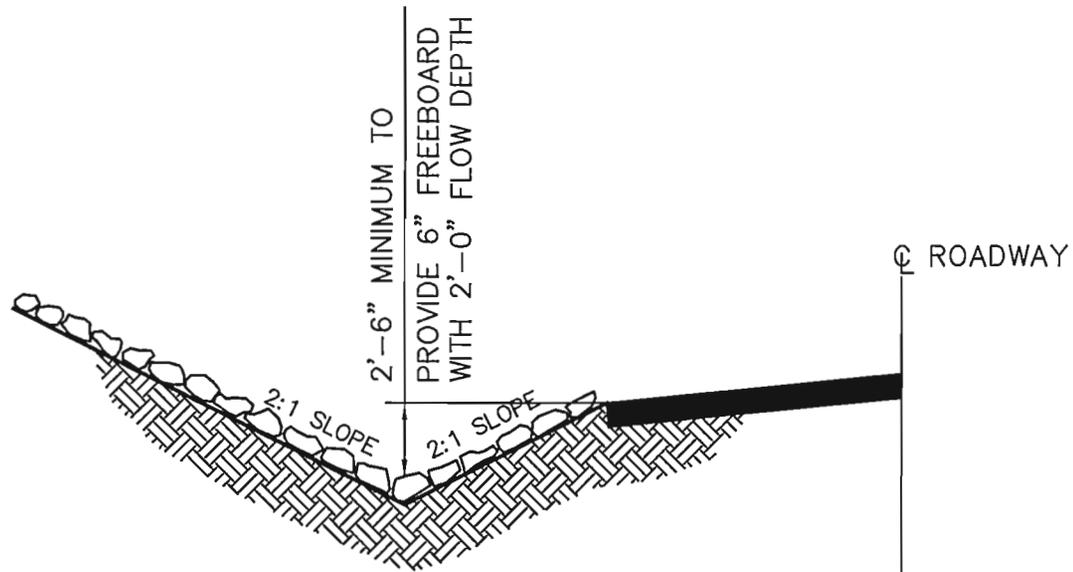
. NO SCALE



## TYPICAL CUT SECTION PRIMARY ROAD

DRAWN BY: K.D.P.	DATE: 2-3-97
DWG. NAME: TYPHAULC	
APPROVED BY: S.R.I.	SCALE: NONE

ATTACHMENT III - B. - 5.



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".



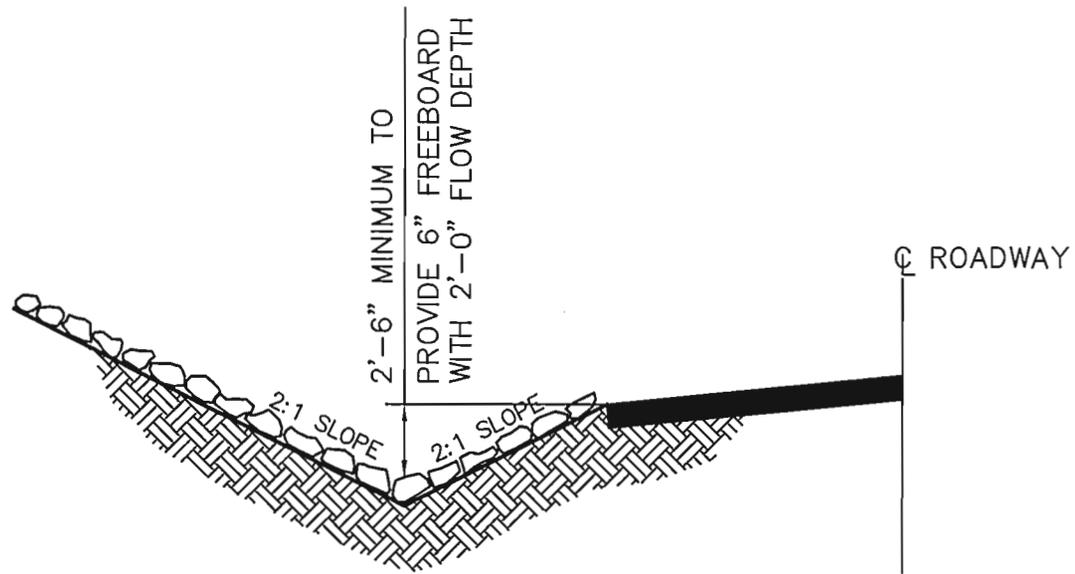
TYPICAL PRIMARY ROADWAY DITCH  
CROSS SECTION

DRAWN BY: S.D.M.  
DWG. NAME: PRIMRD1

DATE: 11/8/2011

APPROVED BY: L.G.S.

SCALE: NONE



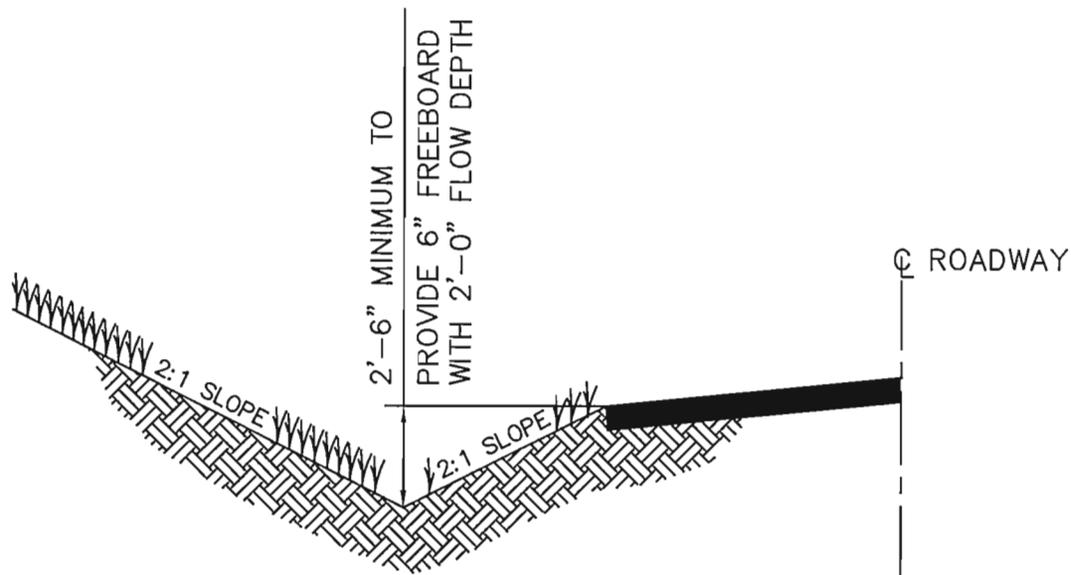
DITCH GRADIENT 11% TO 17%

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



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.



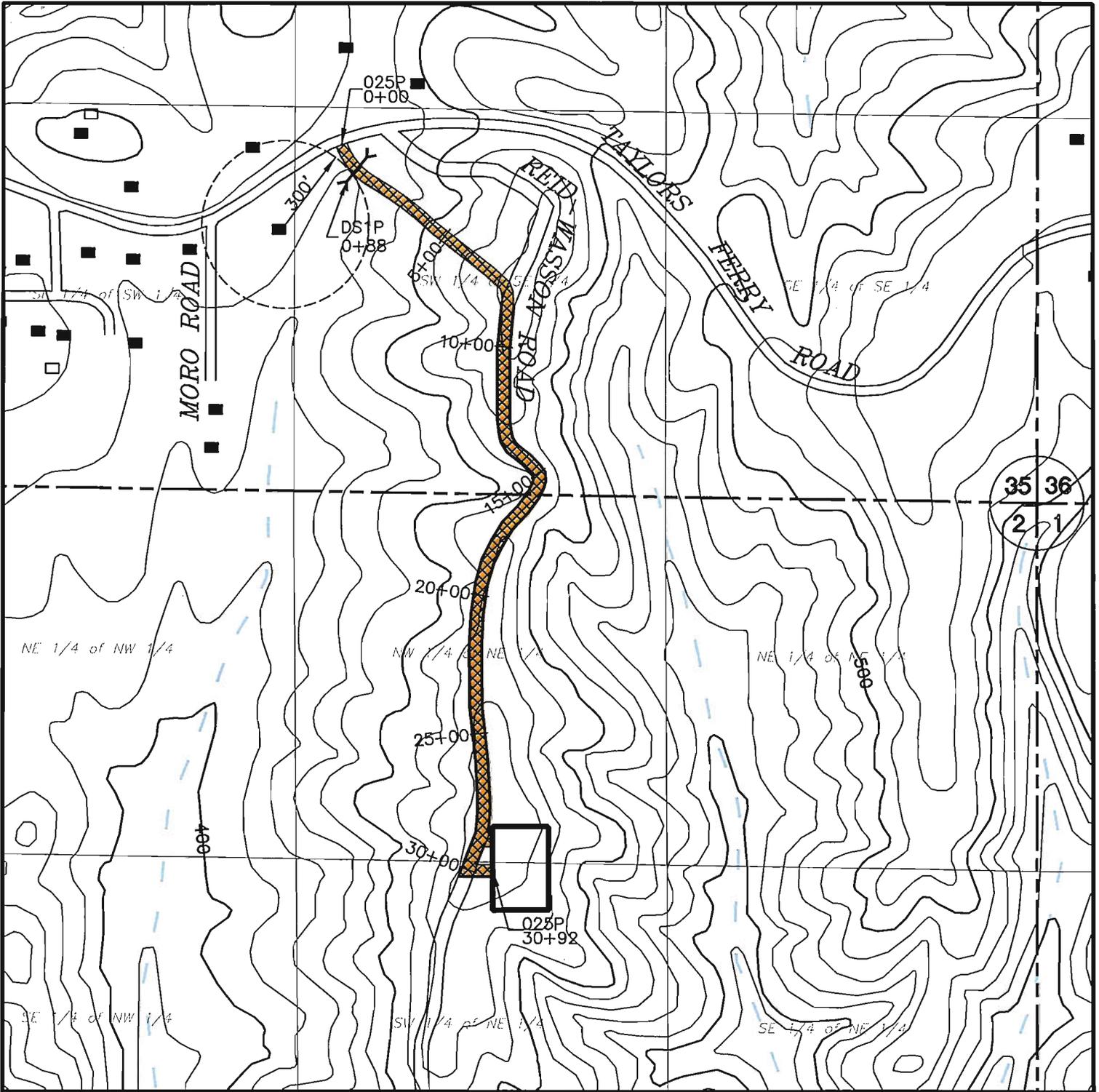
**PERC**  
 ENGINEERING CO., INC.  
 1608 Highway 78 West, Wetumpka, Alabama 36081  
 P.O. Box 1718, Jasper, Alabama 35802  
 (205) 384-8863 Office (205) 384-9881 Fax

TYPICAL PRIMARY ROADWAY DITCH  
 CROSS SECTION

DRAWN BY: K.D.P.	DATE: 2-4-97
DWG. NAME: PRIMROAD	
APPROVED BY: R.E.P.	SCALE: NONE

## NOTES

- 1) The proposed primary road will be a 3092 foot long access road, with one 30" CMP at station 0+88, that will be used to access a proposed fan shaft site.
- 2) Due to there being no significant cut/fill, no stability analysis is required.



BASE MAP - GILMORE, ALABAMA 7.5  
MINUTE U.S.G.S. QUADRANGLE MAP.

**LEGEND**

-  Permit Boundary
-  Surface Contour
-  Perennial Stream
-  Intermittent Stream
-  Occupied Dwelling
-  Unoccupied Dwelling (Barn, Shed, etc.)
-  Primary Road

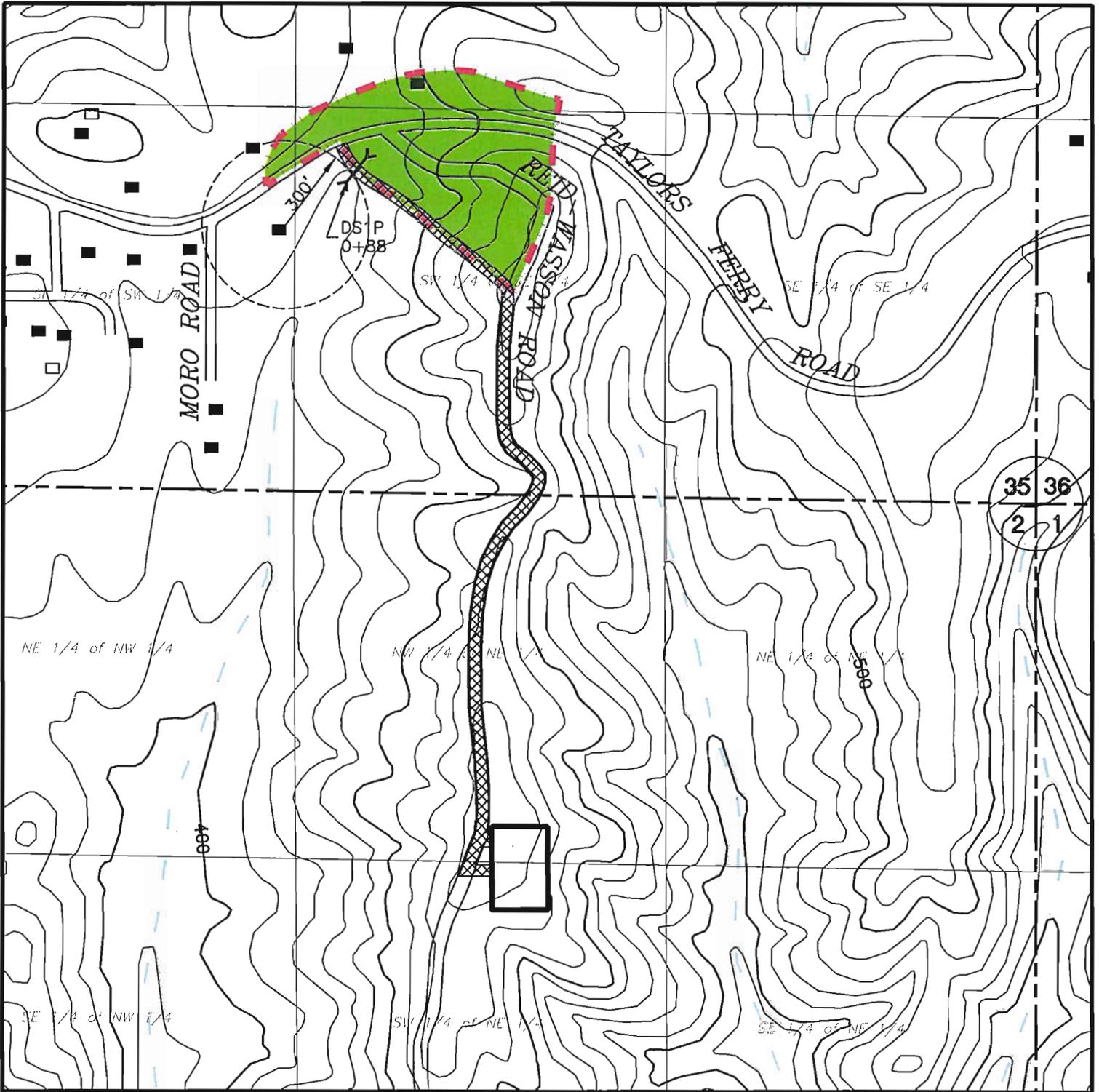
Scale: 1" = 500'




**ATTACHMENT III-B-5  
OAK GROVE RESOURCES, L.L.C.  
OAK GROVE MINE / P-3232  
REVISION R-40  
PRIMARY ROAD 025P LOCATION MAP**

DRAWN BY:	J.W.T.	DATE:	10/09/2013
DWG. NAME:	OGMPR25LMR40		
APPROVED BY:	L.G.S.	SCALE:	1" = 500'

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BASE MAP - GILMORE, ALABAMA 7.5  
MINUTE U.S.G.S. QUADRANGLE MAP.

**LEGEND**

- Permit Boundary
- Surface Contour
- Perennial Stream
- Intermittent Stream
- Occupied Dwelling
- Unoccupied Dwelling (Barn, Shed, etc..)
- Ancillary Road
- Watershed Boundary

**LAND USE INFORMATION, CURVE NUMBER**

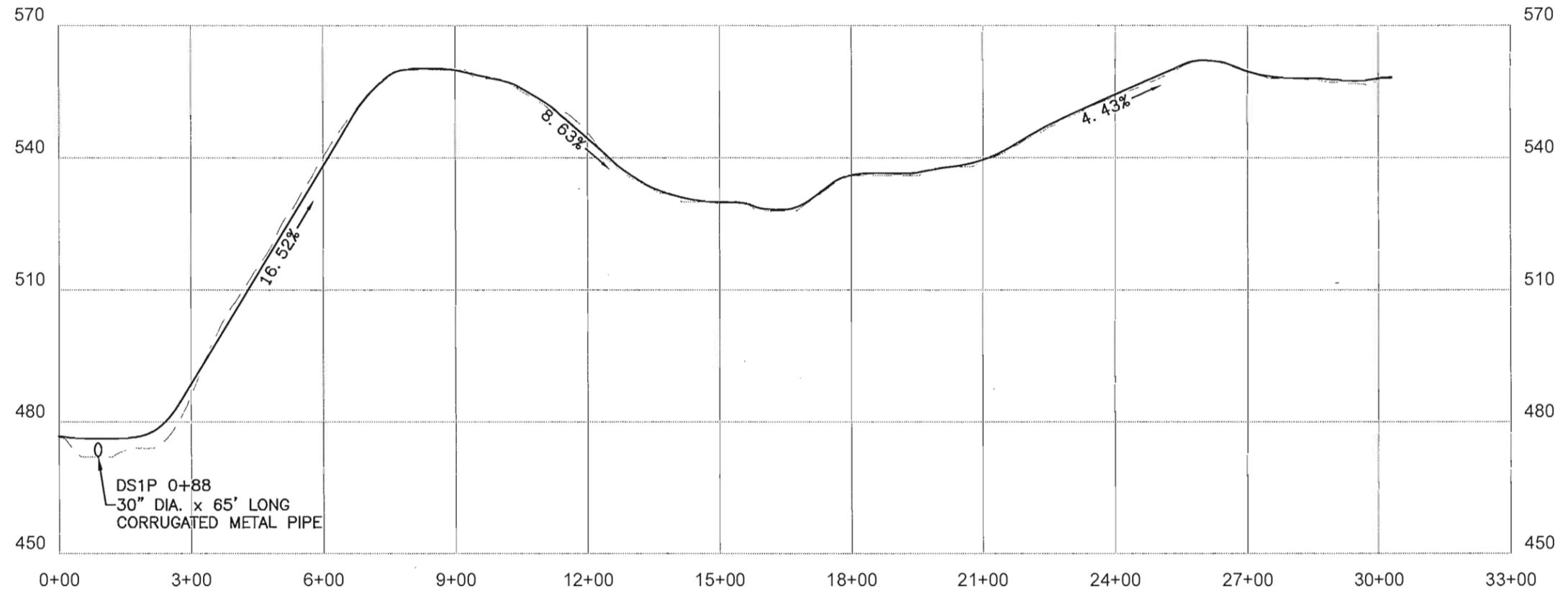
- Unmanaged Timberland, Curve Number 70

Scale: 1" = 500'



**OAK GROVE RESOURCES, L.L.C.**  
**OAK GROVE MINE / P-3232**  
**REVISION R-40**  
**PRIMARY ROAD 025P**  
**WATERSHED MAP**

DRAWN BY: J.W.T.	DATE: 10/09/2013
DWG. NAME: OGMPR25WSMR40	
APPROVED BY: L.G.S.	SCALE: 1" - 500'



HORIZONTAL SCALE: 1"=300  
VERTICAL SCALE: 1"=30'

LEGEND

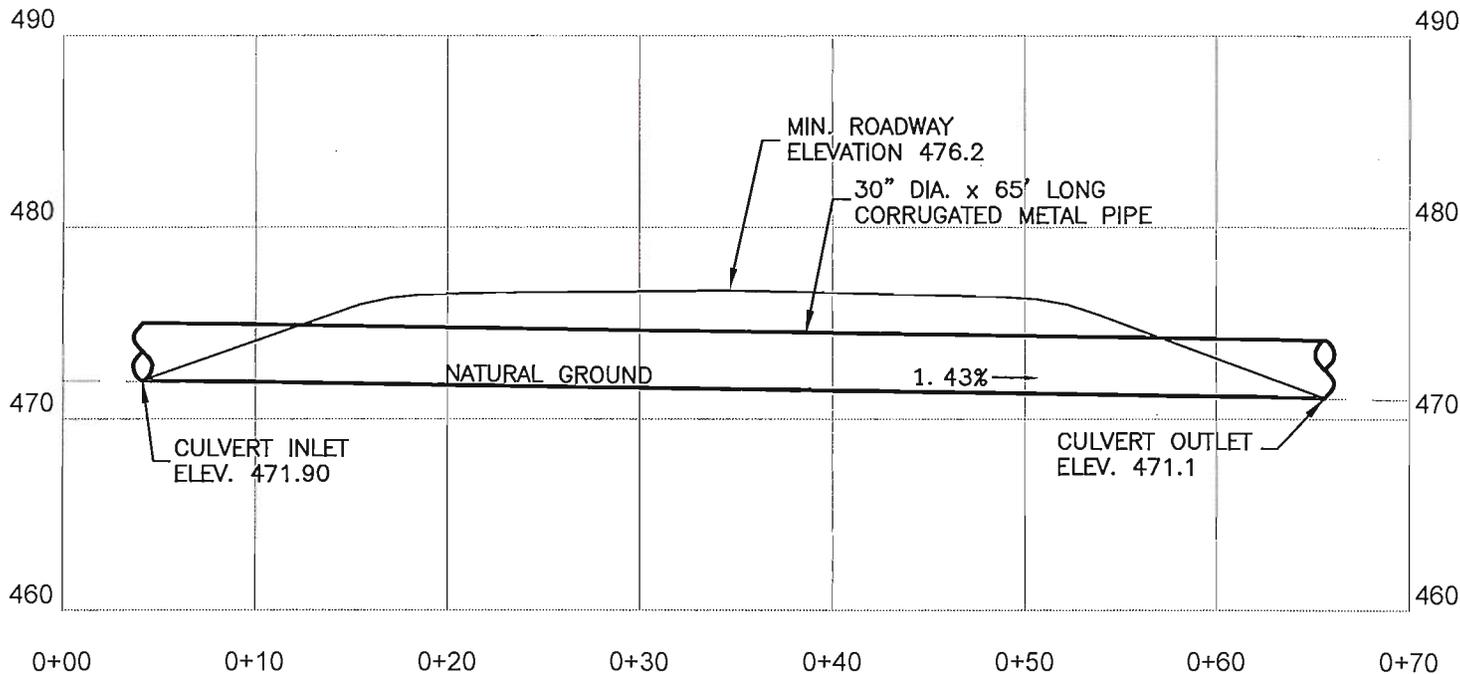
- EXISTING GRADE
- PROPOSED GRADE



**Attachment III-B-5**  
**Oak Grove Resources, LLC**  
**Oak Grove Mine**  
**P-3232 Revision R-40**  
**Primary Road 025P Profile**

DRAWN BY: J.W.T.	DATE: 10-09-2013
DWG. NAME: OGMPR25PROR40	
APPROVED BY: L.G.S.	SCALE: AS NOTED

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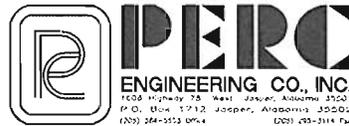


DS1P  
0+88

**HYDRAULICS INFORMATION**

Drainage Area = 10.64 Acres  
 10 YR.-6 HR., Q = 27.69 C.F.S.  
 Maximum Water Elev. = 475.2  
 Minimum Fill Elev. = 476.2  
 Maximum Allowable Cover 30" C.M.P. = 99'  
 Minimum Allowable Cover 30" C.M.P. = 1'  
 Wall Thickness = 0.064"  
 Minimum Freeboard = 1'

NOTE:  
 PROVIDE TRUCK LOAD CAPACITY AND MINIMUM/MAXIMUM  
 COVER TO VENDOR WHEN ORDERING CULVERTS.



**Attachment III-B-5**  
**Oak Grove Resources, LLC**  
**Oak Grove Mine**  
**P-3232 Revision R-40**  
**Primary Road 025P**

DRAWN BY: J.W.T.	DATE: 10-09-2013
DWG. NAME: OGMPR25CSR40	
APPROVED BY: L.G.S.	SCALE: AS NOTED

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**Oak Grove Resources, LLC**

**Oak Grove Mine**

**P-3232 Revision R-40**

**Primary Road 025P**

**Drainage Structure DS1P**

**Station 0+88**

***4.3 Inch, 10 Year-6 Hour***

***NRCS Type II***

JWT

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

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

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***General Information***

***Storm Information:***

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	4.300 inches

**Structure Networking:**

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Culvert	#1	==>	End	0.000	0.000	DS1P 0+88

#1  
Culvert

***Structure Summary:***

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.640	10.640	27.69	1.35

**Structure Detail:**

Structure #1 (Culvert)

DS1P 0+88

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
65.00	1.43	0.0240	4.00	0.00	0.90

Culvert Results:

Design Discharge = 27.69 cfs

Minimum pipe diameter: 1 - 30 inch pipe(s) required

***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	10.640	0.083	0.000	0.000	70.000	M	27.69	1.354
		<b>Σ 10.640</b>						<b>27.69</b>	<b>1.354</b>

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

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	21.00	42.00	200.00	1.150	0.048
		8. Large gullies, diversions, and low flowing streams	5.44	48.00	882.00	6.990	0.035
<b>#1</b>	<b>1</b>	<b>Time of Concentration:</b>					<b>0.083</b>

CURRENT DATE: 10-08-2013  
CURRENT TIME: 07:31:28

FILE DATE: 10-08-2013  
FILE NAME: OGMR39

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3 C 3 SITE DATA 3 CULVERT SHAPE, MATERIAL, INLET 3
3 U AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
3 L 3 INLET OUTLET CULVERT 3 BARRELS 3
3 V 3 ELEV. ELEV. LENGTH 3 SHAPE SPAN RISE MANNING INLET 3
3 NO. 3 (ft) (ft) (ft) 3 MATERIAL (ft) (ft) n TYPE 3
3 1 3 471.93 471.00 65.01 3 1 CSP 2.50 2.50 .024 CONVENTIONAL 3
3 2 3 3
3 3 3 3
3 4 3 3
3 5 3 3
3 6 3 3
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SUMMARY OF CULVERT FLOWS (cfs) FILE: OGMR39 DATE: 10-08-2013

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
471.93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
472.76	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.00	1
473.12	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.00	1
473.64	9.0	9.0	0.0	0.0	0.0	0.0	0.0	0.00	1
473.93	12.0	12.0	0.0	0.0	0.0	0.0	0.0	0.00	1
474.19	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.00	1
474.42	18.0	18.0	0.0	0.0	0.0	0.0	0.0	0.00	1
474.67	21.0	21.0	0.0	0.0	0.0	0.0	0.0	0.00	1
474.90	24.0	24.0	0.0	0.0	0.0	0.0	0.0	0.00	1
475.17	27.0	27.0	0.0	0.0	0.0	0.0	0.0	0.00	1
475.25	27.7	27.7	0.0	0.0	0.0	0.0	0.0	0.00	1
477.00	38.1	38.1	0.0	0.0	0.0	0.0	0.0	0.00	1

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SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: OGMR39 DATE: 10-08-2013

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
471.93	0.000	0.00	0.00	0.00
472.76	0.000	3.00	0.00	0.00
473.12	0.000	6.00	0.00	0.00
473.64	0.000	9.00	0.00	0.00
473.93	0.000	12.00	0.00	0.00
474.19	0.000	15.00	0.00	0.00
474.42	0.000	18.00	0.00	0.00
474.67	0.000	21.00	0.00	0.00
474.90	0.000	24.00	0.00	0.00
475.17	0.000	27.00	0.00	0.00
475.25	0.000	27.69	0.00	0.00

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<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

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CURRENT DATE: 10-08-2013

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PERFORMANCE CURVE FOR CULVERT 1 - 1( 2.50 (ft) BY 2.50 (ft)) CSP

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DIS-CHARGE FLOW (cfs)	HEAD-ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	471.93	0.00	0.00	0-NF	0.00	0.00	0.00	%-200.00	0.00	0.00
3.00	472.76	0.83	0.00	1-S2n	0.56	0.56	0.56	%-200.00	3.64	0.00
6.00	473.12	1.19	0.00	1-S2n	0.80	0.80	0.80	%-200.00	4.39	0.00
9.00	473.64	1.50	1.71	2-M2c	1.00	1.00	1.00	%-200.00	4.91	0.00
12.00	473.93	1.78	2.00	2-M2c	1.17	1.16	1.16	%-200.00	5.40	0.00
15.00	474.19	2.05	2.26	2-M2c	1.34	1.30	1.30	%-200.00	5.81	0.00
18.00	474.42	2.32	2.49	2-M2c	1.51	1.43	1.43	%-200.00	6.19	0.00
21.00	474.67	2.61	2.74	2-M2c	1.68	1.55	1.55	%-200.00	6.56	0.00
24.00	474.90	2.91	2.97	2-M2c	1.86	1.66	1.66	%-200.00	6.93	0.00
27.00	475.17	3.24	3.22	2-M2c	2.10	1.77	1.77	%-200.00	7.27	0.00
27.69	475.25	3.32	3.28	2-M2c	2.18	1.79	1.79	%-200.00	7.35	0.00

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El. inlet face invert 471.93 ft El. outlet invert 471.00 ft

El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

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\*\*\*\*\* SITE DATA \*\*\*\*\* CULVERT INVERT \*\*\*\*\*

INLET STATION 0.00 ft  
 INLET ELEVATION 471.93 ft  
 OUTLET STATION 65.00 ft  
 OUTLET ELEVATION 471.00 ft  
 NUMBER OF BARRELS 1  
 SLOPE (V/H) 0.0143  
 CULVERT LENGTH ALONG SLOPE 65.01 ft

\*\*\*\*\* CULVERT DATA SUMMARY \*\*\*\*\*

BARREL SHAPE CIRCULAR  
 BARREL DIAMETER 2.50 ft  
 BARREL MATERIAL CORRUGATED STEEL  
 BARREL MANNING'S n 0.024  
 INLET TYPE CONVENTIONAL  
 INLET EDGE AND WALL THIN EDGE PROJECTING  
 INLET DEPRESSION NONE

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CONSTANT WATER SURFACE ELEVATION  
271.00

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ROADWAY SURFACE	GRAVEL
EMBANKMENT TOP WIDTH	25.00 ft
CREST LENGTH	100.00 ft
OVERTOPPING CREST ELEVATION	477.00 ft

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□