

HYDROLOGY STUDY

QUALITY COAL CO., INC.

DUTTON HILL MINE NO. 2

P-

WALKER COUNTY, ALABAMA

PRIMARY ROAD 1P

DETAILED DESIGN PLANS

ATTACHMENT III-B-5

DECEMBER 31, 2013

Quality Coal, Inc.

P.O. Box 2705 • Jasper, AL 35502-2705
Phone: (205) 384-6300 • Fax (205) 384-6040

December 31, 2013

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

RE: Quality Coal Co., Inc.
Dutton Hill Mine No. 2
P-

Dear Gary,

I hereby certify the attached detailed design plans for Primary Road 1P for the above referenced mine are in accordance with the current engineering practices and the Regulations of the Alabama Surface Mining Commission and are true and correct to the best of my knowledge, information and belief.

If you have any questions or require additional information please give me a call at (205) 388-7376 or email at sdmiles7@gmail.com.

Sincerely,



Stephen Miles, P.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 and will have a minimum width of ten feet and a maximum width necessary to accommodate the largest equipment traveling the road.
7. 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.
8. 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.
9. Roads will be constructed so as to have adequate drainage utilizing ditches, culverts, cross drains and ditch relief drains designed to

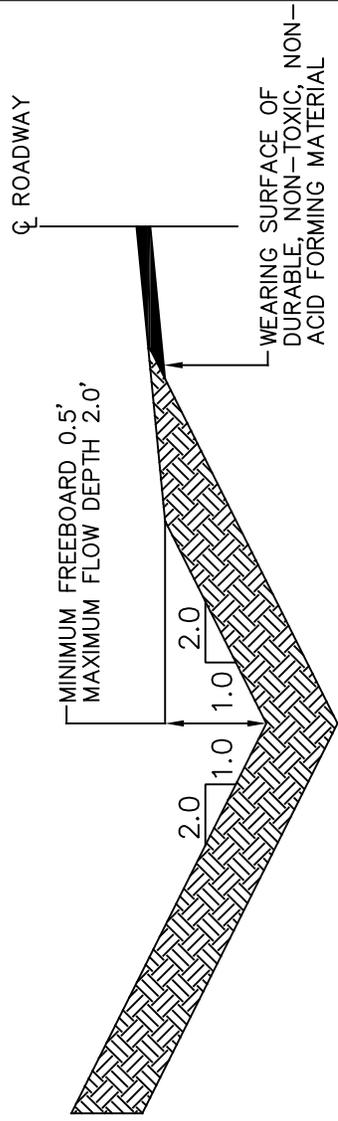
safely pass the peak runoff from a ten year, six hour precipitation event. Drainage pipes and culverts shall be installed as designed and will be maintained in a free and operating condition to prevent and control erosion at inlets and outlets. Culverts have been designed to support the load of the heaviest 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.

10. 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.
11. 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.
12. 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.
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**PRIMARY ROAD
TYPICAL DRAINAGE DITCH CROSS-SECTION**

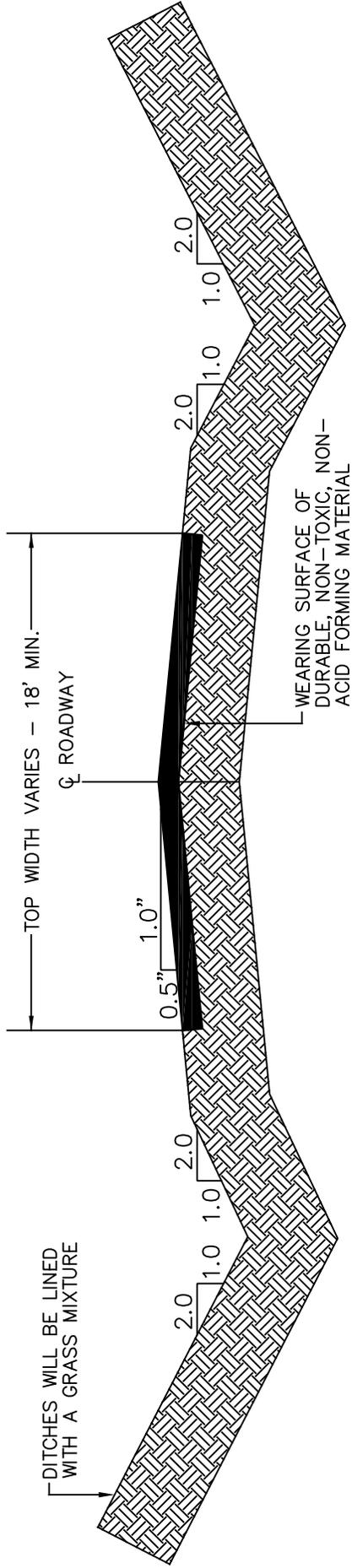


MINIMUM DITCH GRADIENT = 0%
 MAXIMUM DITCH GRADIENT = 5%
 DRAINAGE DITCH TO BE LINED WITH A
 GRASS MIXTURE.

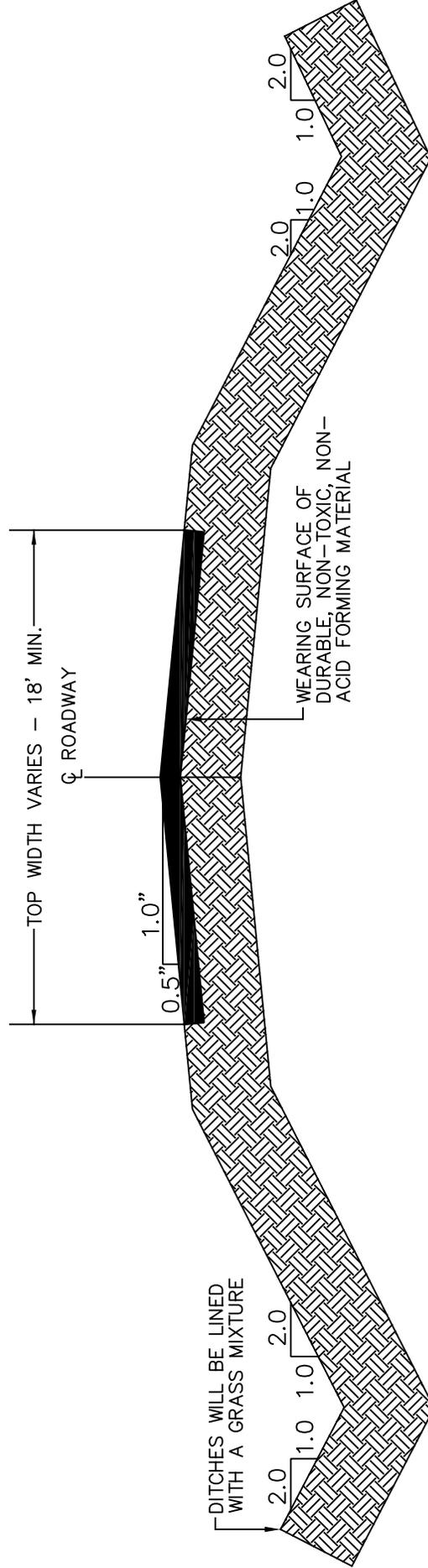
MINIMUM DITCH GRADIENT = 6%
 MAXIMUM DITCH GRADIENT = 10%
 DRAINAGE DITCH TO BE LINED WITH DURABLE
 NON-TOXIC & NON-ACID FORMING SANDSTONE OR
 LIMESTONE CLASS I RIP-RAP AND HAVE A MINIMUM
 THICKNESS OF 12".

MINIMUM DITCH GRADIENT = 11%
 MAXIMUM DITCH GRADIENT = 17%
 DRAINAGE DITCH TO BE LINED WITH DURABLE
 NON-TOXIC & NON-ACID FORMING SANDSTONE OR
 LIMESTONE CLASS II RIP-RAP AND HAVE A MINIMUM
 THICKNESS OF 16".

PRIMARY ROAD TYPICAL CUT SECTION

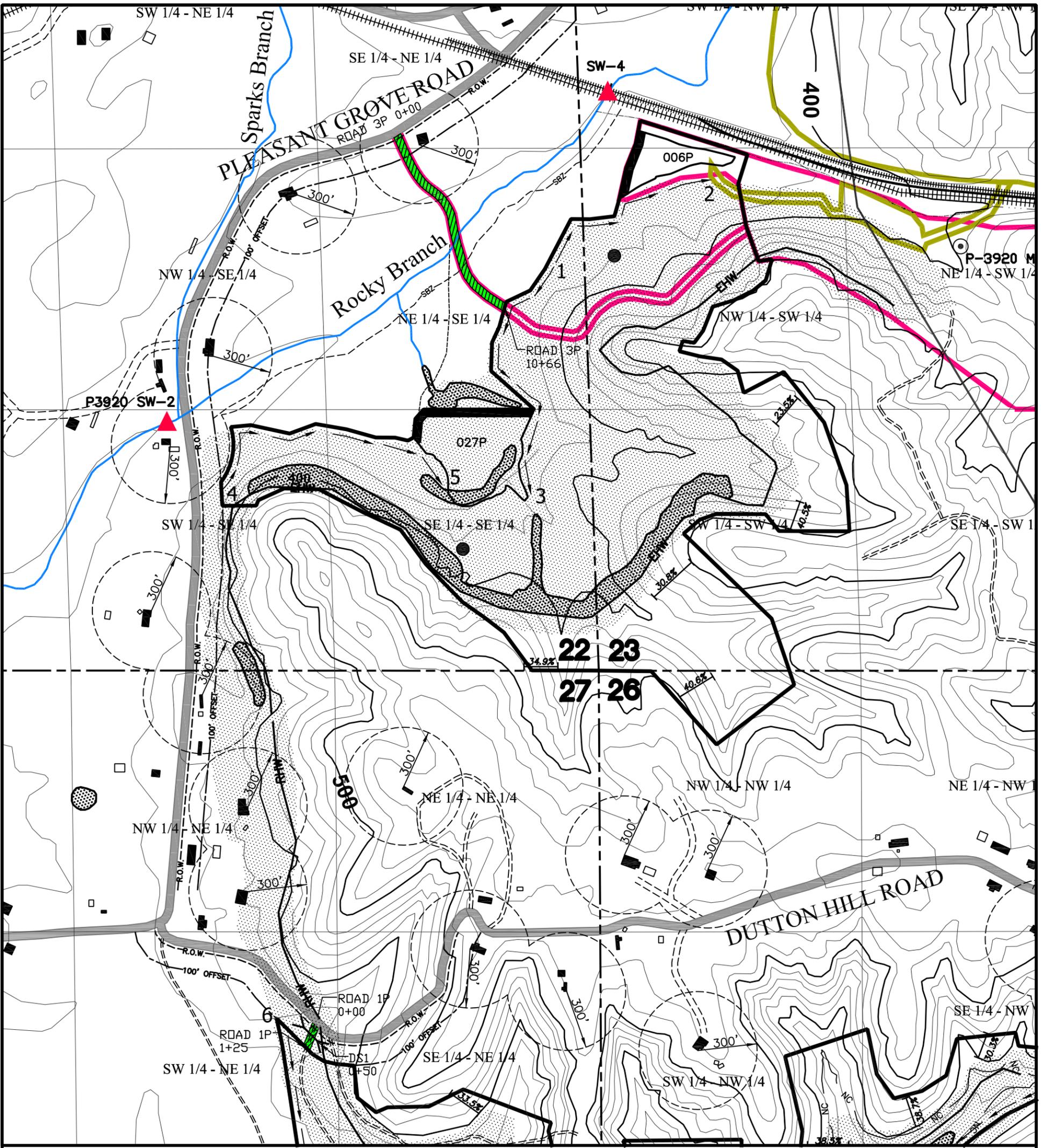


PRIMARY ROAD TYPICAL FILL SECTION

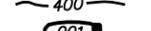
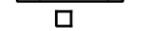
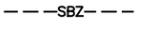


NOTES

- 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.

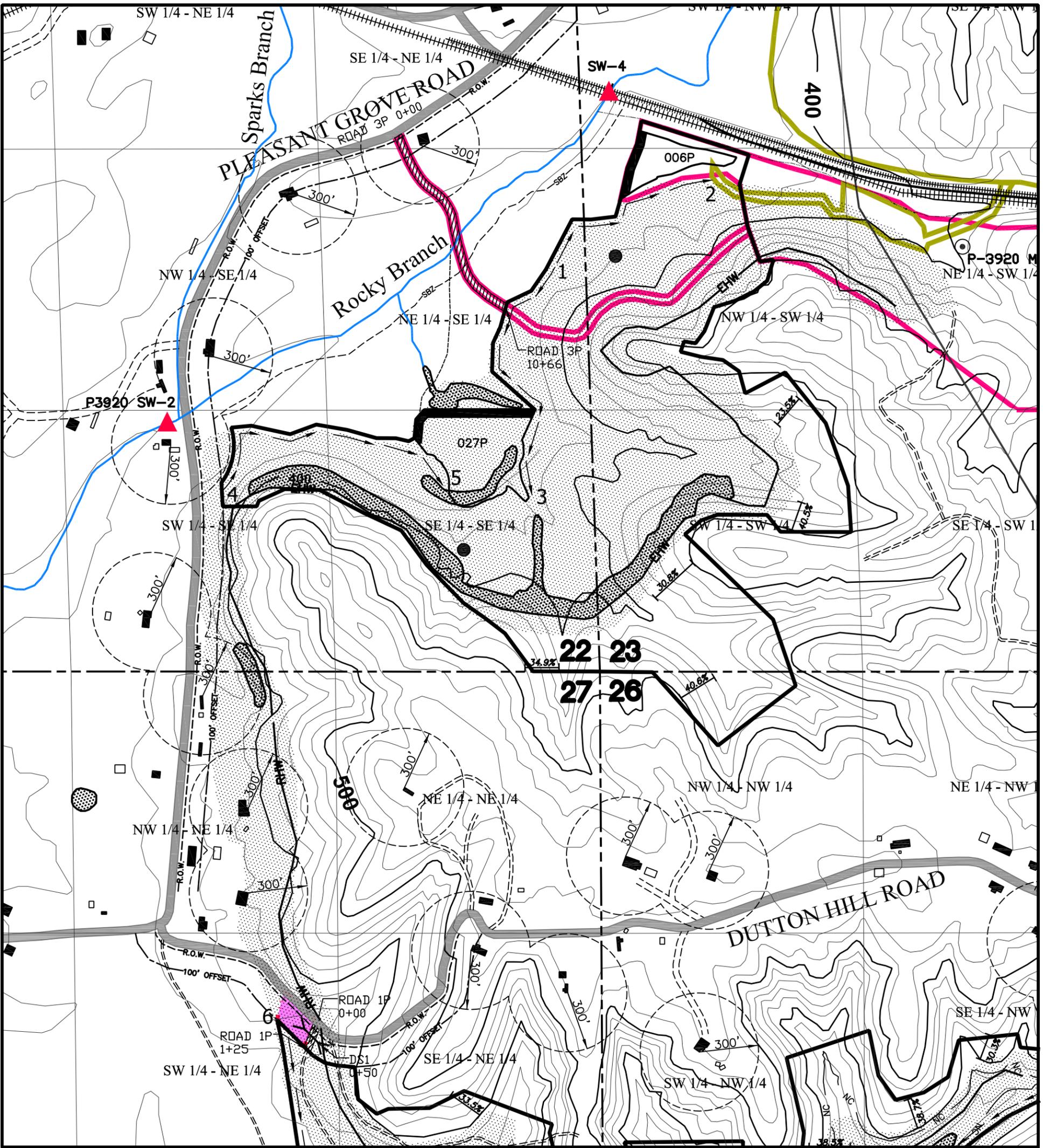


MAP LEGEND

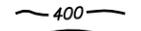
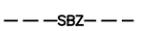
-  Permit Boundary
-  Surface Contour
-  Sediment Basin
-  Existing Highwall
-  Reclaimed Highwall
-  Diversion Ditch
-  County Road (Paved unless otherwise designated)
-  Road (Private unless otherwise shown)
-  Area Previously Surface Mined
-  Unoccupied Dwelling (Barn, Shed, Etc.)
-  Occupied Dwelling
-  Primary Road
-  ASMC Permit P-3920
-  ASMC Permit P-3793
-  Drainage Course
-  Perennial Stream
-  Stream Buffer Zone
-  Culvert

ATTACHMENT III-B-5
PRIMARY ROAD LOCATION MAP
QUALITY COAL CO., INC.
DUTTON HILL MINE NO. 2
P-3980

DATE: 1/2/2015 SCALE: 1"=500'



MAP LEGEND

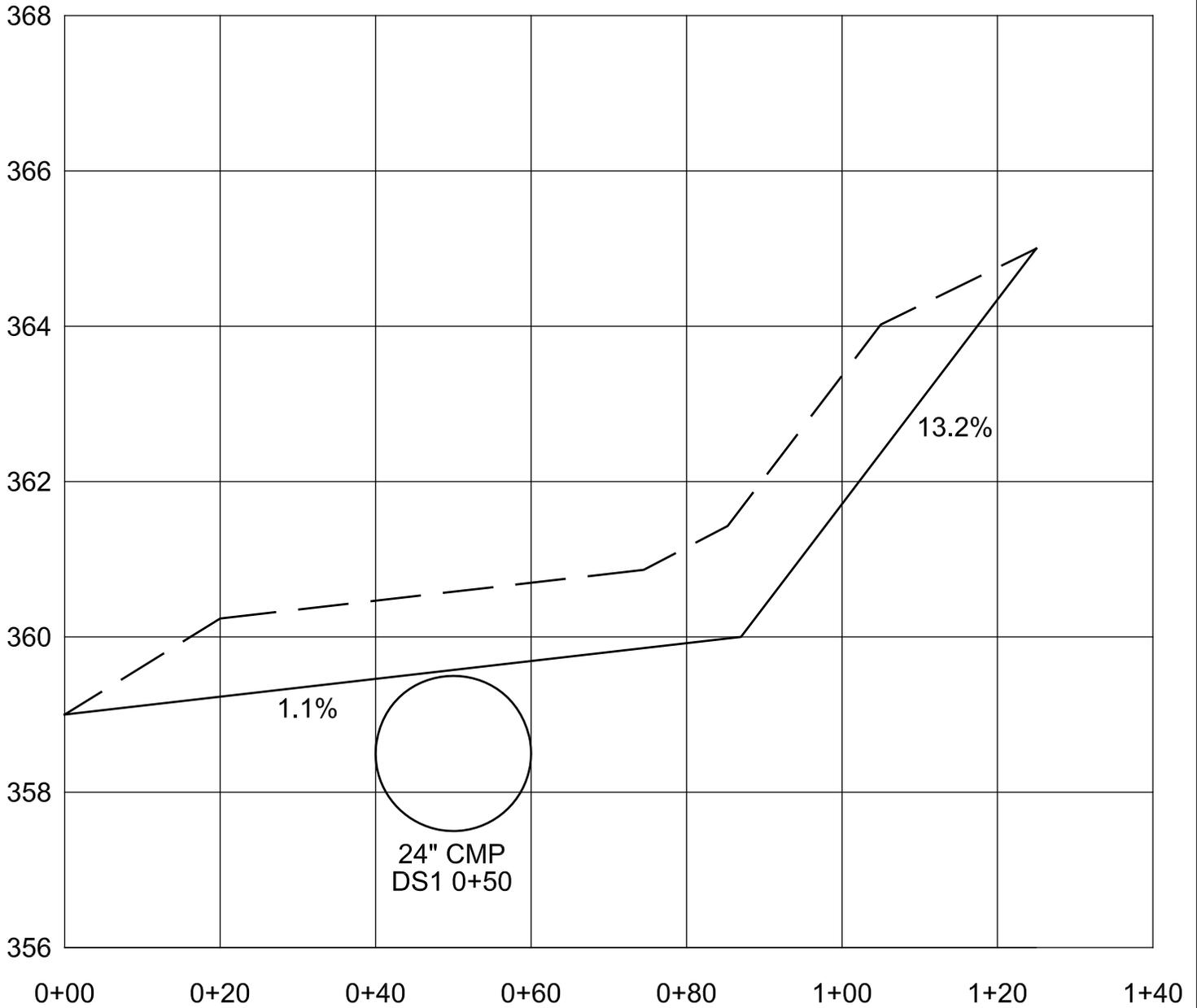
-  Permit Boundary
-  Surface Contour
-  Sediment Basin
-  Existing Highwall
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-  County Road (Paved unless otherwise designated)
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-  Unoccupied Dwelling (Barn, Shed, Etc.)
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-  ASMC Permit P-3920
-  ASMC Permit P-3793
-  Drainage Course
-  Perennial Stream
-  Stream Buffer Zone
-  Culvert
-  Watershed Boundary

CURVE NUMBER INFORMATION

-  Previously Mined Area, Curve No. 68
-  Gravel Road, Curve No. 95

ATTACHMENT III-B-5
PRIMARY ROAD LOCATION MAP
QUALITY COAL CO., INC.
DUTTON HILL MINE NO. 2
P-3980

DATE: 1/2/2015 SCALE: 1"=500'

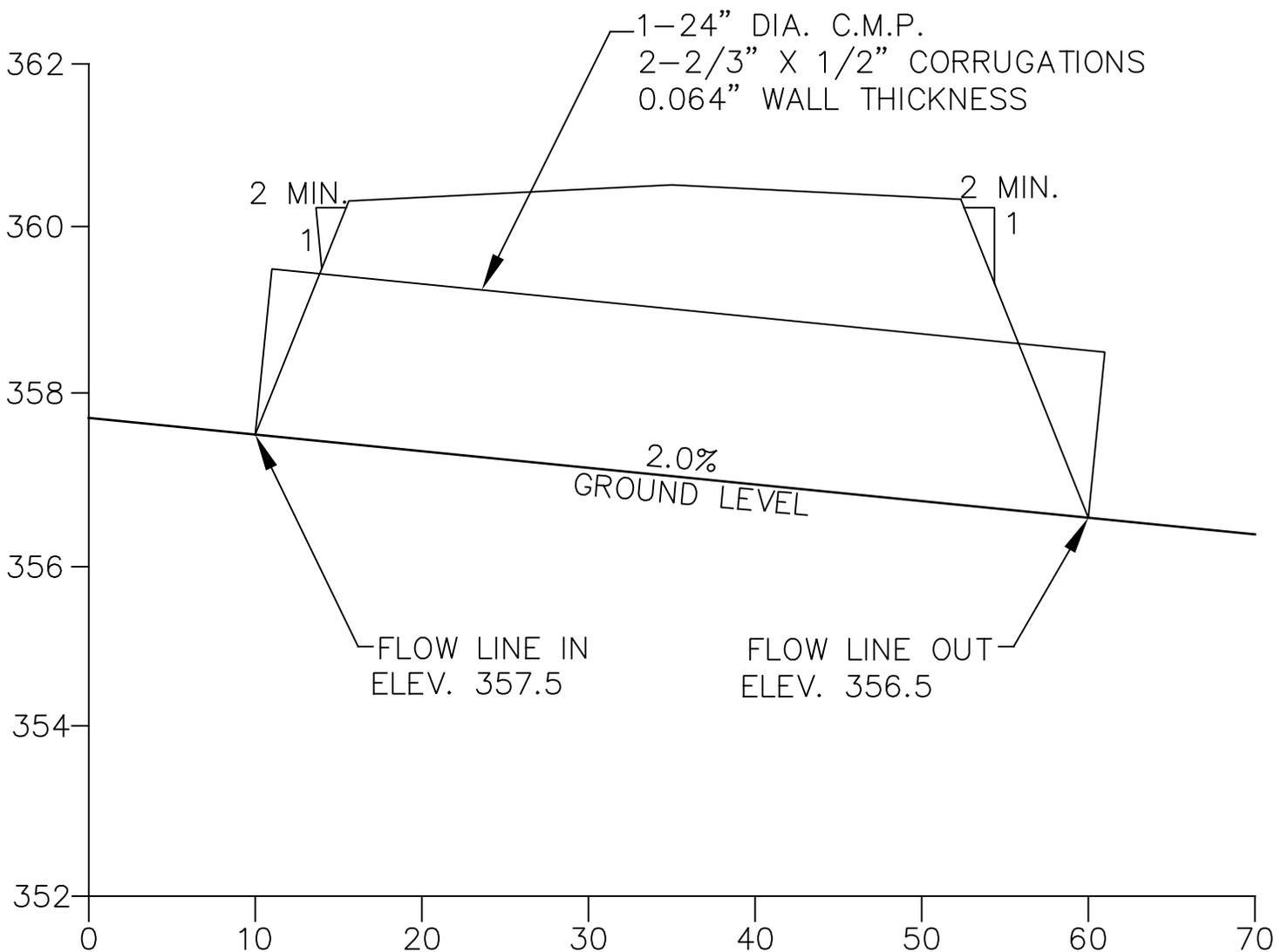


Primary Road 1P

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

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

Attachment III-B-5 Quality Coal Co., Inc. Dutton Hill Mine No. 2 P-3980 Primary Road Profile	
DATE: 10/27/2014	SCALE: H: 1" = 20' V: 1" = 2'



Hydraulics Information

Drainage Area = 2.0 Acres
 10 YR.-6 HR., Q = 3.5 C.F.S.
 Maximum Water Elev. = 359.5
 Minimum Fill Elev. = 360.5
 Minimum Freeboard = 1'
 Maximum Allowable Cover 24" C.M.P. 124'
 Minimum Allowable Cover 24" C.M.P. = 1'
 Wall Thickness = 0.064"
 Minimum Freeboard = 1'

Attachment III-B-5
 Quality Coal Co., Inc.
 Dutton Hill Mine No. 2
 P-
 Primary Road 1P Cross-Section - DS1 0+50

DATE: 1/2/2014

SCALE: Not to Scale

Quality Coal Co., Inc.
Dutton Hill Mine No. 2
P-
Primary Road 1P
Drainage Structure DS1 0+50

4.2 Inch, 10 Year - 6 Hour
SCS 6 Hour Event

Stephen Miles, P.E.

Quality Coal Co., Inc.
PO Box 2705
Jasper, Alabama 35502

General Information

Storm Information:

Storm Type:	Rainfall Event
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Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1470
1.00	0.3360
1.50	0.5670
2.00	0.9660
2.50	2.5200
3.00	2.9400
3.50	3.2760
4.00	3.5070
4.50	3.7170
5.00	3.8850
5.50	4.0530
6.00	4.2000

Peak 30-minute Intensity: 3.108 in/hr

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Culvert	#1	==>	End	0.000	0.000	Drainage Structure DS1 0+50

#1
Culvert

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	2.000	2.000	3.51	0.32

Structure Detail:

Structure #1 (Culvert)

Drainage Structure DS1 0+50

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
50.00	2.00	0.0240	1.30	0.00	0.90

Culvert Results:

Design Discharge = 3.51 cfs

Minimum pipe diameter: 1 - 18 inch pipe(s) required

⇒ USE 24" 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	1.500	0.035	0.000	0.000	68.000	M	2.00	0.165
	2	0.500	0.046	0.000	0.000	95.000	F	1.51	0.151
	Σ	2.000						3.51	0.316

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	5.00	10.00	200.00	1.780	0.031
		8. Large gullies, diversions, and low flowing streams	5.00	5.00	100.00	6.700	0.004
#1	1	Time of Concentration:					0.035
#1	2	7. Paved area and small upland gullies	0.44	1.00	225.00	1.340	0.046
#1	2	Time of Concentration:					0.046