Logos Engineering
P.O. Box 350
Manchester, Kentucky 40962

Don R. Roberts
Professional Engineer

Office (606) 598-6746
Fax (606) 598-4544

May 6, 2008

Mr. Douglas L. Bartley, Supervisor
Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Permit Application No. 807-0339
Original
Nally & Hamilton Enterprises, Inc.

Dear Mr. Bartley:

Enclosed you will find the corrections and/or additional information to the deficiencies noted in your most recent letter dated April 24, 2008, concerning the above referenced permit application. Each item has been addressed as follows:

1. Acreage: (a – c) Items 7.2, 8.4 and 8.8 have been corrected to read 252.09 acres.

   (d) Item 8.11 is correct with 252.09 acres.

   (e) Item 10.2, the advertisement, has the correct acreage.

   (f) Item 11.5 has been corrected to 252.09 acres.

   (g – j) The acreage is correct for items 20.1, 21.6, 21.10, 22.2 and 24.5.A (1).

   (k) The MRP map surface acreage has now been corrected.

2. NOI: Awaiting expiration of comment period.

3. Pending Protest: Per your conversation, the legal issue has been resolved.

4. Corrected Copies: Two (2) corrected copies have now been submitted.

If you should have any questions, please contact our office.

Sincerely,

Don R. Roberts by bhs

Don R. Roberts
Professional Engineer

DRR/bhs

Enclosures

Logos Engineering
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April 18, 2008

Mr. Douglas L. Bartley
Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Permit Application No. 807-0339
Original
Nally & Hamilton Enterprises, Inc.

Dear Mr. Bartley:

Enclosed you will find the corrections and/or additional information to the deficiencies noted in your most recent letter dated March 21, 2008, concerning the above referenced permit application. Each item has been addressed as follows:

MPA-03:

1. Item 7.2: These items have been corrected.
2. Item 8.4 (a - b): These items have been corrected.
3. Item 8.5: This item has been corrected.
4. Item 8.8.A: This item has been corrected.
5. Item 9.1 and MRP: This item has been corrected.
6. Item 8.11: This item has been corrected.
7. Item 10.2: This item has been corrected.
8. Item 12.2: This item has been corrected.
9. Item 21: These items have been addressed.
10. Item 22: This item has been corrected.
11. Item 22: Attachment 22.1.A has been revised.

12. Item 24: Attachment 24.5.A has been revised.

13. Item 25: This item has been corrected.

14. Item 26: This item has been corrected.

15. Item 31: SS #9 is not affected by the deletion of tracts and is still proposed in the permit application.

16. Item 32: DD-14 & 15 and DD-21 - 27 are not be affected by the deletion of tracts and are still proposed in the permit application.

17. Item 33: All proposed roads have been included and respective items and maps have been revised.

If you should have any questions or need additional information, please contact our office.

Sincerely,

Don R. Roberts/by JRE

Don R. Roberts
Professional Engineer

DRR/jre

Enclosures

Logos Engineering
P.O. Box 350
Manchester, Kentucky 40962

Don R. Roberts
Professional Engineer

Office (606) 598-6746
Fax (606) 598-4544

February 1, 2008

Mr. Douglas L. Bartley
Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Permit Application No. 807-0339
Original
Nally & Hamilton Enterprises, Inc.

Dear Mr. Bartley:

Enclosed you will find the corrections and/or additional information to the deficiencies noted in your most recent letter dated October 26, 2006, concerning the above referenced permit application. Each item has been addressed as follows:

MPA-03:

1. Item 24.5.A (a-b): These items have been corrected.

2. Item 24.6.A: This item has been corrected.

3. Item 24.8.A (a-c): Each item has been addressed as required.

4. Item 24.9: The additional statement is now added.

5. Item 8.5: This item has been corrected.

6. Item 8.8: This item has been corrected.

7. Item 12.1: This item has been corrected.

8. Item 12.2 (a-b): Additional discussion is added at item 12.2 even though a discussion is already provided at 26.3 and 31 already.

   c. This item has been addressed.

9. Item 15.3: This item has been addressed.

10. Item 15.4 and 15.5: This item has been addressed.

11. Item 21.5: This information is now provided.

12. Item 25.1:

    a. The legend is now provided.

    b. This item has been updated.

    c. The coordinates are now labeled.

13. Item 25.4:

    a. The drawing is provided. The drawing is a typical drawing. Since coal seam thicknesses vary, a sealed drawing cannot be accurate. Please accept the typical drawing for this item.

    b. The correction is made.

14. Item 26.3 (a-d): Each item has been corrected.

    e. Additional discussion has been provided at 26.3.A (1) (b).

15. Item 31.3 (a-c): This item has been addressed.

16. Item 33 (a-e): Each item has been addressed/corrected.

    f. Only haul road "D" is already permitted.

    g. This item is addressed.

17. This item has been addressed.

If you should have any questions or need additional information, please contact our office.

Sincerely,

Don R. Roberts -by bhs

Don R. Roberts
Professional Engineer

DRR/bhs

Enclosures

Logos Engineering
P.O. Box 350
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Don R. Roberts
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Fax (606) 598-4544

September 8, 2006

Mr. Chinmoy Mukhopadhyay
Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Application No. 807-0339
Original
Nally & Hamilton Enterprises, Inc.

Dear Mukhopadhyay:

Enclosed you will find the corrections and/or additional information to the deficiencies noted in your most recent letter dated August 25, 2006, concerning the above referenced application. Each item has been addressed as follows:

1. Archaeological Survey: The archaeological survey has been completed and submitted to DNR on or about September 8, 2006.

2. Item 8.6: This information has been addressed.

3. Item 8.8: This item has been addressed at 8.8 for incremental payments.

4. Item 12.2: (a) The wording has been changed in paragraph #6.

   (b) A description is added as required.

   (c) A further discussion is added at 12.2

5. Item 15.1: The bore hole cross section (stratigraphic column) includes all strata above and below the Hance coal seams along with their name and corresponding thickness. Please note the Hance seam is split into three parts but all are considered the Hance seam.

6. Item 15.5: This information is added.

7. Item 21 and 25: Please note that RAM #124 was considered and followed for each item as required.

8. Item 26: RAM #135 was used to develop the construction plan for the fills. However, the underdrains will be constructed completely prior to fill placement.

9. Item 29: Please note that NP values exceed corresponding PA values. Additionally, none of the PA values are significant. Therefore, no potential for AMD is evident. Only topsoil has slightly higher PA values and that is due to organic matter in the sample.

If you should have any questions or need additional information, please contact our office.

Sincerely,

Don R. Roberts

Don R. Roberts by bhs
Professional Engineer

DRR/bhs

Enclosures

Logos Engineering
P.O. Box 350
Manchester, Kentucky 40962

Don R. Roberts
Professional Engineer

Office (606) 598-6746
Fax (606) 598-1544

August 10, 2006

Mr. Chinmoy Mukhopadhyay
Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Application No. 807-0339
Original
Nally & Hamilton Enterprises, Inc.

Dear Mr. Mukhopadhyay:

Enclosed you will find the corrections and/or additional information to the deficiencies noted in your most recent letter dated January 4, 2006, concerning the above referenced permit. Each item has been addressed as follows:

1. Missing Items: Items 8.11, 9.1, and Attachment 20.1.A have now been provided.

2. Item 8.3 (MPA-03): Increment No. 14 has been removed from the incremental bonding chart, there are 13 increments in total.

3. Item 8.6 (MPA-03): This item has now been corrected for the overlaps.

4. Item 9 (MPA-03): This item has now been addressed.

5. Items 11.1, 13.1, 14.1 and 14.4 (MPA-03): These items have now been provided.

6. Item 12.2 (MPA-03): This information has now been included.

7. Item 15 (MPA-03): The attachment numbers have now been corrected.

8. Item 20.1 (MPA-03): This item has been addressed.

Mr. Chinmoy Mukhopadhyay
Page 2
August 10, 2006

9. MRP Map: All previous mining areas are shown on the map. The areas shown on the MRP map as "previous mining" represents mining that was conducted pre-law. Therefore, highwalls exist on all this area.

If you should have any questions or need additional information, please contact our office.

Sincerely,

Don R. Roberts/by

Don R. Roberts
Professional Engineer

DRR/jre

Enclosures

Logos Engineering
P.O. Box 350
Manchester, Kentucky 40962

Don R. Roberts
Professional Engineer

Office (606) 598-6746
Fax (606) 598-1544

December 22, 2005

RECEIVED
DEC 27 5 55 PM '05

Department for Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, KY 40601

RE: Nally & Hamilton Enterprises, Inc.
Permit Application No. 807-0339

Dear Sirs:

Enclosed you will find one (1) red original and two (2) black copies of the MPA-03 application concerning the above referenced permit application.

If you should have any questions or need additional information, please contact our office.

Sincerely,

Don R. Roberts/by

Don R. Roberts
Professional Engineer

DRR/jre

Enclosure

TECHNICAL INFORMATION FOR A MINING PERMIT

This form supplies all technical information in regard to the mining and reclamation plan for the permit. It shall be filed in conjunction with MPA-01 for all original and amendment applications.	PERMIT NUMBER 807-0339 DSMRE ID NUMBER 001939

3. Identification of Applicant/Engineer

3.1 Applicant Name Nally & Hamilton Enterprises, Inc.

3.2 Engineer Don R. Roberts Registration No. 12575
Associated with Logos Engineering
Address P.O. Box 350
City Manchester State KY Zip 40962
Telephone No. 606-598-6746

3.3 Indicate the name, address, and telephone number of the individual to whom all permit application correspondence including return of the application for correction or modification, is to be addressed. If such designation is not made, the cabinet will return the application only to the applicant. If such designation is changed at some future date, the applicant is responsible for notifying the cabinet:

Name Don R. Roberts/Logos Engineering Telephone No. 606-598-6746
Address P.O. Box 350
City Manchester State KY Zip 40962

4. Site Location Information

4.1 Name of proposed mine Blacksnake No. 2
Local address Blacksnake, KY

4.2 Contact person at mine site Bobby Boggs Title Mine Foreman
Telephone No. (606) 675-7300

4.3 County(ies) Bell Quadrangle(s) Balkan
Latitude 36°45'51" Longitude 83°29'15"
Nearest named stream Campbell Branch Nearest community Blacksnake

4.4 Is any of the proposed mining area previously permitted or pending permitting under KRS 350?
☐ YES ☒ NO. If "YES", list permittee names, permit numbers, and current status of operations. If additional pages are necessary, identify as "Item 4.4 continued".

5. Application Information

5.1 Type of application: ☒ Original ☐ Amendment No. ______

5.2 Type of operation: (check all appropriate boxes)

☐ Surface Area (SA)	☐ Refuse Disposal (RD)
☒ Surface Contour (SC)	☐ Underground (UG)
☒ Surface Auger (SG)	☐ Processing Plant (PP)
☐ Surface Remining (SR)	☐ Haul Road Only (HR)
☐ Surface Refuse Recovery (RR)	☐ Load Out Only (LO)
☐ Steep Slope (SS)	☐ In-situ (IS)
☐ Surface Mountaintop (SM)	Other ______________________

6. Advance Notification Information

6.1 Is proposed permit located within boundaries for which a governmental planning agency has jurisdiction to act with regard to land use, air, or water quality planning? ☐ YES ☒ NO. If "YES", provide agency name and correct mailing address:

Agency Name ______________________
Mailing Address ______________________

6.2 Is proposed permit area located within boundaries of any sewage and/or water treatment authorities, water companies which provide sewage or water services to citizens in the area of the proposed permit, or have water sources, collection, treatment, or distribution facilities located in the area or the proposed permit? ☐ YES ☒ NO.

Authority/Company Name ______________________
Mailing Address ______________________

6.3 Proposed permit area located within the watershed of any U.S. Army Corps of Engineer projects? ☐ YES ☒ NO. If "YES", indicate below and provide one additional copy of the application:

Huntington District	☐ Dewey Lake ☐ Grayson Lake ☐ Yatesville Lake	☐ Fishtrap Lake ☐ Paintsville Lake
Louisville District	☐ Buckhorn Lake ☐ Cave Run Lake	☐ Carr Fork Lake ☐ Green River Watershed
Nashville District	☐ Lake Cumberland ☐ Martin's Fork Watershed ☐ Dale Hollow Lake	☐ Laurel River Lake ☐ Lake Barkely ☐ Middlesboro Flood Control Project Watershed

6.4 Is proposed permit area located within the official limits of any town, city or municipality?
☐ YES ☒ NO. If "YES", provide name and county:

Town/City Name ________________ County ________________

6.5 Was any of the data presented in this application prepared/provided as a result of a Small Operator Assistance Program (SOAP) grant? ☐ YES ☒ NO. If "YES", provide SOAP identification number

____

6.6 Is the proposed permit boundary and acreage under this application the same as proposed under the corresponding "preliminary" permit application?
☒ YES ☐ NO. If "NO", describe differences:

____

NOTE: If significant differences are determined to exist, another field walk by regional personnel may be required.

7. Permit Information

7.1 Each new original permit will be issued for a term of five (5) years. If an initial term in excess of five (5) years is required, provide the information stipulated by 405 KAR 8:010, Section 17 as "Attachment 7.1.A."

N/A

7.2 Provide the acreage associated with the following activities. If additional pages are necessary, identify as "Item 7.2 continued".

	Currently Permitted	Additions/ Deletions	Redesignations	Total Acreage
Mining or Face Up Areas				140.4
Roads				104.9
Sediment Ponds				2.0
Spoil Storage Areas				*7.16
Waste Disposal Areas				
Facility and Processing Areas				
Coal Stockpile and Loading Areas				
Surface Ventilation Areas				
Drainage Corridors				0.4
Total Surface Disturbance Area				252.09
Underground Areas				
Auger Areas				108.8
Total Underground/Auger Area				108.8
Permit Area				360.89

NOTE: The first three columns are used for amendments only.

* 2.77 ac. overlaps mining (not included in total acreage)

7.3 If this permit contains acreage in more than one county, name the counties affected and specify surface and underground acreage within each county. If incremental acreage fees are being used, provide a table indicating acreage per county, per increment as "Attachment 7.3.A".

County	Total Surface Acreage	Total Underground Acreage
Bell	250.29	108.8 (Auger)
Harlan	1.8	

8. Bonding & Fees

8.1 Check the proposed bonding plan to be used:
☐ Single Area ☒ Incremental, with 11 total increments.

8.2 If incremental bonding is proposed, identify the increment(s) which will be initially bonded prior to permit issuance:
Inc. No. 1

8.3 For incremental bonding submit an incremental bonding map to clearly identify the number and boundary of each increment.

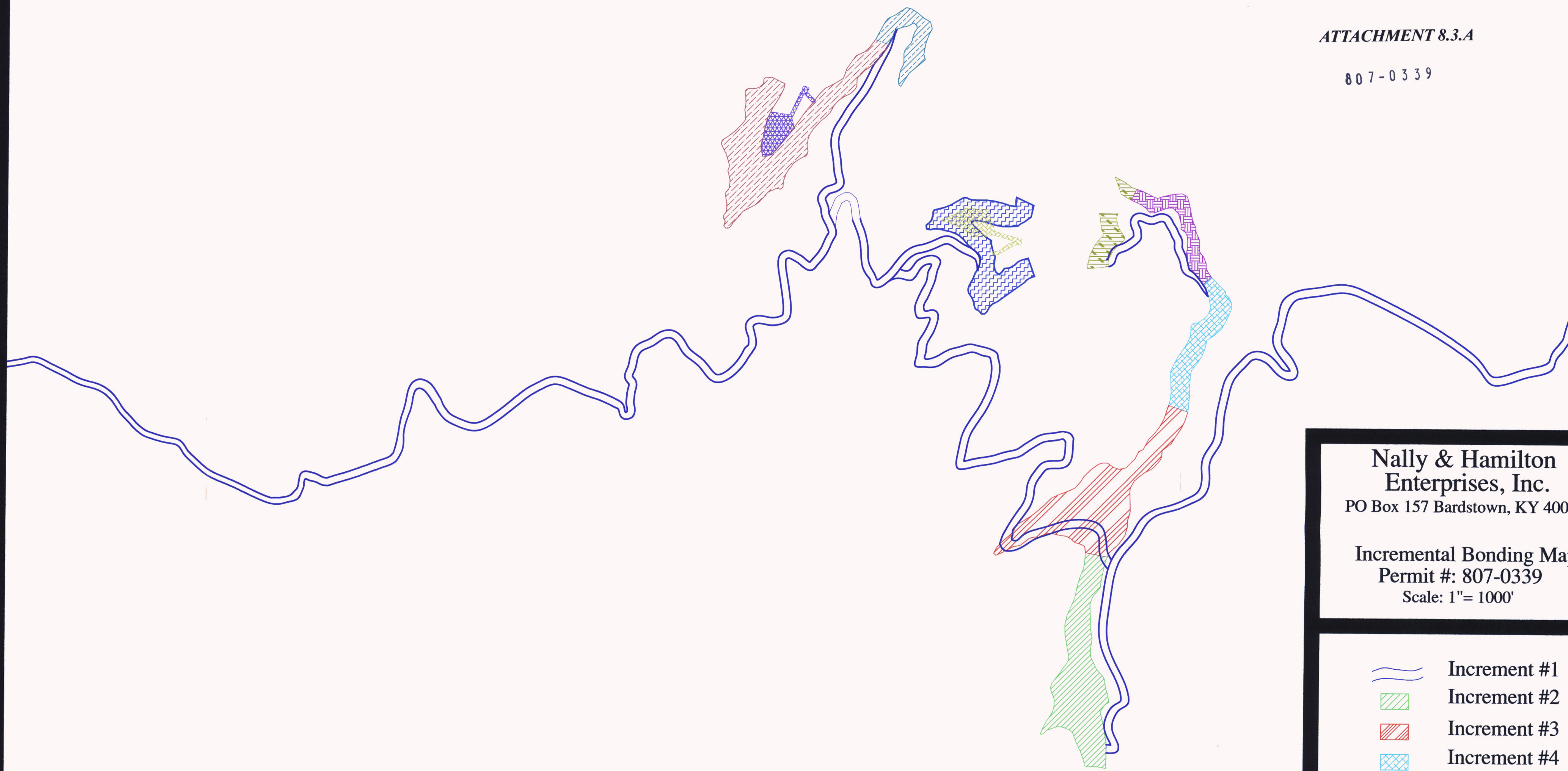
See Attachment 8.3.A

8.4 Complete the following charts with acreage for each increment:

Increment	1	2	3
Mining or Face Up Areas		26.7	31.9
Roads	104.6		
Sediment Ponds			
Spoil Storage Areas			
Waste Disposal Areas			
Facility and Processing Areas			
Coal Stockpile and Loading Areas			
Surface Ventilation Areas			
Drainage Corridors			
Total Surface Disturbance Area	104.6	26.7	31.9
Underground Areas			
Auger Areas	108.8		
Total Underground/Auger Area	108.8		
Permit Area	213.4	26.7	31.9

ATTACHMENT 8.3.A

807-0339



Nally & Hamilton Enterprises, Inc.
PO Box 157 Bardstown, KY 40004

Incremental Bonding Map
Permit #: 807-0339
Scale: 1"= 1000'

Increment #1
Increment #2
Increment #3
Increment #4
Increment #5
Increment #6
Increment #7
Increment #8
Increment #9
Increment #10
Increment #11

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

I, [signature], 12575, 4-10-08,
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Increment	4	5	6
Mining or Face Up Areas	10.6	6.8	5.55
Roads			
Sediment Ponds			
Spoil Storage Areas			
Waste Disposal Areas			
Facility and Processing Areas			
Coal Stockpile and Loading Areas			
Surface Ventilation Areas			
Drainage Corridors			
Total Surface Disturbance Area	10.6	6.8	5.55
Underground Areas			
Auger Areas			
Total Underground/Auger Area			
Permit Area	10.6	6.8	5.55

Increment	7	8	9
Mining or Face Up Areas	20.09	7.46	31.3
Roads			
Sediment Ponds			
Spoil Storage Areas			
Waste Disposal Areas			
Facility and Processing Areas			
Coal Stockpile and Loading Areas			
Surface Ventilation Areas			
Drainage Corridors			
Total Surface Disturbance Area	20.09	7.46	31.3
Underground Areas			
Auger Areas			
Total Underground/Auger Area			
Permit Area	20.09	7.46	31.3

Increment	10	11	Total
Mining or Face Up Areas			140.4
Roads	0.2	0.1	104.9
Sediment Ponds	1.0	1.0	2.0
Spoil Storage Areas	* 3.59	3.57	* 7.16
Waste Disposal Areas			
Facility and Processing Areas			
Coal Stockpile and Loading Areas			
Surface Ventilation Areas			
Drainage Corridors	0.1	0.3	0.4
Total Surface Disturbance Area	* 2.12	4.97	252.09
Underground Areas			
Auger Areas			108.8
Total Underground/Auger Area			108.8
Permit Area	* 2.12	4.97	360.89

* 2.77 acres overlaps mining (not included in total acreage)

8.5 Complete the following chart which details additional information about each increment.

Increment	1	2	3
Prelaw Mined Acreage			
Alternate Topsoil Acreage	104.6	26.7	31.9
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds			

Increment	4	5	6
Prelaw Mined Acreage			
Alternate Topsoil Acreage	10.6	6.8	5.55
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds			

Increment	7	8	9
Prelaw Mined Acreage			
Alternate Topsoil Acreage	20.09	7.46	31.3
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds			

Increment	10	11	
Prelaw Mined Acreage			
Alternate Topsoil Acreage	4.89	4.97	
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds	1	1	

Increment			
Prelaw Mined Acreage			
Alternate Topsoil Acreage			
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds			

Increment			
Prelaw Mined Acreage			
Alternate Topsoil Acreage			
Mulching Variance			
Prime Farmland Acreage			
Stream Channel Alteration Acreage			
Number of Off Bench Ponds			

8.6 Provide a narrative describing all acreage overlaps. This includes double bonding and shared facilities (with identification of other permits involved). In addition, all overlaps shall be clearly identified on the map requested in item 8.3.

See Attachment 8.6.A

8.7 Check the method of acreage fee payment used:

☐ Single Area ☒ Incremental

8.8 ☒ Permit processing fee of $375 is included.

If applicable, indicate amount of acreage fee included:

Number of surface acres 252.09 X $75 = $18,975.00 acreage fee.

See Attachment 8.8.A

8.9 Have credit acres been applied to the acreage fee amount? ☐ YES ☒ NO. If "YES", list below the permit number, permittee name, acreage and amount. Attach copies of the bond release forms showing that those acreages were not disturbed. Identify attached documents as "Attachment 8.9.A, 8.9.B", etc.

Permit Number	Permittee Name	Undisturbed Acreage	Rate Per Acre	Total

Total acreage fee credit $ ____________

ATTACHMENT 8.6.A

As shown on the map, the only overlap associated with this proposed permit is in the area of Haul Road "A". The road overlaps portions of permit #807-0258 of C. T. & L. Coal and a portion of Kincaid Enterprises #848-0232. On the Kincaid Enterprises area, Haul Road "A" coincides, and therefore, overlaps the road only. No mining area, on the Kincaid area, will be affected.

Additionally it should be noted that mining is completed on the C. T. & L. Coal permit. Haul Road "A" also exists through this permit as well.

The area included for permit number 807-0258 is bonded. However, coal removal is complete with reclamation activities only.

The area included for permit number 848-0232 is currently bonded and actively producing coal.

ATTACHMENT 8.8.A

Increment No. 1 -	104.6	(rounded to 105)	acres	x	$75.00	=	$ 7,875.00
Increment No. 2 -	26.7	(rounded to 27)	acres	x	$75.00	=	$ 2,025.00
Increment No. 3 -	31.9	(rounded to 32)	acres	x	$75.00	=	$ 2,400.00
Increment No. 4 -	10.6	(rounded to 11)	acres	x	$75.00	=	$ 825.00
Increment No. 5 -	6.8	(rounded to 7)	acres	x	$75.00	=	$ 525.00
Increment No. 6 -	5.55	(rounded to 6)	acres	x	$75.00	=	$ 450.00
Increment No. 7 -	20.09	(rounded to 21)	acres	x	$75.00	=	$ 1,575.00
Increment No. 8 -	7.46	(rounded to 8)	acres	x	$75.00	=	$ 600.00
Increment No. 9 -	31.3	(rounded to 32)	acres	x	$75.00	=	$ 2,400.00
Increment No. 10 -	4.89	(rounded to 5)	acres	x	$75.00	=	$ 375.00
Increment No. 11 -	4.97	(rounded to 5)	acres	x	$75.00	=	$ 375.00
							$19,425.00

8.10 If permittee name is different from the applicant, submit a letter from the permittee granting the credit acres to the applicant.

N/A

8.11 Based upon all surface acres total to be disturbed under the proposed permit, provide an estimate of the costs of reclamation. Attach detailed supporting calculations as "Attachment 8.11.A".

See Attachment 8.11.A

9. Right of Entry

9.1 For all properties to be permitted by this application, complete the following chart for all surface and mineral owners. In the case of surface owners of severed estates which overlie underground works, but no surface disturbance is proposed, list n/a for type of document, grantor of rights, and date.

Owner	Type of Document	Grantor of Rights	Execution Date	Acreage
Nally & Hamilton	Lease	Charla S. Evans	01/18/06	70.47±
Nally & Hamilton	Lease	John R. Slusher, Sr.	11/01/05	59.52±
Nally & Hamilton	Lease	J. Burton Miracle	11/04/05	39.99±
Nally & Hamilton	Lease	Dessie Ann Shoupe	01/24/06	33.87±
Nally & Hamilton	Lease	Bobby Slusher	12/14/05	4.96±
Nally & Hamilton	Lease	Earl Casada	08/03/06	8.25±
Nally & Hamilton	Lease	Joyce Ann Snellings Middleton	01/08/06	12.33±
Nally & Hamilton	Lease	Asher Land & Minerals, Ltd.	01/09/05	800±

ATTACHMENT 8.11.A

APPLICATION NUMBER 807-0339

A.	COST FOR REMOVAL OF ALL EQUIPMENT, BUILDINGS, AND OTHER SUPPORT FACILITIES NOT PROPOSED AS PART OF THE POST MINING LAND USE. N/A	$ 0.00
B.	COST FOR SEALING UNDERGROUND MINE OPENINGS OR AUGER HOLES. 108.8 acres x $100 per acre	$ 10,880.00
C.	COST FOR BACKFILLING AND GRADING, INCLUDING NON-PERMANENT SEDIMENT STRUCTURES. 140.4 acres x $1,000 per acre	$ 140,400.00
D.	COST FOR DISTRIBUTION OF TOPSOIL OR SUBSTITUTE MATERIAL. 147.56 acres x $420 per acre	$ 61,975.20
E.	COST FOR REVEGETATION, INCLUDING SEEDBED PREPARATION, SEEDING, MULCHING, LIMING, FERTILIZING, AND TREE PLANTING. 252.09 acres x $400 per acre	$ 100,836.00
F.	COST FOR MONITORING SEDIMENTATION STRUCTURES UNTIL REMOVAL (MINIMUM OF TWO YEARS AFTER LAST AUGMENTED SEEDING.) 16 ponds x $1,000 per pond	$ 16,000.00
G.	COST FOR MAINTENANCE OF REVEGETATED AREAS, ADDITIONAL GRADING, MAINTENANCE OF DRAINAGE CONTROLS, SEDIMENTATION STRUCTURES AND ACCESS ROADS UNTIL FINAL BOND RELEASE. 60 hours x $100 per hour	$ 6,000.00
H.	COST OF PRIME FARMLAND RECONSTRUCTION. N/A	$ 0.00
I.	COST OF CONDUCTING SURFACE AND GROUND WATER MONITORING UNTIL FINAL BOND RELEASE. 76 samples x $35 per sample	$ 2,660.00
J.	OTHER COST (IDENTIFY) N/A	$ 0.00
	TOTAL COSTS (A - J)	$ 338,751.20

9.2 Explain the legal rights claimed by the applicant for the proposed permit area:
Legal rights claimed by the applicant are the right of ingress, egress, and the right to conduct surface and auger mining.

9.3 Are any rights to enter and mine the area, as claimed by the applicant, subject to any pending litigation?
☐ YES ☒ NO

9.4 Have the private surface and mineral estates been severed for any parcel of land within the proposed permit area? ☐ YES ☒ NO. If "YES", and the applicant proposes to extract coal by surface mining methods, one (1) of the following items shall be provided as part of this application:

(a) Notarized copy of the letter or a lease document from the surface owner(s) consenting to the use of surface mining methods to extract coal within the proposed permit area; or

(b) Notarized copy of the document of conveyance which originally severed the private surface and mineral estates and also expressly grants or reserves the right to extract coal by surface mining methods; or

(c) Notarized copy of a judicial order which expressly grants or reserves the right to extract coal by surface mining methods.

Is the order subject to pending litigation? ☐ YES ☒ NO

Documents submitted in response to this requirement shall be identified as "Attachments 9.4.A, 9.4.B", etc.

9.5 Describe any interest, options or pending bids on interest held or made by the applicant for lands which are contiguous to the proposed permit area. If additional pages are needed, identify as "Item 9.5 continued".

None

9.6 Is the proposed permit area within or adjacent to any lands where a federal agency owns either the surface or mineral rights? ☐ YES ☒ NO. If "YES", list the agency controlling such lands. Describe the location and boundaries of these lands with respect to the proposed permit area. If additional pages are needed, identify as "Item 9.6 continued".

Agency

Address ( ) Telephone Number

10. Notice of Intention to Mine

10.1 List the name of the newspaper of largest circulation in each county in which the proposed operation will be located.

County	Newspaper
Bell	Daily News
Harlan	Harlan Daily Enterprise

10.2 Provide on a separate page immediately following this section the language of the "Notice of Intention to Mine" to be advertised in the newspaper(s) listed in Item 10.1 and identify as "Attachment 10.2.A". In accordance with 405 KAR 8:030, or 8:040, a copy of each of the four newspaper advertisements or an affidavit from the newspaper editor(s) including a copy of the final advertisement shall be submitted to the Department not later than 15 days after the date of the final advertisement. NOTE: The cabinet cannot complete the final processing and issuance of a mining permit unless and until all advertising requirements have been properly fulfilled by the applicant. <u>Failure to submit accurate newspaper advertisements in a timely manner will result in the delayed issuance of a permit</u>.

See Attachment 10.2.A

11. Areas Designated Unsuitable for Mining & Requests for Variances

NOTE: Only those waivers and variances identified in this section will be considered for approval by the cabinet.

11.1 Is any part of the proposed permit area: ☐ within lands designated by the state as unsuitable for mining; ☐ under study for designation as such; ☐ within an area with special conditions as a result of a lands unsuitable study. If entire permit area is not designated unsuitable and not currently under study for such designation, check here ☒. Attach DSMRE clearance letter as "Attachment 11.1.A".

11.2 Indicate if proposed surface mining and reclamation activities will occur on, or are adjacent to: ☐ national park system; ☐ national or state forest lands; ☐ national system of trails; ☐ national wilderness preservation system; ☐ wild and scenic rivers system, including "study" rivers; ☐ state wide rivers established pursuant to KRS 146; ☐ national recreation areas; ☐ public wildlife management area; and/or ☐ places listed in or eligible for listing in the National Register of Historic Places. If not, check here ☒.

11.3 Indicate if the proposed permit area is within: ☐ 500' of known abandoned or active underground mines; ☐ 300' of a public park, public building, school, church, community or institutional building; ☐ 300' of an occupied dwelling; ☐ 100' of the outside right-of-way line of a public road; ☒ 100' of a stream; ☐ 100' of a cemetery, or prehistoric burial ground. If not, check here ☐.

11.4 For each item checked in items 11.2 and 11.3 above, attach appropriate maps to identify the location and boundaries of the lands or facilities referenced. These attachments shall be identified as "Attachment 11.2.A" and "Attachment 11.3.A", respectively. Any required waiver documentation such as land owner consent or approval of appropriate state or federal agencies shall be attached. These attachments shall be identified as "Attachment 11.4.A, 11.4.B", etc. Any engineering designs for Item 11.3 shall be submitted in other appropriate sections of this application.

See Attachment 11.4.A

ATTACHMENT 10.2.A

NOTICE OF INTENTION TO MINE

Pursuant to Application Number 807-0339

In accordance with KRS 350.055, notice is hereby given that Nally & Hamilton Enterprises, Inc., P.O. Box 157, Bardstown, KY 40004, has applied for a permit for a surface coal mining and reclamation operation affecting 360.89 acres located 1.02 miles southeast of Blacksnake in Bell County and 0.1 mile south from Harlan County.

The proposed operation is approximately 0.1 mile south from Old School Road's junction with KY 72 and located 0.1 mile south of Puckett Creek.

The proposed operation is located on the Balkan U.S.G.S. 7½ minute quadrangle map. The operation will use the contour and auger methods of surface mining. The surface and auger areas are owned by Charla S. Evans, John R. Slusher, Sr., J. Burton Miracle, Dessie Ann Shoupe, Bobby Slusher, Earl Casada, Joyce Ann Snellings Middleton and Asher Land & Minerals, Ltd.

The application has been filed for public inspection at the Division of Mine Reclamation and Enforcement's Middlesboro Regional Office, 1804 East Cumberland Avenue, Middlesboro, Kentucky 40965. Written comments, objections, or requests for a permit conference must be filed with the Director, Division of Mine Permits, #2 Hudson Hollow, U.S. 127 South, Frankfort, KY 40601.

(USE IN FINAL ADVERTISEMENT ONLY) This is the final advertisement of the application. All comments, objections, or requests for a permit conference must be received within thirty (30) days of today's date.

Note to Newspaper Publisher: The heading **"NOTICE OF INTENTION TO MINE"** must be a minimum of ten (10) point, bold face, all capitals type.

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR NATURAL RESOURCES

Ernie Fletcher
Governor

2 Hudson Hollow
Frankfort, Kentucky 40601
Phone (502) 564-6940
Fax (502) 564-5698
www.naturalresources.ky.gov
www.kentucky.gov

LaJuana S. Wilcher
Secretary

Susan C. Bush
Commissioner

March 6, 2006

DON ROBERTS
LOGOS ENGINEERING
PO BOX 350
MANCHESTER KY 40962

RE: Nally & Hamilton Enterprises, Inc.
Application # 807-0339, NW

Dear Mr. Roberts:

The Division of Permits is conducting the critical resources review of the above referenced application. Attached are the Division's findings, listed by application item, describing the issues that must be addressed. These attachments and supporting documentation must be incorporated into the appropriate sections of the comprehensive application. The findings for each application item are summarized below.

11.1 Areas Designated Unsuitable for Mining: See attached
12.2 General Description of Mining and Reclamation Operations:
Stream restoration plan required; BMPs recommended
13.1 Cultural or Historic Resources: Archaeological survey required
14.1 Fish and Wildlife Information: No T/E species identified
14.4 Fish and Wildlife Survey: None required
21.11 Fish and Wildlife Enhancement Plan: Required

Please be advised that any changes to the proposed mine plan may require additional environmental review. If you have any questions concerning this matter, please contact the review biologist, Jonathan Scheibly, or archaeologist, Rose Moore, Critical Resources Review Section, at (502) 564-2320.

Sincerely,

Susan Wind

Susan Wind, Supervisor
Critical Resources Review Section/
Small Operator Assistance Program
Division of Mine Permits

Enclosure to Applicant
c: Rose Moore
Jonathan Scheibly
David Morgan, SHPO
Mike Hardin, KDFWR
Lee Andrews, USFWS
Permit File – w/enclosure (Chinmoy Mukhopadhyay)
Stephen Hamilton, Nally & Hamilton Enterprises

Nally & Hamilton Entrprises, Inc.
Application No. 807-0339, NW
December 21, 2005

Application Item 11.1: Areas Designated Unsuitable for Mining

1. The proposed permit area may include in-stream disturbance and require 401 Certification from the Kentucky Division of Water and a 404 Permit from the U.S. Army Corps of Engineers. The applicant is advised to contact these agencies for assistance.

2. The propsed permit may impact Puckett Creek, listed as impaired on the 303(d) List of Waters for Kentucky. Please be advised that new or modified discharges into impaired waters may require an individual KPDES permit for mining-related pollutants.

3. Please be advised that mining operations seeking new or modified coverage under the Coal KPDES General Permit must submit a Notice of Intent (NOI-CM) to the Division of Water. Please file the NOI-CM with the Division of Water as soon as possible in order to avoid potential delays in the processing and issuance of your SMCRA/DNR permit.

4. As of this date, there are no lands in the proposed permit area designated unsuitable for surface coal mining or under study for such designation, as provided in 405 KAR Chapter 24.

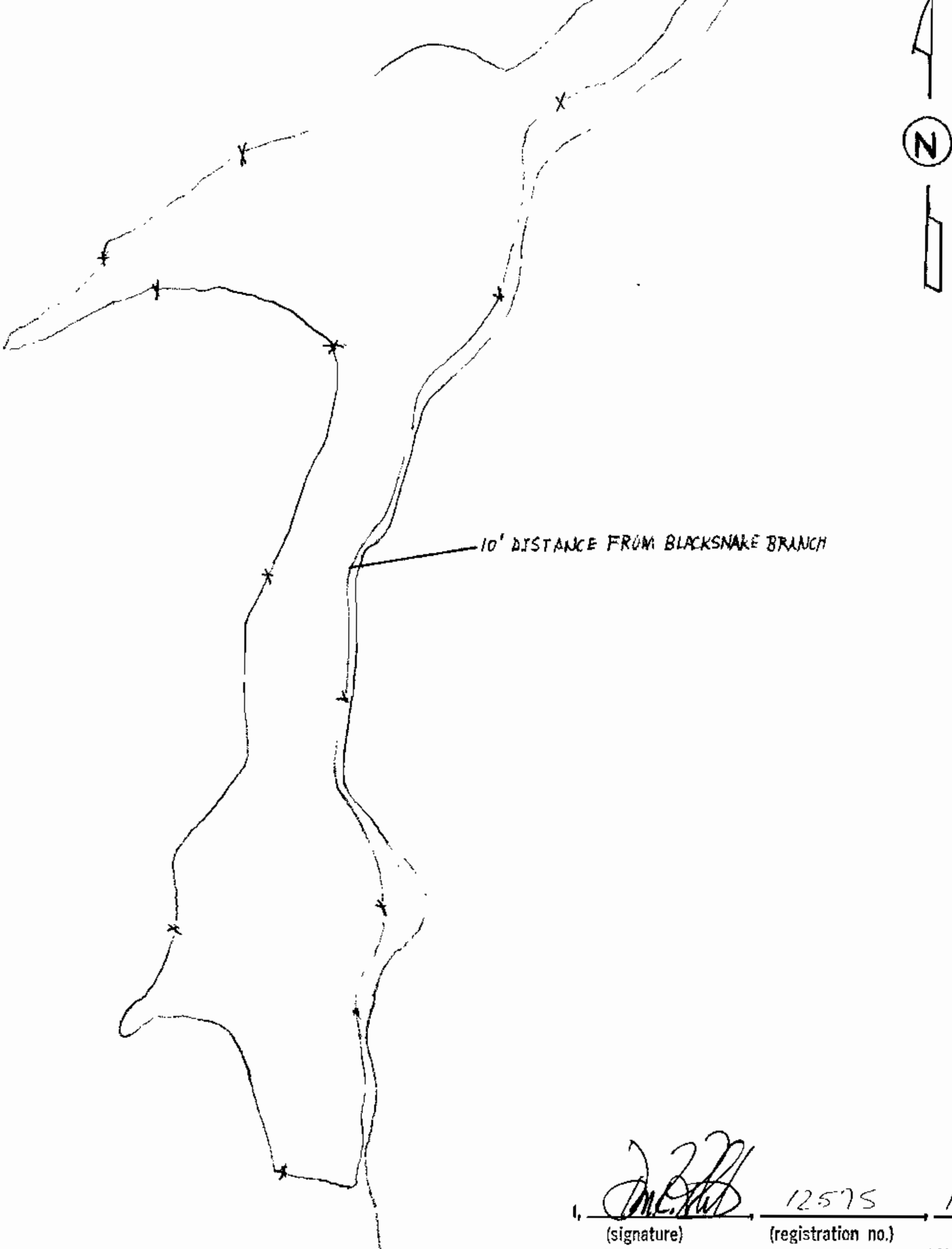
5. The proposed permit area does not fall within an area with special conditions as a result of a lands unsuitable study.

6. The proposed permit area is not located within a U.S. Army Corps of Engineers project area.

7. Based on information available to the Department, there are no federal lands within or adjacent to the proposed permit area.

MINING WITHIN 100' OF A STREAM

SCALE: 1" = 500'



I, [signature], 12575, 12/21/05
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

11.5 Indicate below all waivers and variances to be requested for the proposed operation. The acreage (or facility designation) affected should be provided as requested. Those variances which have been granted in previous applications to this permit should be marked with an [x] while those proposed or expanded as part of this application should be marked with an [*]. The documentation necessary to approve each variance requested as part of this application shall be submitted in the appropriate sections of this application.

- [ ] Post mining land use change ______
- [ ] * Alternate topsoil material for 252.09 acres
- [ ] Permanent pond # ______
- [ ] AOC variance: remining for ______ acres
- [ ] AOC variance: steep slope for ______ acres
- [ ] AOC variance: mountaintop removal for ______ acres
- [ ] * Alternate contemporaneous reclamation standards
- [ ] Alternate contemporaneous reclamation standards for joint surface and underground operations
- [ ] Mulching variance
- [ ] Permanent road(s) # ______
- [ ] Culvert spacing variance for roads # ______
- [ ] Grade variance for roads # ______

OTHERS: * Mining within 100'of a stream

11.6 If valid existing rights are claimed for any part of the proposed permit area identified in 11.1, 11.2, or 11.3, submit the required information as "Attachment 11.6.A".

N/A

12. General Description of Mining and Reclamation Operations

12.1 Indicate the types of facilities to be constructed/utilized:

- [x] Sediment ponds, no. 16
- [ ] Fresh water ponds, no. ______
- [ ] Levees, ______ ft.
- [ ] Water treatment facilities
- [x] Coal haulroads
- [x] Access roads
- [ ] Conveyors, ______ ft.
- [ ] Rail loading facilities
- [ ] Coal refuse fills
- [ ] Coal slurry impoundments
- [ ] Coal stockpiles
- [x] Excess spoil fills, no. 2
- [ ] Hard rock/durable rock fills, no. ______
- [ ] Deep mine entries, no. ______
- [ ] Coal processing facilities
- [ ] Mine management and/or support areas
- [ ] Loading facilities
- [ ] Other ______

12.2 Provide a narrative description, identified as "Attachment 12.2.A", of each phase of the proposed surface and underground mining operation. Include the anticipated starting and termination dates of each phase and/or increment, major equipment to be utilized, acreage affected in each phase, and the total acreage affected over the life of this permit. The narrative should describe the location and mitigation plans for any utility lines which will be encountered. If this application is an amendment, describe any changes to the mining plan proposed for the currently permitted area.

See Attachments 12.2.A - 12.2.A (1)

12.3 Describe the plan for maximizing resource recovery. Provide as "Attachment 12.3.A".

See Attachment 12.3.A

13. Cultural or Historic Resources

13.1 List and describe any cultural or historic resources listed, or eligible for listing, on the National Register of Historic Places and any known archaeological sites within or adjacent to the proposed permit area. Provide under separate cover a description of the measures to be taken to mitigate adverse impacts to these sites and a map showing their location.

See Attachment 13.1.A

14. Fish and Wildlife Information

14.1 Has any threatened or endangered species or the critical habitat of such species been identified within or adjacent to the proposed permit area? ☐ YES ☒ NO. If "No", attach DSMRE documentation to verify this determination. Identify as "Attachment 14.1.A".

See Attachment 14.1.A

14.2 If the answer to item 14.1 is "YES" or a threatened or endangered species or critical habitat has been reported within or adjacent to the proposed permit area, list the species involved and provide a map identifying its location relative to the proposed permit area. Identify as "Attachment 14.2.A".

N/A

14.3 Will any "wetland" area be impacted by the proposed operation?
☐ YES ☒ NO.

If "YES", provide acreage of wetland, and delineate its boundaries on the ERI Map.
Acreage of wetland ______________________________

14.4 Provide as "Attachment 14.4.A", the results of any fish and wildlife survey conducted for the proposed area, or other studies required by DSMRE.

See Attachment 14.4.A

14.5 Provide a description of the measures which will be taken to avoid or minimize adverse impacts to wetland areas, important fish and wildlife species, the critical habitat of such species, or other species protected by state or federal law. If additional pages are needed, identify as "Item 14.5 continued".

See Attachment 14.5.A

Nally & Hamilton Entrprises, Inc.
Application No. 807-0339, NW-
December 21, 2005

Application Item 12.2: General Description of Mining and Reclamation Operations

1. The proposed permit may temporarily affect intermittent or perennial stream segment(s) of Blacksnake Branch, Bull Branch, and Campbell Branch. The Division recommends that the applicant include a **stream restoration plan** as an attachment to Application Item 31.6. Restoration should strive to reconstruct the pre-mining conditions of the natural stream. The plan must, at a minimum, describe the following pre-disturbance stream parameters and propose measures to reconstruct them: substrate characterization, channel slope and width, riffle-pool ratios, run-bend ratios, water depth, average flow, and riparian vegetation. Profile, plan, and cross-sectional views of the pre-mining and the restored stream channel must also be included.

The applicant must include a copy of the restoration plan in the comprehensive application and submit **one (1) copy under separate cover** to the following address: Critical Resources Review Section, Division of Mine Permits, #2 Hudson Hollow, Frankfort, Kentucky 40601.

2. The proposed permit may result in impacts on aquatic resources. The Division recommends the use of Best Management Practices (BMPs) to aid in sediment control. BMPs may include, but are not limited to, any of the following, singly or in combination:

Basins
Diversion ditches
Filter strips
Land grading and reshaping
Maintenance of a 100' buffer zone along streams
Minimization of surface disturbance
Mulching
Placement of rip-rap
Rapid revegetation, especially along stream banks
Rock check dams
Silt fences
Straw bale barriers
Stream bank stabilization
Sumps
Work in periods of no or low flow or dry weather

The narrative description of mining operations (Attachment 12.2.A) provided in the comprehensive application should specify what BMPs will be implemented.

ATTACHMENT 12.2.A

CONTEMPORANEOUS RECLAMATION VARIANCE

A variance is being requested for time and distance to comply with the revised regulations, 405 KAR 16 : 020 Section 6, Supplemental Assurance. A variance is needed to meet marketing demands for different coal qualities, quantity, and the large amount of equipment and manpower and many different operations that need to be executed at the same time. The different working areas needed are for clearing & grubbing, topsoil removal, drill benching, drill operations, blasting area, overburden removal by dozer, overburden removal by loader trucks, final pit preparation, and coal loading areas. Each operation needs a separate working area so it will not interface with the other ongoing operation and to ensure continuous coal loading operations so that coal contracts can be met. The additional time is needed so that the highwall can be eliminated by progressive mining. We are requesting a distance of nine thousand (9,000) linear feet and a time of 360 days for backfilling and grading to approximate original contour. Supplemental assurance per each additional section (1,500 feet) will be submitted upon activation as concurrently as possible and in a timely manner in order to minimize the time period in which disturbed areas are exposed prior to reclamation. The proposed number of pits or working places that will be utilized at any one time will be (6) six to (15) fifteen.

SUPPLEMENTAL ASSURANCE BONDING CALCULATIONS:

The original bonding will initially apply to the original 1,500' of mining area. From the total of 9,000' requested under the Alternate Contemporaneous Reclamation standards a total of 7,500 feet will have an additional $50,000.00 of Supplemental Assurance Bond for each 1,500 foot section. Therefore, 7,500' divided by 1,500' = 5; 5 sections X $50,000.00=$250,000.00 in Supplemental Assurance Bond. The Supplemental Assurance Bond will be submitted as needed. Each section may contain multiple pits.

Summary:

9,000' total length of wall
9,000' - 1,500' (Initially bonded) = 7,500'
7,500' ÷ 1,500' sections = 5 additional sections
5 X $50,000.00 = $250,000.00 in Supplemental Assurance Bond

ATTACHMENT 12.2.A (1)

This application proposes surface and auger mining of the area shown on the attached maps. Mining is expected to begin within two months of the final issuance of the permit.

Removal of overburden and coal will be conducted by conventional surface mining methods. Equipment utilized will consist primarily of drills, dozers, loaders, and trucks. Drills (RDC-16) will assist in the blasting of material, with dozers (155 KOMATSU or D9 - D11 CAT)) and loaders (988 - 922 CAT) moving the overburden. Trucks (769 -777 CAT) will be used if necessary to transport material to storage areas. Similar equipment may be used as determined by the operator.

Initially, organic material will be removed before topsoil and/or alternate material can be stockpiled. All trees and brush will be windrowed on the solid berm. Since small underbrush, weeds, grasses, and a few small trees are the only forms of organic matter present, non-woody organic matter may be mixed with overburden materials where no stability problems will be created. Organic materials may also be burned if necessary.

All topsoil and/or alternate material will be removed and stockpiled or immediately redistributed on a regraded area. If topsoil and/or alternate material is not redistributed within thirty days, the stockpile will be seeded to prevent erosion, etc.

Once topsoil and/or alternate material has been removed from a site, overburden removal will begin. As stated previously, loaders, trucks, and dozers will transport material from the coal removal pit. Coal will then be removed following overburden removal. Coal removal from each pit should not exceed two weeks under normal conditions. However, variables such as weather and equipment breakdowns may cause additional delays.

Backfilling will be an automatic process. After coal has been removed from the pit area, overburden from the next proposed coal extraction point will be transported to reclaim behind the preceding operation. This operation proposes to have multiple pits open simultaneously to allow coal haulage on a continuous basis. This is necessary to fulfill contract obligations with the purchaser. Backfilling and grading to approximate original contour shall follow coal removal. Final grading will ensure that all highwalls are eliminated. The area will be compacted by several passes on each layer with the use of heavy equipment.

Following final grading of slopes, topsoil and/or alternate material will be reapplied. Care will be taken to prevent compaction of this material. The area will then be seeded and mulched according to the revegetation plan. Any eroded gullies will be regraded, reseeded, and stabilized or rip-rapped.

Mining termination will depend upon weather and market conditions.

ATTACHMENT 12.2.A (2)

Bench Pond Construction

Bench ponds will be constructed per enclosed designs at locations shown on the MRP map. However, bench ponds will not be constructed until mining has progressed through the pond location and any coal within the pond location is removed. Prior to pond construction, mining on the bench in a particular watershed will contain all the water in the pit or will be diverted back to the nearest approved/certified structure until the pond area has been mined through and the pond constructed. Since the size of the pit will exceed the pond size, water holding capacities will exceed those of the pond, thereby, providing adequate sediment control.

In no case will runoff be allowed to leave the permitted area without first passing through a certified sediment facility.

Bench ponds will be built on lowest coal seam to be mined.

ATTACHMENT 12.2.A (3)

Drainage Corridors

Drainage corridors will be permitted between the mining/storage area and the sediment pond proposed. As shown on the enlarged MRP map, the corridor will include the drainage channel and an area adjacent to the channel for access. Total width is proposed at 30 feet. This includes approximately 10 feet for the drainage channel and areas adjacent to it for any mitigation that might arise, and 20 feet to allow equipment access.

However, damage to drainage ways is not expected if design plans within the application are followed.

The drainage corridor areas will have limited usage. They will only be used when necessary for clean out or restoration of the stream channel or associated silt structure. Disturbance will be kept minimal.

Should clean out become necessary, a backhoe or excavator will be used to remove sediment from the channel. Care will be taken to minimize the effects to the stream channel and to ensure that stream characteristics are altered as little as possible. Any sediment removed will be handled according to the plan enclosed for clean out of sediment ponds. After any necessary drying, sediment will be placed with overburden on the bench.

Inspections for sediment clean out will be conducted simultaneously with pond inspections or at least annually.

ATTACHMENT 12.2.A (4)

Best Management Practices

This proposed operation intends to use the best management practices available to ensure protection of the lower lying streams and the associated areas. Erosion will be minimized by immediate seeding, mulching and revegetating of disturbed areas including ponds and outslopes. Hay checks will be placed in areas where erosion gullies or concentrated flows may occur. During pond construction, hay checks will be placed below the disturbance to filter initial disturbance runoff. Likewise, hay checks will be used if necessary along roadway ditches or any temporary ditches or drainage channels created. Rip-rap will be used when velocities or volume of runoff dictates.

Throughout the mining process, care will be taken to minimize erosion and protect surface and groundwater quantity and quality. Measures will be taken, as conditions dictated, to prevent adverse effects to the area.

Rock check dams will be constructed at the toe of each hollow fill. These dams will be constructed once the fill has been cleared. These check dams will aid in filtering of any runoff from the fill site and help reduce sediment load to the lower lying sediment pond.

ATTACHMENT 12.2.A (4) (q)

The two hollow fills, their underdrains and drainage corridors have been discussed at item 26.3.A of this application. The hollow fills will be utilized when mining in the vicinity of each respectively begins. As started in 26.3, each fill will be cleared and grubbed and underdrains constructed prior to placement of fill material. Excess overburden will be placed in each fill as necessary.

Likewise, as mining progresses, sediment ponds (16 total) will be constructed sequentially as disturbance begins in respective watersheds. The ponds will be constructed in accordance with plans and designs included.

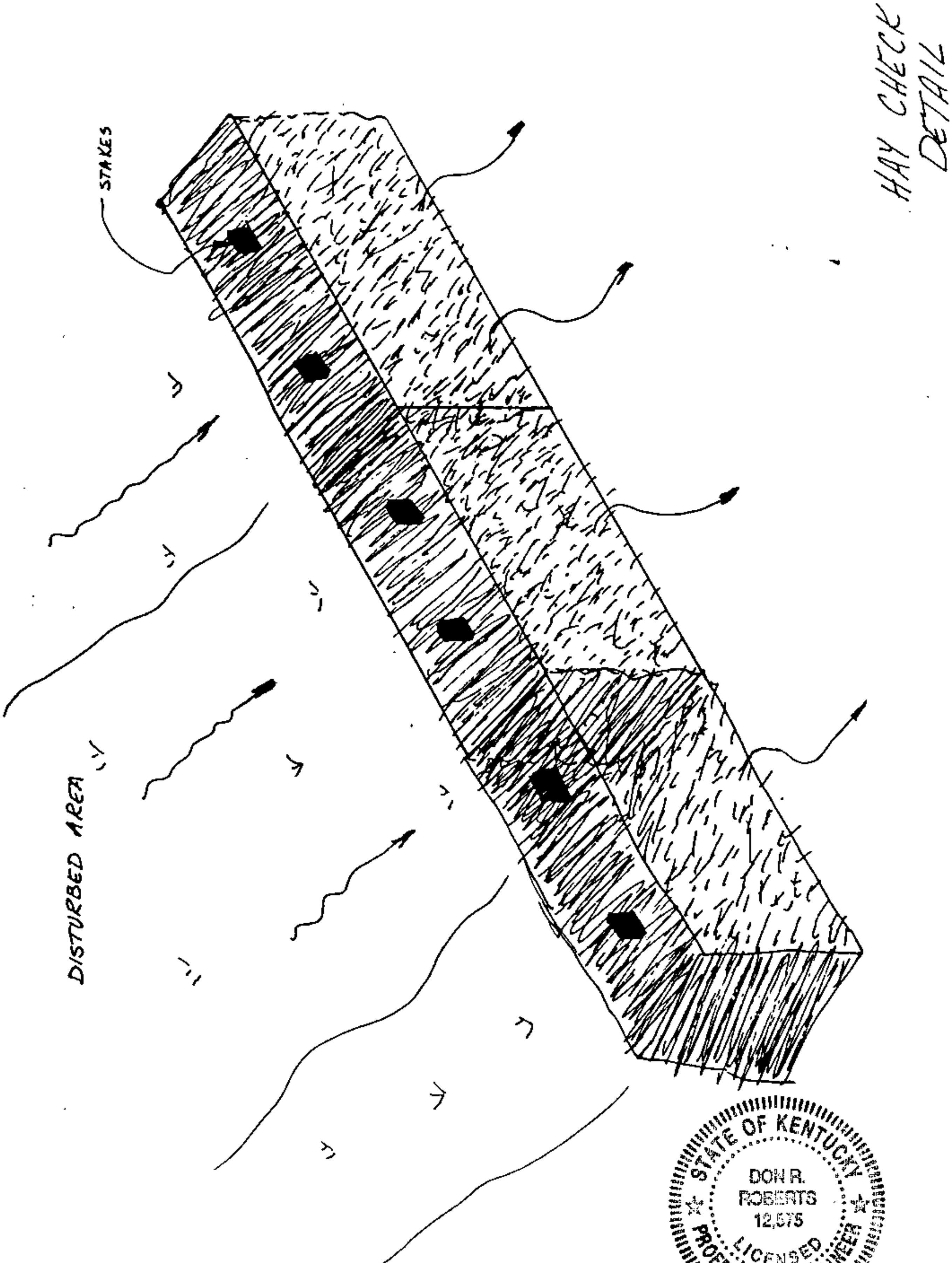
SECONDARY SEDIMENT CONTROL

Should secondary sediment control be necessary, it will be accomplished using hay bales staked down. Hay bales will be placed end to end around the area to be controlled. Staking will prevent movement when sediment or water contacts the hay bales.

If necessary, hay bales will be replaced if it is found they have deteriorated and are not functioning properly.

Any sediment build up will be removed when necessary to ensure the secondary sediment control is functioning properly. This sediment will be spread back onto previously disturbed areas prior to seeding. Excessive amounts of sediment will be taken back on the bench and dried prior to mixing with overburden.

It is not likely that large amounts of sediment build up will occur with the secondary sediment control system.



STATE OF KENTUCKY
DON R.
ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

ATTACHMENT 12.2.A (6)

Construction Specifications
For Durable Rock Hollow Fills

Clearing and Grubbing

Initially, clearing and grubbing of portions of the fills will be conducted. These areas will include underdrains, the toe area where rock checks are to be constructed and the upper portions of the fills where dumping will be initiated. Clearing and grubbing may include the entire footprint of the fill to facilitate the Indiana bat habitat handling plan especially concerning, as a minimum, removal of trees during tree cutting periods of mid-November through the end of March.

Material cleared and grubbed will be windrowed along the outside edge of the fills but within the permitted area. This material will serve as a barrier for sediment and provide a wildlife enhancement area.

Rock Check Structures

Rock check dams will be constructed below each fill to minimize siltation below each fill area. These structures will also assist with entrapment of debris that might affect proper functioning of sediment ponds. Period maintenance will ensure that the rock check structures are free of debris as well as sediment build up. Sediment will be removed, prior to final construction of the underdrain and placement of material at the final toe, to ensure that the underdrain functions properly.

Underdrain Construction

The underdrain will be constructed in accordance with designs and drawings attached. The underdrain channel will be prepared by removing organic material and topsoil initially. The channel will be constructed to design depth and width. Durable rock will then be placed in the channel. Underdrain material will be taken from strata designated in the stratigraphic column having an acceptable SDI value. Care will be taken to ensure that underdrain materials are blasted, transported and otherwise handled to maximize integrity relating to its use in the underdrain. Only the most competent materials will be used in underdrain construction.

ATTACHMENT 12.2.A (7)

Initially, the underdrain will be constructed from the top rim of the fill down to the toe. Care will be taken to ensure that the underdrain is not interrupted or improperly constructed prior to placement of fill material.

In no case will outcrop or degraded material be used in underdrain construction. This material will not be placed in or around the drain in a manner that may cause plugging. A minimum of 4 feet of non-degraded material will be used to cover the underdrain to prevent crushing by equipment or plugging of the drain.

Placement of Material

Once underdrains are installed, end dumping will begin around the top perimeter of the fill. Dumping locations will change periodically to promote fill stability by interlocking dumped material. Dumping may also be conducted at lower elevations within the fill if deemed necessary by the Department or by the operator to ensure proper construction. However, in no case will dumping occur outside the footprint of the fill or in any area where the underdrain is not properly constructed.

Keyway cuts are not necessary since fills are designed to toe out on slopes of less than 36%.

Areal reconnaissance did not reveal any springs, abnormal seepages or apparent stability problems. Should springs or seepages be encountered, the underdrain will be extended to intercept these areas to drain off flow. No adverse geologic conditions were noted including faults or underground mines.

ATTACHMENT 12.2.A (8)

SDI

An SDI analysis was run on each strata to be placed in the fills and each revealed a value higher than 90%. Therefore, of the material to be place in fills 100% is considered durable material. This, of course, does not include topsoil or coal. Results of SDI analysis are shown on attached geologic sheets.

ATTACHMENT 12.2.A (9)

All organic material shall be removed from the disposal area and the topsoil will be removed and segregated pursuant to 405 KAR 16:050 Section 1(5)(a) before the material is place in the disposal area.

A system of underdrains constructed of durable rock shall be installed along the natural drainage system, shall extend from the toe to the head of the fill and contain lateral drains to each area of potential drainage or seepage. In constructing the underdrains, no more than ten (10) percent of the rock may be larger than twenty-five (25) percent of the width of the drain. No rock shall be used in underdrains if it tends to easily disintegrate and thereby clog the drain or if it is acid-forming or toxic-forming. The minimum size of the main underdrain shall be:

Total amount of fill material	Perdominant type of fill material	Drain size in feet	
		Width	Height
Less than 1 million cubic yards	Sandstone	10	4
	Shale	16	8
More than 1 million cubic yards	Sandstone	16	8
	Shale	16	16

ATTACHMENT 12.2.A (10)

Construction of excess spoil disposal structures will initially begin with removal of any topsoil available. Topsoil will be stockpiled in areas designated on the map. Following removal of topsoil, construction of underdrains will be conducted as described by designs. Underdrains will extend throughout the width of each site. Once in place, material will be placed in a controlled manner as required by laws and regulations. Material to remain permanently will be placed in lifts of 4 feet maximum. Final grading will be employed once all material to remain has been finally placed. The surface will rescarified if necessary and seeding and mulching will be conducted.

ATTACHMENT 12.3.A

As can be seen from proposed mining plan narratives and production estimates, this operation is planned to remove all minable and merchantable coal from the area proposed for disturbance.

Mining will proceed in a continuous manner as described in Item 12.2. This method eliminates the possibility of leaving small strips of coal around each pit. Further, all spoil from an active pit can be placed in preceding pits where necessary. This prevents reserve losses incurred by placing spoil on merchantable coal and thereby rendering it inaccessible. All spoil storage on this operation will be in areas where coal has been removed or where no minable coal exists.

No underground mining is proposed at this time. However, any area that provides sufficient size in thickness and access to reserves that may be recovered by underground mining methods will be considered at the time they are encountered. During surface operations, if it is determined that an underground operation is economically and environmentally feasible, then an underground mining application will be filed with the Department.

Nally & Hamilton Enterprises, Inc.
Application No. 807-0339, NW
February 6, 2006

Application Item 13.1: Cultural or Historic Resources

The Division of Mine Permits has received comments from the State Historic Preservation Officer (SHPO) concerning the potential for archaeological resources within the proposed permit area. A copy of the SHPO comments is attached for your information and use.

The Division of Mine Permits has considered these comments and has determined that the proposed operation may potentially impact archaeological resources that are eligible for listing in the National Register of Historic Places. **Therefore, an archaeological survey of the proposed permit area is required.** If you so request, a list of individuals and firms qualified to conduct archaeological investigations in the Commonwealth will be provided to you.

The applicant must submit five (5) copies of the resulting archaeological survey report to the following address: Critical Resources Review Section, Division of Mine Permits, Department for Natural Resources, No. 2 Hudson Hollow, Frankfort, KY 40601.

COMMERCE CABINET
KENTUCKY HERITAGE COUNCIL

Ernie Fletcher
Governor

The State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601
Phone (502) 564-7005
Fax (502) 564-5820
www.kentucky.gov

George Ward
XXXWXJames Host
Secretary

David L. Morgan
Executive Director and
State Historic Preservation Officer

January 31, 2006

Ms. Susan Wind, Supervisor
Critical Resources Review Section
DSMRE/Division of Permits
#2 Hudson Hollow Complex
U.S. 127 South
Frankfort, Kentucky 40601

Re: Nally & Hamilton Enterprises, Inc.
Application # 807-0339, NW
Bell County

Dear Ms. Wind:

Thank you for your letter of December 22, 2005 (received January 6, 2006) concerning the above referenced project. A review of our files indicates that the proposed project will not impact any previously recorded archaeological sites. However, the proposed permit area has never been investigated by a professional archaeologist to determine if any properties eligible for listing in the National Register of Historic Places are present. Investigations of projects in similar environmental contexts have resulted in the identification of a large number of sites some of which have been determined eligible for listing in the National Register. Given the project area's environmental setting, in my opinion, it has a high potential for impacting archaeological sites. Therefore, I recommend that all undisturbed portions of the proposed permit area be surveyed by a professional archaeologist.

In order to make a preliminary determination if properties eligible for listing in the National Register of Historic Places will be affected by this project, the applicant must submit photographs of all structures 50 years or older that are within and adjacent to the project area. Each photograph should be labeled by street address with a brief description of potential impacts or proposed treatment, and should be accompanied by a project map showing their location. Upon completion of our review, this office will advise the applicant if further consultation is required. As always, I would be happy to provide you with a technical review of the report documenting the results of these investigations. Should you have any questions, feel free to contact Charles Hockensmith of my staff at 564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

Nally & Hamilton Entrprises, Inc.
Application No. 807-0339, NW
December 21, 2005

Application Item 14.1: Fish and Wildlife Information

1 . The Division's review of the Kentucky State Nature Preserves Commision's Natural Heritage Database indicates that occurrences of state/federal designated threatened or endangered species **have NOT been recorded** within or adjacent to the proposed permit area.

Nally & Hamilton Enterprises, Inc.
Application No. 807-0339, NW
January 11, 2006

Application Item 14.4: Fish and Wildlife Survey

Based upon the Division's environmental review, it has been determined that the proposed mine operation will not adversely impact any of the resources referenced in 405 KAR 8:030/040, Section 20 (a-c). Therefore, surveys for site-specific fish and wildlife resource information **will not be required** in this application.

ATTACHMENT 14.5.A

There are no wetland areas, important fish and wildlife species, critical habitat of such species, or other protected by state or federal law found within or near the vicinity of the proposed mining area. Therefore, no specific measures will be necessary for unrequired protection.

15. Geologic Information

15.1 Provide the information requested below concerning the coal seam(s) to be mined:

USGS Name	Thickness (inches)	% Total Sulfur	% Pyrite Sulfur	Elevation
Hance	54	0.9%	----	1240-1300

15.2 Provide a description of the geology within the proposed permit area down to and including the stratum immediately below the lowest coal seam to be mined. The description shall include the structural geology, lithology, thickness and chemical characteristics of the overburden strata which will be removed and strata which may be impacted in areas overlying underground works. Include the results of the baseline geologic sampling program on cabinet approved forms and all appropriate drill logs, stratigraphic columns, cross-sections, geochemical lab results and other information on which the description is based. Submit description and related information as "Attachment 15.2.A, 15.2.B", etc.

See Attachments 15.2.A - 15.2.B (5)

15.3 Do aquifers exist within the proposed permit area below the lowest coal seam to be mined, which may be adversely affected by the mining operation? ☐ YES ☒ NO. If "YES", describe the structural geology, lithology and thickness of each stratum from the lowest coal seam to be mined to such aquifers. Submit description and related information as "Attachment 15.3.A".

15.4 Describe all aquifers located within and adjacent to the proposed permit area which the mining operation may adversely impact. Identify the description as "Attachment 15.4.A". At a minimum, the description shall include, for each aquifer, the following information:

Aquifers within the permit area

(a) aquifer identification,
(b) top elevation,
(c) lithology,
(d) thickness,
(e) areal extent,
(f) number of users, and
(g) structural geology

Aquifers adjacent to the permit area

(a) approximate areal extent
(b) approximate thickness
(c) aquifer identification, and
(d) number of users

Correlate this information with the cross-section required in item 15.2.

See Attachments 15.4.A

15.5 Provide, as "Attachment 15.5.A", a volume weighted acid-base account of all overburden strata to be removed by the proposed mining operation.

See Attachments 15.5.A - 15.5.A (1)

15.6 Describe the sampling program used for the collection of premining geologic data within the proposed permit area. The description shall identify: (a) method of sample collection: (b) vertical sampling frequency; (c) parameters tested; (d) laboratory methods used, and (e) name of laboratory. Submit the description as "Attachment 15.6.A".

See Attachment 15.6.A

15.7 Provide the following information for each geologic sampling location.

Site No.	Type (core, rotary, etc.)	Surface Elevation	Total Depth	Latitude	Longitude
C-1	Rotary	1351.2	121.2	36-45-30	83-30-35.8
C-2	Rotary	1411.9	121.9	36-46-6.4	83-30-57.3

NOTE: Show the location of each geologic sampling site on the ERI Map.

ATTACHMENT 15.2.A 807-0339

GEOLOGICAL INFORMATION FORM

(Please print or type all responses)

1. Quadrangle Name Balkan
2. Latitude 36°45'30"
3. Longitude 83°30'35.8"
4. UTM Zone (Eastern Kentucky = 17, Western Kentucky = 16) 17
5. UTM Easting coordinate
6. UTM Northing coordinate
7. Quadrangle Scale 1
   1/24,000 = 1; 1/62,500 = 2; 1/125,000 = 3; Other = 4 – Explain
8. State Identification Code Number 21
   (Use Federal Information Processing Standards Code (FIPS). The FIPS number for Kentucky is 21; additional surrounding states may be found on the last page of this form.)
9. County Code Number (refer to county number list on the last page of this form) 007
10. Coal Company Name Nally & Hamilton Enterprises, Inc.
11. Operator's Name Hamilton (Last), Thomas (First), (M.I.)
12. Permit Number 807-0339
13. SOAP Identification Number N/A
14. Hole Number C-1
15. Date (month, day, year) 12-16-05
16. Driller's Name Minton (Last), Mike (First), (M.I.)
17. Type of Sample 6
    Core = 5; Chip = 6; Auger = 7; Geophysical log = 8;
    Highwall = 9; Other = 10 – Explain
18. Top of hole elevation (round to nearest unit of measurement and indicate units used*) 1351.2
19. Top of hole determination T
    (Barometer = B; Survey = S; Hand Level = H; Topo = T;
    Other = O – Explain)
20. Cumulative thickness of the sample (round to nearest unit of measurement and indicate units used*) 121.2
21. Name of geologist or engineer responsible for preparing this form (last, first, middle initial and title)

Roberts, Don, R., P.E.

Quadrangle		UTM Zone		UTM E		UTM N	

ATTACHMENT 15 2.A (1)
GEOLOGICAL INFORMATION FORM
(Please print or type all responses)

807-0339

Hole Number C-1 UTM Zone 17 Quadrangle Balkan

Latitude 36°45'30" UTM E Coordinate

Longitude 83°30'6.1' UTM N Coordinate

Driller Last First MI Date

Type - Core ___ Chip ✓ Highwall ___ Auger ___ G-log ___ Other ___

Unit of Measurement – Feet & Inches ___ Feet & Tenths ✓ Metric ___

Drillers Log Sheet
(Please Print or Type)

Page 1 of 1 pages

Rock Code	Unit Thickness	Cumulative Thickness	N.P.	P.A.	Comments
001	5.0	5.0	0.8	1.9	Topsoil & Subsoil
001	5.0	10.0	0.6	1.3	Subsoil
001	2.6	12.6	1.4	0.5	Subsoil
324	5.0	17.6	4.3	1.8	Sandy shale
324	5.0	22.6	4.7	1.1	Sandy shale
324	3.2	25.8	5.3	1.4	Sandy shale
544	5.0	30.8	1.6	0.5	Gray Massive sandstone
544	5.0	35.8	1.7	0.4	Gray Massive sandstone
544	5.0	40.8	1.8	0.3	Gray massive sandstone
544	5.0	45.8	1.9	0.4	Gray Massive Sandstone
544	5.0	50.8	2.8	0.2	Gray Massive Sandstone
544	5.0	55.8	3.2	0.7	Gray Massive Sandstone
544	5.0	60.8	2.0	0.6	Gray massive Sandstone
544	5.0	65.8	2.3	0.5	Gray massive Sandstone
544	2.8	68.3	2.4	0.8	Gray massive sandstone
324	5.0	73.3	2.1	1.4	Sandy shale
324	5.0	78.3	2.3	1.2	Sandy shale
324	2.5	80.8	2.5	1.4	Sandy shale
544	5.0	85.8	2.6	0.8	Gray massive sandstone
544	2.0	87.8	2.4	0.6	Gray massive sandstone
124	3.5	91.3	2.3	0.7	Dark Gray shale
020	0.7	92.0			Coal
543	5.0	97.0	1.6	0.5	Gray sandstone w/shale
543	2.0	99.0	1.8	0.6	Gray sandstone w/shale
020	2.5	101.5			Coal
324	5.0	106.5	4.5	0.9	Sandy shale
324	3.2	109.7	4.8	0.7	Sandy shale
020	1.5	111.2			Coal
543	5.0	116.2	1.9	0.8	Gray sandstone w/shale
543	5.0	121.2	2.8	0.7	Gray sandstone w/ shale

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-1

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
1	0.0 - 5.0'	0.8	1.9	-1.1	001
2	5.0 - 10.0'	0.6	1.3	-0.7	001
3	10.0 - 12.6	1.4	0.5	+0.9	001
4	12.6 - 17.6'	4.3	1.8	+2.5	324
5	17.6 - 22.6'	4.7	1.1	+3.6	324
6	22.6 - 25.8'	5.3	1.4	+3.9	324
7	25.8 - 30.8'	1.6	0.5	+1.1	544
8	30.8 - 35.8'	1.7	0.4	+1.3	544
9	35.8 - 40.8'	1.8	0.3	+1.5	544
10	40.8 - 45.8'	1.9	0.4	+1.5	544
11	45.8 - 50.8'	2.8	0.2	+2.6	544
12	50.8 - 55.8'	3.2	0.7	+1.4	544
13	55.8 - 60.8'	2.0	0.6	+1.4	544

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Hensley

ATTACHMENT 15.2.A (2)

807-0339

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-1

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
14	60.8 - 65.8'	2.3	0.5	+1.8	544
15	65.8 - 68.3'	2.4	0.8	+1.6	544
16	68.3 - 73.3'	2.1	1.4	+0.7	324
17	73.3 - 78.3'	2.3	1.2	+1.1	324
18	78.3 - 80.8'	2.5	1.4	+1.1	324
19	80.8 - 85.8'	2.6	0.8	+1.8	544
20	85.8 - 87.8'	2.4	0.6	+1.8	544
21	87.8 - 91.3'	2.3	0.7	+1.6	124
22	91.3 - 92.0'				020 Coal
23	92.0 - 97.0'	1.6	0.5	+1.1	543
24	97.0 - 99.0'	1.8	0.6	+1.2	543
25	99.0 - 101.5'				020 Coal
26	101.5 - 106.5	4.5	0.9	+3.6	324

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Hensley

ATTACHMENT 15.2.A (3)

807-0339

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-1

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
27	106.5 - 109.7'	4.8	0.7	+4.1	324
28	109.7 - 111.2'				020 Coal
29	111.2 - 116.2'	1.9	0.8	+1.1	543
30	116.2 - 121.2'	2.8	0.7	+2.1	543

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Hensley

ATTACHMENT 15.2 A (4)

807-0339

STRATIGRAPHIC COLUMN

C-1

	THICKNESS	STRATA
001	12.6'	TOPSOIL & SUBSOIL
324	13.2'	SANDY SHALE
544	42.8'	GRAY MASSIVE SANDSTONE
324	12.5'	SANDY SHALE
544	7'	GRAY MASSIVE SANDSTONE
124	3.5'	DARK GRAY SHALE
020	0.7'	COAL (Hance)
543	7'	GRAY SANDSTONE W/SHALE
020	2.5'	COAL (Hance)
324	7.2'	SANDY SHALE
020	1.5'	COAL (Hance)
543	10'	GRAY SANDSTONE W/SHALE

TOTAL THICKNESS 121.2'

I, (signature) 12575 (registration no.) 12/16/05 (date) hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 152.A (4)(a)

807-0339

ATTACHMENT 15.2.B

807-0339

GEOLOGICAL INFORMATION FORM

(Please print or type all responses)

1. Quadrangle Name Balkan
2. Latitude 36°46'6.4"
3. Longitude 83°30'57.3"
4. UTM Zone (Eastern Kentucky = 17, Western Kentucky = 16) 17
5. UTM Easting coordinate ______
6. UTM Northing coordinate ______
7. Quadrangle Scale 1
   1/24,000 = 1; 1/62,500 = 2; 1/125,000 = 3; Other = 4 – Explain ______
8. State Identification Code Number 21
   (Use Federal Information Processing Standards Code (FIPS). The FIPS number for Kentucky is 21; additional surrounding states may be found on the last page of this form.)
9. County Code Number (refer to county number list on the last page of this form) 007
10. Coal Company Name Nally & Hamilton Enterprises, Inc.
11. Operator's Name Hamilton (Last), Thomas (First), ______ (M.I.)
12. Permit Number 807-0339
13. SOAP Identification Number N/A
14. Hole Number C-2
15. Date (month, day, year) 12-16-05
16. Driller's Name Minton (Last), Mike (First), ______ (M.I.)
17. Type of Sample 6
   Core = 5; Chip = 6; Auger = 7; Geophysical log = 8;
   Highwall = 9; Other = 10 – Explain ______
18. Top of hole elevation (round to nearest unit of measurement and indicate units used*) 1411.9
19. Top of hole determination T
   (Barometer = B; Survey = S; Hand Level = H; Topo = T;
   Other = O – Explain) ______
20. Cumulative thickness of the sample (round to nearest unit of measurement and indicate units used*) 121.9
21. Name of geologist or engineer responsible for preparing this form (last, first, middle initial and title)

   Roberts, Don, R., P.E.

Quadrangle ______	UTM Zone ______	UTM E ______	UTM N ______

ATTACHMENT 15.2.B (1) 807-0339

GEOLOGICAL INFORMATION FORM

(Please print or type all responses)

Hole Number C-2 UTM Zone ______ Quadrangle Balkan

Latitude 36°46'6.4" UTM E Coordinate ______

Longitude 83°30'57.3" UTM N Coordinate ______

Driller ______ (Last, First, MI) Date ______

Type - Core ______ Chip ✓ Highwall ______ Auger ______ G-log ______ Other ______

Unit of Measurement – Feet & Inches ______ Feet & Tenths ✓ Metric ______

Drillers Log Sheet

(Please Print or Type)

Page 1 of 1 pages

Rock Code	Unit Thickness	Cumulative Thickness	N.P.	P.A.	Comments
001	5.0	5.0	0.4	1.2	Topsoil & Subsoil
001	5.0	10.0	0.7	1.8	Subsoil
001	3.3	13.3	1.2	0.9	Subsoil
324	5.0	18.3	4.2	1.9	Sandy Shale
324	5.0	23.3	4.9	1.3	Sandy Shale
324	3.3	26.6	5.1	1.6	Sandy shale
544	5.0	31.6	1.8	0.7	Gray Massive sandstone
544	5.0	36.6	1.9	0.5	Gray massive sandstone
544	5.0	41.6	2.5	0.6	Gray massive sandstone
544	5.0	46.6	1.5	0.2	Gray massive sandstone
544	5.0	51.6	1.7	0.4	Gray massive Sandstone
544	5.0	56.6	3.2	0.8	Gray massive Sandstone
544	5.0	61.6	2.1	0.9	Gray massive sandstone
544	5.0	66.6	2.4	0.7	Gray massive Sandstone
544	2.9	69.5	2.6	0.4	Gray Massive sand stone
324	5.0	74.5	2.2	1.1	Sandy shale
324	5.0	79.5	2.4	1.6	Sandy shale
324	2.8	82.3	2.8	1.8	Sandy Shale
544	5.0	87.3	2.8	0.4	Gray massive Sandstone
544	2.1	89.4	2.6	0.8	Gray massive sand stone
124	2.4	91.8	2.1	0.9	Dark Gray shale
020	0.9	92.7			coal
543	5.0	97.7	1.7	0.6	Gray sandstone w/shale
543	2.1	99.8	1.5	0.4	Gray sandstone w/shale
020	2.6	102.4			Coal
324	5.0	107.4	4.3	0.8	Sandy shale
324	3.1	110.5	4.5	0.9	Sandy shale
020	1.4	111.9			coal
543	5.0	116.9	2.1	0.7	Gray sandstone w/shale
543	5.0	121.9	2.5	0.4	Gray sandstone w/shale

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-2

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
1	0.0 - 5.0'	0.4	1.2	-0.8	001
2	5.0 - 10.0'	0.7	1.8	-1.1	001
3	10.0 - 13.3'	1.2	0.9	+0.3	001
4	13.3 - 18.3'	4.2	1.9	+2.3	324
5	18.3 - 23.3'	4.9	1.3	+3.6	324
6	23.3 - 26.6'	5.1	1.6	+3.5	324
7	26.6 - 31.6'	1.8	0.7	+1.1	544
8	31.6 - 36.6'	1.9	0.5	+1.4	544
9	36.6 - 41.6'	2.5	0.6	+1.9	544
10	41.6 - 46.6'	1.5	0.2	+1.3	544
11	46.6 - 51.6'	1.7	0.4	+1.3	544
12	51.6 - 56.6'	3.2	0.8	+2.4	544
13	56.6 - 61.6'	2.1	0.9	+1.2	544

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Hensley

ATTACHMENT 15.2.B (2)

807-0339

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-2

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
14	61.6 - 66.6'	2.4	0.7	+1.7	544
15	66.6 - 69.5'	2.6	0.4	+2.2	544
16	69.5 - 74.5'	2.2	1.1	+1.1	324
17	74.5 - 79.5'	2.4	1.6	+0.8	324
18	79.5 - 82.3'	2.8	1.8	+2.0	324
19	82-3 - 87.3'	2.8	0.4	+2.4	544
20	87.3 - 89.4'	2.6	0.8	+1.8	544
21	89.4 - 91.8'	2.1	0.9	+1.2	124
22	91.8 - 92.7'				020 Coal
23	92.7 - 97.7'	1.7	0.6	+1.1	543
24	97.7 - 99.8'	1.5	0.4	+1.1	543
25	99.8 - 102.4'				020 Coal
26	102.4 - 107.4'	4.3	0.8	+3.5	324

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Hensley

ATTACHMENT 15.2.B(3)

807-0339

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

OVERBURDEN ANALYSIS

To: Nally & Hamilton Enterprises, Inc.
P. O. Box 157
Bardstown, KY 40004

Sampled by: Lab

Date: 12/19/05

Permit #: 807-0339
County: Bell
Job I.D.: Blacksnake, C-2

Sample #	Depth	Neut. Pot. 1/ (excess)	Pot. Acid. 1/ (deficiency)	Net Excess (+) or defic. (-)	Description
27	107.4 - 110.5'	4.5	0.9	+3.6	324
28	110.5 - 111.9'				020 Coal
29	111.9 - 116.9'	2.1	0.7	+1.4	543
30	116.9 - 121.9'	2.5	0.4	+2.1	543

1/ $CaCO_3$ equiv. - tons/acre

Signed: Dale Henly

ATTACHMENT 15.2.B(4)

807-0339

STRATIGRAPHIC COLUMN

C-2

	THICKNESS	STRATA
001	13.3'	TOPSOIL & SUBSOIL
324	13.3'	SANDY SHALE
544	42.9'	GRAY MASSIVE SANDSTONE
324	12.8'	SANDY SHALE
544	7.1'	GRAY MASSIVE SANDSTONE
124	2.4'	DARK GRAY SHALE
020	0.9'	COAL (Hance)
543	7.1'	GRAY SANDSTONE W/SHALE
020	2.6'	COAL (Hance)
324	8.1'	SANDY SHALE
020	1.4'	COAL (Hance)
543	10'	GRAY SANDSTONE W/SHALE

TOTAL THICKNESS 121.9'

I, [signature] 12575 12/16/05
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 15.2.B(5)

807-0339

ATTACHMENT 15.4.A

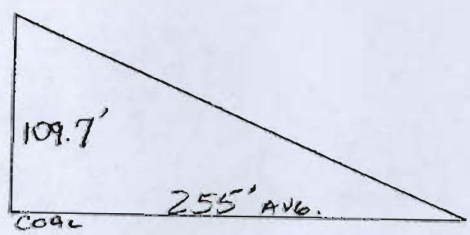
There are no known aquifers within the proposed mining area and none in the vicinity of the mine site that will be adversely impacted.

Generally, ground water flow is governed by the fracture flow that occurs within random fractures to a depth of approximately 100 feet below the surface. Flows are primarily perpendicular to the contour lines and travel fairly consistently with the surface flow directions.

Ground water monitoring stations were set up considering that this fracture flow system is the governing mechanism for ground water movement in the area. These points will best reflect quantity and quality conditions affected by the mining operation.

WEIGHTED ACID - BASE ACCT.
C - 1

SAMPLE	DEPTH	AVG. NET +/-	ROCK CODE	AREA
1-3	12.6	-0.3	001	184.5
4-6	25.8	3.3	324	589.1
7-14	68.3	1.6	544	4648.2
15-18	80.8	1.0	324	2166.2
19-20	87.8	1.8	544	1371.7
21	91.3	1.6	124	728.6
22	92.0	-	020 COAL	149.1
23-24	99.0	1.2	543	1553.9
25	101.5	-	020 COAL	582.6
26-27	109.7	3.8	324	2012.8
				13,986.8



$$\text{OVERALL WEIGHTED NET +/-} = \frac{\sum \text{NET +/-} \times \text{AREA}}{\text{TOTAL AREA}}$$

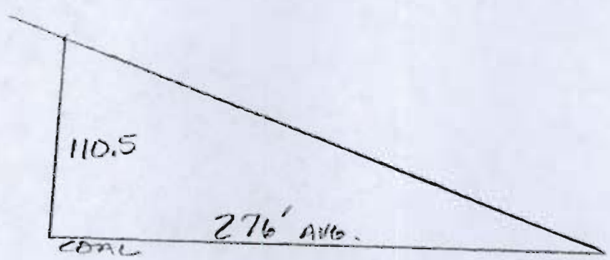
$$= \frac{24{,}640.2}{13{,}986.8}$$

$$= +1.76$$

I, [signature], 12575, 09/05/06
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

WEIGHTED ACID - BASE ACCT.
C-2

SAMPLE	DEPTH	AVG. NET +/-	ROCK CODE	AREA
1-3	13.3	-0.5	001	220.9
4-6	26.6	3.1	324	662.7
7-15	69.5	1.6	544	5148.7
16-18	82.3	1.3	324	2426.6
19-20	89.4	2.1	544	1522.4
21	91.8	1.2	124	543.1
22	92.7	—	020 COAL	207.4
23-24	99.8	1.1	543	1706.9
25	102.4	—	020 COAL	656.5
26-27	110.5	3.6	324	2153.7
				15,249.0



$$\text{OVERALL WEIGHTED NET +/-} = \frac{\Sigma \text{ NET +/-} \times \text{AREA}}{\text{TOTAL AREA}}$$

$$= \frac{26,816.2}{15,249.0}$$

$$= +1.76$$

I, [signature], 12575, 09/05/06
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 15.6.A

The analysis of the geology of the area begins with the consideration of the strata data collections points. The locations, as shown on the maps, were chosen to best depict characteristics of stratigraphy in the vicinity. Types and description detail of each are given at item 15.7.

Of the strata sampled, geochemical analysis of all non-acid producers less than one foot thick were grouped with the next lower strata. Each strata ranging in thickness from one to five feet were sampled at one location within the lithologic unit. Those strata found to range between five and ten feet in thickness were sampled twice at equal intervals within the units. One sample was taken for every five foot interval of strata along the core.

Samples were analyzed for neutralization potential and potential acidity. Lab analysis conducted by Kentucky Resource Lab follow procedures outlined in the E.P.A. publication, "Field and Laboratory Methods Applicable to Overburdens and Minesoils", (KPS-600/2-78-054). The neutralization potential analysis were conducted by the hydrochloric acid method found in the application.

16. Ground Water

16.1 Provide the results of the ground water inventory conducted for the proposed permit and adjacent areas. The inventory shall identify wells, springs, underground mines or other similar ground water supply facilities which are currently being used, have been used in the past, or have a potential to be used. For each supply source, describe the location, ownership, type of use and where possible other relevant information such as the depths and diameters of wells, approximate rate of usage, pumpage or discharge. Provide results as "Attachment 16.1.A".

See Attachment 16.1.A

16.2 Describe the premining ground water monitoring program used to determine the seasonal variations in ground water quality and quantity for all aquifers and water transmitting zones. At a minimum, six months of data shall be collected. The description shall identify the location and construction specifications of each monitoring point used, parameters tested, and laboratory methods used. Submit the description as "Attachment 16.2.A".

See Attachment 16.2.A

16.3 On approved cabinet forms submit the results of the premining ground water monitoring program. Original or notarized copies of all laboratory analyses shall be provided. Submit this information as "Attachment 16.3.A".

See Attachment 16.3.A - 16.3.A (8)

17. Surface Water Information

Major Watershed(s) Affected:

- ☐ Big Sandy River (BS)
- ☒ Cumberland River, Upper (CU)
- ☐ Cumberland River, Lower (CL)
- ☐ Green River (GR)
- ☐ Kentucky River (KY)
- ☐ Licking River (LC)
- ☐ Little Sandy River (LS)
- ☐ Mississippi River (MS)
- ☐ Ohio River (OH)
- ☐ Salt River (ST)
- ☐ Tennessee River (TN)
- ☐ Tradewater River (TW)
- ☐ Tygarts Creek (TG)

17.1 Identify on the environmental resources map and provide a narrative description of the immediate watershed(s) receiving discharge from the proposed permit area. Describe any existing facilities or conditions within the watershed(s) (e.g. existing mining operations, abandoned surface or underground mines, logging operations, oil or gas exploration sites or wells, etc.) which may contribute to surface water pollution. Provide the description as "Attachment 17.2.A". On the ERI map, indicate the location of any existing discharges resulting from such facilities or activities.

See Attachment 17.1.A

17.2 Provide as "Attachment 17.3.A", the results of the surface water user inventory for the proposed permit and adjacent areas. This inventory shall identify the name of the surface water boundary being used as a water supply source, the location, drainage area, ownership, type of usage, and where possible, other relevant information such as the rate of withdrawal and seasonal variation.

See Attachment 17.2.A

17.3 Describe the premining surface water monitoring program used to determine the seasonal variations in surface water quality and quantity. At a minimum, six months of data shall be collected. The description shall identify the location of each monitoring point, parameters tested, and laboratory methods used. Submit the description as "Attachment 17.4.A".

See Attachment 17.3.A

ATTACHMENT 16.1.A

Ground water users for the proposed permit area are listed on the following ground water user map at Attachment 16.1.A (1).

The following ground water users use city water: 1 - 16, 18 - 21, 23 - 28, 32 -39 and 40 - 98.

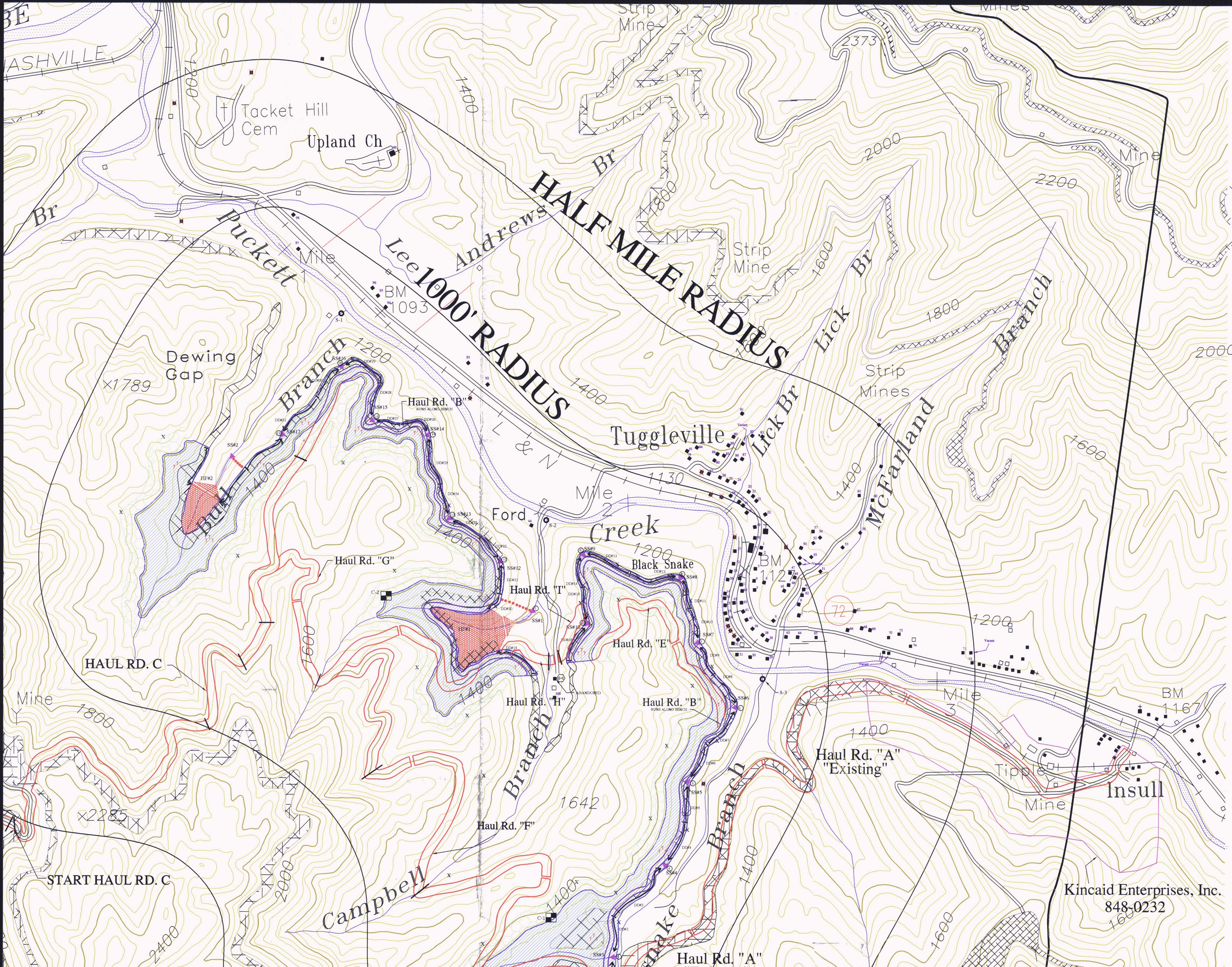
The following ground water users use well water:

	Well Depth	Depth to Water	Casing Diameter	Comments
17.	60'	40'	6"	
22.	60'	40'	6"	
29.	70'	50'	6"	
30.	70'	50'	6"	
31.	75'	50'	6"	
40.	100'	80'	6"	

Groundwater User Map

ATTACHMENT 16.1.A (1)
Ground Water User Map
807-0339

Scale: 1"= 500'



1. John J. Slusher
2. Jerry Cox
3. Bonnie Scott
4. Barb Hoskins
5. Darlean Melton
6. Ray Stapp
7. Ronnie Simpson
8. Shawn Davenport
9. Greg Davenport
10. Bill Ellis
11. Nancy Henderson
12. Cotton Lamb
13. Ronnie Ellie
15. Larry Henderson
16. J.D. Daniels
17. Ronald Bunch
18. David Johnson
19. Tommy Marcum
20. Zora Marcum
21. Lloyd Vanover
22. Virgie Roark
23. Stanley Kinderd
24. Jr. Shackelford
25. Dan Lamar
26. Carolyn Sayler
27. Larry Rapier
28. Joyce Jones
29. Norma Snelling
30. Dorris Snelling
31. Bud Haufield
32. Joyce Jones
33. Joyce Jones
34. Jay Daniest
35. Brandon Rutherford
36. Haley Ealy
37. Eugine Creech
38. Chuck Daniett
39. Beth Stapp
40. Viola Miracle
41. Ollie Napier
42. Mickey Stewart
43. Gabe Hoskins
44. Rue Jackson
45. John Ellie
46. Austin Freight
47. Katherin Fredrick
48. Gary Gross
49. Gary Gross
50. Jim Garrison
51. Alex Lawson
52. Will Lawson
53. Sue Lawson
54. Mike Henderson
55. Angre Horton
56. Michael Abner
57. Bob Hnederson
58. Ken Lawson
59. Samantha Gardner
60. Mitch Perry
61. Russel Minuard
62. Ronnie Simpson
63. Katheryn Lawson
64. Wendel Middleton
65. Krystal Napier
66. Greg Davenport
67. Shawn Davenport
68. Harvey Henderson
69. Joyce Hale
70. Joyce Hale
71. Richard Marcum
72. Lenard Marcum
73. Bill Ellis
74. Bill Ellis
75. Thomas Marcum
76. Margrett Hobbs
77. Cegil Griffin
78. Harold Cupp
79. Opal Hobbs
80. Opal Hobbs
81. Opal Hobbs
82. Ruth Midton
83. Eddie Milton
84. Sam Saylor
85. Laura Hobbs
86. Laura Hobbs
87. Laura Hobbs
88. Laura Hobbs
89. Laura Hobbs
90. Wanda Hobbs
91. Ancie Wayne Hobbs
92. Darryl Jones
93. Anthony Wagers
94. Cody Brooks
95. Tim Medows
96. James Jones
97. Bertha Smith
98. Russell Blake
99. Upland Church
100. John Ellie

I, [signature], 12575, 08/08/06,
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 16.2.A

Monitoring of ground waters has been conducted at the location noted on the enlarged maps. This point was chosen to best reflect changes in quantities and qualities of the aquifer described at item 15.4.

Six months of data from the monitoring station has been collected to properly address seasonal variations affecting flows. Laboratory reports provide a base for comparison of premining water to during mining and post-mining conditions.

As can be seen from these reports, samples collected were tested for pH, alkalinity, acidity, conductivity, sulfate, dissolved iron, and dissolved manganese. All laboratory procedures were in accordance with required methods prescribed by E.P.A.

Additional information on ground water monitoring is given in the hydrologic consequences determination at item 18.1 regarding ground water.

WATER QUALITY DATA ENTRY FORMS: Part 1

Type of Report:
X Premining
____ During Mining/Reclamation
____ Other

STATION INFORMATION

PERMIT#: 807-0339 | STATION#: G-1 | SOAP PERMITTEE#: N/A

*COUNTY#: 007 | *BASIN#: 02 | QUAD NAME: Balkan

STATION TYPE (check): ____ Spring X Well
____ Stream ____ Sediment Pond/Influent
____ Lake ____ Sediment Pond/Discharge

FOR WELLS ONLY

DEPTH (ft.): 68 | CASING DIAMETER (in.): 6 | AQUIFER DESCRIPTION: Fracture Flow

TOP OF AQUIFER (MSL): 1241 | AQUIFER THICKNESS (ft.): 19 | TOP OF WELL ELEVATION MSL): 1260

WATERSHED DESCRIPTION: | DRAINAGE AREA (acres):

LATITUDE (DMS): 36°45'57" | LONGITUDE (DMS): 83°30'34.3"

UTM ZONE: 17 | 16 West of 84^0 Longitude | UTM EASTING: | UTM NORTHING:
17 East of 84^0 Longitude

LOCAL STREAM NAME: Campbell Branch

COAL COMPANY NAME: Nally & Hamilton Enterprises, Inc.

COLLECTING FIRM NAME: Kentucky Resource Lab

ANALYZING FIRM NAME: Kentucky Resource Lab

COMMENTS:

*Refer to coding Instructions for list of codes.

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # G-1

Sample No. [1]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	06/29/05	59	----	141	6.3	0	92	----	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe. Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	16.5	----	0.12	----	0.08	----	48.5			

COMMENT:

Sample No. [2]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	07/28/05	58	----	134	6.4	0	96	----	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	18.6	----	0.13	----	0.06	----	47.5			

COMMENT:

Sample No. [3]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	08/26/05	58	----	130	6.4	0	90	----	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	19.3	----	0.12	----	0.06	----	48.0			

COMMENT:

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # G-1

Sample No. [4]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	09/28/05	57	----	139	6.3	0	88	----	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	16.5	----	0.16	----	0.06	----	49			

COMMENT:

Sample No. [5]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	10/27/05	56	----	148	6.3	0	86	----	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	15.8	----	0.18	----	0.08	----	50			

COMMENT:

Sample No. [6]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	11/28/05	54	----	149	6.3	0	90	----	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	18.6	----	0.18	----	0.08	----	49			

COMMENT:

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 06/29/05

Job I.D.: Blacksnake #1/G-1
Temperature: 59°
Depth to Water: 48.5'

Parameter	Results
pH	6.3
Alkalinity	92 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.12 mg/l
Dissolved Manganese	0.08 mg/l
Sulfate	16.5 mg/l
Specific Conductance	141 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 07/28/05

Job I.D.: Blacksnake #1/G-1
Temperature: 58°
Depth to Water: 47.5'

Parameter	Results
pH	6.4
Alkalinity	96 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.13 mg/l
Dissolved Manganese	0.06 mg/l
Sulfate	18.6 mg/l
Specific Conductance	134 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 08/26/05

Job I.D.: Blacksnake #1/G-1
Temperature: 58°
Depth to Water: 48'

Parameter	Results
pH	6.4
Alkalinity	90 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.12 mg/l
Dissolved Manganese	0.06 mg/l
Sulfate	19.3 mg/l
Specific Conductance	130 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester. KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 09/28/05

Job I.D.: Blacksnake #1/G-1
Temperature: 57°
Depth to Water: 49'

Parameter	Results
pH	6.3
Alkalinity	88 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.16 mg/l
Dissolved Manganese	0.06 mg/l
Sulfate	16.5 mg/l
Specific Conductance	139 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 10/27/05

Job I.D.: Blacksnake #1/G-1
Temperature: 56°
Depth to Water: 50'

Parameter	Results
pH	6.3
Alkalinity	86 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.18 mg/l
Dissolved Manganese	0.08 mg/l
Sulfate	15.8 mg/l
Specific Conductance	148 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS GROUNDWATER

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 11/28/05

Job I.D.: Blacksnake #1/G-1
Temperature: 54°
Depth to Water: 49'

Parameter	Results
pH	6.3
Alkalinity	90 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Dissolved Iron	0.18 mg/l
Dissolved Manganese	0.08 mg/l
Sulfate	18.6 mg/l
Specific Conductance	149 umhos/cm

Signed: Dale Hensley

ATTACHMENT 17.1.A

Disturbance will be within the watersheds of Bull Branch and Campbell Branch.

There should be no stability or water quality problems associated with this permit.

ATTACHMENT 17.2.A

There are no known surface water users within the immediate vicinity of this proposed permit.

ATTACHMENT 17.3.A

The monitoring programs for this particular mine site was designed to collect representative water data at locations that would provide optimum information on watershed characteristics. The points, as shown on the attached maps, are located downstream of the mine site and will therefore reflect actual conditions of water quantities and qualities flowing from the site.

Data has been collected for six (6) months, as reflected on each of the laboratory reports attached. This type of collection period provides information on seasonal variation in both quantity and quality. Lab reports indicate differences in flows and temperature levels for each month sampled.

Field measurements of temperature and discharge were taken along with pH. Samples were then returned to the laboratory for analysis of acidity, alkalinity, sulfate, total iron, total manganese, total suspended solids, and specific conductance. Results of each are given on the reports attached and labeled as 17.5.A.

17.4 <u>On cabinet approved forms</u> submit the results of the premining surface water monitoring program. Original or notarized copies of all laboratory analyses shall be provided. Submit this information as "Attachment 17.5.A".

See Attachment 17.4.A - 17.4.C (8)

18. Determination of Probable Hydrologic Consequences

18.1 Provide as "Attachment 18.1.A", a determination of the probable hydrologic consequences (PHC) which the proposed mining operation will have on both surface water and ground water systems within the proposed permit and adjacent areas. The contents of the determination shall conform to the requirements of 405 KAR 8:030, Section 32 (surface mine) or 405 KAR 8:040, Section 32 (underground mine).

See Attachment 18.1.A - 18.1.B (1)

18.2 Provide as "Attachments 18.2.A", a detailed description of the protective measures to be taken as part of the mining and reclamation operations to ensure compliance with 405 KAR 16:060, Sections 1, 2, 3, 4, 5, 6, 8, 9, 12, and 405 KAR 16:080 (surface mine) or 405 KAR 18:060, Sections 1, 2, 3, 4, 5, 7, and 405 KAR 18:080 (underground mine). Detailed designs of protective measures shall be presented in other pertinent sections of this application.

See Attachment 18.2.A - 18.2.B

19. Alternate Water Supply Information

19.1 Describe the extent to which the proposed mining activities may approximately result in the contamination, diminution, or interruption of underground or surface sources of water within the proposed permit or adjacent areas which are used for domestic, agricultural, industrial or other beneficial uses. This description shall be noted as "Attachment 19.1.A".

See Attachment 19.1.A

19.2 If contamination, diminution, or interruption may result, identify and describe the adequacy of the alternate sources of water supply that could be developed. Provide this information as "Attachment 19.2.A".

See Attachment 19.2.A

WATER QUALITY DATA ENTRY FORMS: Part 1

Type of Report:
X Premining
____ During Mining/Reclamation
____ Other

STATION INFORMATION

PERMIT#: 807-0339 STATION#: S-1 SOAP PERMITTEE#: N/A

*COUNTY#: 077 *BASIN#: 02 QUAD NAME: Balkan

STATION TYPE (check): ___ Spring ___ Well
X Stream ___ Sediment Pond/Influent
___ Lake ___ Sediment Pond/Discharge

FOR WELLS ONLY

DEPTH (ft.): CASING DIAMETER (in.): AQUIFER DESCRIPTION:

TOP OF AQUIFER (MSL): AQUIFER THICKNESS (ft.): TOP OF WELL ELEVATION MSL):

WATERSHED DESCRIPTION: Forest and Prevously Mined DRAINAGE AREA (acres): 380

LATITUDE (DMS): 36°46'37.8" LONGITUDE (DMS): 83°31'2.5"

UTM ZONE: 17 16 West of 84^0 Longitude UTM EASTING: UTM NORTHING:
17 East of 84^0 Longitude

LOCAL STREAM NAME: Campbell Branch

COAL COMPANY NAME: Nally & Hamilton Enterprises, Inc.

COLLECTING FIRM NAME: Kentucky Resource Lab

ANALYZING FIRM NAME: Kentucky Resource Lab

COMMENTS:

*Refer to coding Instructions for list of codes.

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-1

Sample No. [1]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	06/29/05	69	0.084	237	6.9	10	14	4	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	52.6	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [2]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	07/28/05	73	0.089	232	6.8	0	20	2	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	55.3	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [3]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	08/26/05	71	0.094	230	6.7	0	26	4	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	50	----	----	0.02	----	0.06	----			

COMMENT:

ATTACHMENT 17.4.A (1)

807-0339

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-1

Sample No. [4]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	09/28/05	66	0.097	244	6.8	0	22	8	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	56.7	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [5]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	10/27/05	58	0.116	238	6.8	0	28	6	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	58.2	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [6]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	11/28/05	49	0.121	242	6.9	0	24	8	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe. Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	51.3	----	----	0.01	----	0.06	----			

COMMENT:

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 06/29/05

Job I.D.: Blacksnake #1/S-1
Temperature: 69°
Discharge: 0.084

Parameter	Results
pH	6.9
Alkalinity	14 mg/l $CaCO_3$
Acidity	10 mg/l $CaCO_3$
Total Suspended Solids	4 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	52.6 mg/l
Specific Conductance	237 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester. KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 07/28/05

Job I.D.: Blacksnake #1/S-1
Temperature: 73°
Discharge: 0.089

Parameter	Results	
pH	6.8	
Alkalinity	20	mg/l $CaCO_3$
Acidity	0	mg/l $CaCO_3$
Total Suspended Solids	2	mg/l
Total Iron	0.01	mg/l
Total Manganese	0.06	mg/l
Sulfate	55.3	mg/l
Specific Conductance	232	umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester. KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 08/26/05

Job I.D.: Blacksnake #1/S-1
Temperature: 71°
Discharge: 0.094

Parameter	Results
pH	6.7
Alkalinity	26 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	4 mg/l
Total Iron	0.02 mg/l
Total Manganese	0.06 mg/l
Sulfate	50 mg/l
Specific Conductance	230 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 09/28/05

Job I.D.: Blacksnake #1/S-1
Temperature: 66°
Discharge: 0.097

Parameter	Results
pH	6.8
Alkalinity	22 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	8 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	56.7 mg/l
Specific Conductance	244 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 10/27/05

Job I.D.: Blacksnake #1/S-1
Temperature: 58°
Discharge: 0.116

Parameter	Results
pH	6.8
Alkalinity	28 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	6 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	58.2 mg/l
Specific Conductance	238 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 11/28/05

Job I.D.: Blacksnake #1/S-1
Temperature: 49°
Discharge: 0.121

Parameter	Results
pH	6.9
Alkalinity	24 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	8 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	51.3 mg/l
Specific Conductance	242 umhos/cm

Signed: Dale Hensley

WATER QUALITY DATA ENTRY FORMS: Part 1

Type of Report:
X Premining
____ During Mining/Reclamation
____ Other

STATION INFORMATION

PERMIT#: 807-0339 | STATION#: S-2 | SOAP PERMITTEE#: N/A

*COUNTY#: 007 | *BASIN#: 02 | QUAD NAME: Balkan

STATION TYPE (check):
____ Spring
____ Well
X Stream
____ Sediment Pond/Influent
____ Lake
____ Sediment Pond/Discharge

FOR WELLS ONLY

DEPTH (ft.): | CASING DIAMETER (in.): | AQUIFER DESCRIPTION:

TOP OF AQUIFER (MSL): | AQUIFER THICKNESS (ft.): | TOP OF WELL ELEVATION MSL):

WATERSHED DESCRIPTION: Forest | DRAINAGE AREA (acres): 400

LATITUDE (DMS): 36°46'14.2" | LONGITUDE (DMS): 83°30'34.9"

UTM ZONE: 17 | 16 West of 84^0 Longitude / 17 East of 84^0 Longitude | UTM EASTING: | UTM NORTHING:

LOCAL STREAM NAME: Campbell Branch

COAL COMPANY NAME: Nally & Hamilton Enterprises, Inc.

COLLECTING FIRM NAME: Kentucky Resource Lab

ANALYZING FIRM NAME: Kentucky Resource Lab

COMMENTS:

*Refer to coding Instructions for list of codes.

ATTACHMENT 17.4.B

807-0339

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-2

Sample No. [1]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	06/29/05	67	0.22	301	6.9	0	82	8	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	83.2	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [2]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	07/28/05	72	0.231	294	6.8	0	86	6	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	85.8	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [3]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	08/26/05	70	0.248	291	6.7	0	72	6	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/1	Mn, Total mg/1	Depth to Water/ft.			
VALUE	76.2	----	----	0.01	----	0.06	----			

COMMENT:

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-2

Sample No.

[4]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	09/28/05	65	0.251	298	6.8	0	80	10	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	78.4	----	----	0.01	----	0.06	----			

COMMENT:

Sample No.

[5]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	10/27/05	56	0.281	306	6.8	0	76	10	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe, Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/l	Mn, Total mg/1	Depth to Water/ft.			
VALUE	83.2	----	----	0.01	----	0.06	----			

COMMENT:

Sample No.

[6]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	11/28/05	48	0.285	303	6.9	0	84	12	----	----

PARAMETER	SO_4 DISS. mg/1	O_2 DISS. mg./1	Fe. Diss. mg/1	Fe, Total mg/1	Mn, Diss. mg/l	Mn, Total mg/1	Depth to Water/ft.			
VALUE	80.7	----	----	0.01	----	0.06	----			

COMMENT:

ATTACHMENT 17.4.B (2)

807-0339

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 06/29/05

Job I.D.: Blacksnake #1/S-2
Temperature: 67°
Discharge: 0.22

Parameter	Results
pH	6.9
Alkalinity	82 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	8 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	83.2 mg/l
Specific Conductance	301 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 07/28/05

Job I.D.: Blacksnake #1/S-2
Temperature: 72°
Discharge: 0.231

Parameter	Results
pH	6.8
Alkalinity	86 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	6 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	85.8 mg/l
Specific Conductance	294 umhos/cm

Signed: Dale Heasley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS

STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 08/26/05

Job I.D.: Blacksnake #1/S-2
Temperature: 70°
Discharge: 0.248

Parameter	Results
pH	6.7
Alkalinity	72 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	6 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	76.2 mg/l
Specific Conductance	291 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 09/28/05

Job I.D.: Blacksnake #1/S-2
Temperature: 65°
Discharge: 0.251

Parameter	Results
pH	6.8
Alkalinity	80 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	10 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	78.4 mg/l
Specific Conductance	298 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 10/27/05

Job I.D.: Blacksnake #1/S-2
Temperature: 56°
Discharge: 0.281

Parameter	Results
pH	6.8
Alkalinity	76 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	10 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	83.2 mg/l
Specific Conductance	306 umhos/cm

Signed: Dale Heasley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 11/28/05

Job I.D.: Blacksnake #1/S-2
Temperature: 48°
Discharge: 0.285

Parameter	Results
pH	6.9
Alkalinity	84 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	12 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	80.7 mg/l
Specific Conductance	303 umhos/cm

Signed: Dale Hensley

WATER QUALITY DATA ENTRY FORMS: Part 1

Type of Report:
X Premining
____ During Mining/Reclamation
____ Other

STATION INFORMATION

PERMIT#: 807-0339 | STATION#: S-3 | SOAP PERMITTEE#: N/A

*COUNTY#: 007 | *BASIN#: 02 | QUAD NAME: Balkan

STATION TYPE (check): ___ Spring ___ Well
X Stream ___ Sediment Pond/Influent
___ Lake ___ Sediment Pond/Discharge

FOR WELLS ONLY

DEPTH (ft.):	CASING DIAMETER (in.):	AQUIFER DESCRIPTION:
TOP OF AQUIFER (MSL):	AQUIFER THICKNESS (ft.):	TOP OF WELL ELEVATION MSL):

WATERSHED DESCRIPTION: Forest and Previously Mined | DRAINAGE AREA (acres): 750

LATITUDE (DMS): 36°45'56.4" | LONGITUDE (DMS): 83°30'6.1"

UTM ZONE: 17 | 16 West of 84^0 Longitude | UTM EASTING: | UTM NORTHING:
17 East of 84^0 Longitude

LOCAL STREAM NAME: Campbell Branch

COAL COMPANY NAME: Nally & Hamilton Enterprises, Inc.

COLLECTING FIRM NAME: Kentucky Resource Lab

ANALYZING FIRM NAME: Kentucky Resource Lab

COMMENTS:

*Refer to coding Instructions for list of codes.

ATTACHMENT 17.4.C

807-0339

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-3

Sample No. [1]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	06/29/05	68	0.346	348	6.8	0	88	4	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	105	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [2]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	07/28/05	72	0.351	345	6.7	0	76	4	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	100.3	----	----	0.01	----	0.06	----			

COMMENT:

Sample No. [3]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	08/26/05	70	0.354	341	6.6	0	70	2	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	88.6	----	----	0.01	----	0.06	----			

COMMENT:

WATER QUALITY DATA ENTRY FORMS: Part 2

SAMPLE DATA

PERMIT # 807-0339 STATION # S-3

Sample No.

[4]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	09/28/05	65	0.383	342	6.6	0	74	2	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	96	----	----	0.01	----	0.06	----			

COMMENT:

Sample No.

[5]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	10/27/05	56	0.3694	346	6.9	0	86	6	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	116.2	----	----	0.01	----	0.06	----			

COMMENT:

Sample No.

[6]

PARAMETER	DATE MM/DD/YY	TEMP (F)	DISCHARGE (cfs)	CONDUCTIVITY (umhos)	pH. (Std. Units)	ACIDITY mg/l	ALKALINITY mg/l	TSS mg/l	TDS mg/l	SETT. SOLIDS ml/l
VALUE	11/28/05	48	0.428	351	6.8	0	90	8	----	----

PARAMETER	SO_4 DISS. mg/l	O_2 DISS. mg./l	Fe, Diss. mg/l	Fe, Total mg/l	Mn, Diss. mg/l	Mn, Total mg/l	Depth to Water/ft.			
VALUE	110	----	----	0.01	----	0.06	----			

COMMENT:

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 06/29/05

Job I.D.: Blacksnake #1/S-3
Temperature: 68°
Discharge: 0.346

Parameter	Results
pH	6.8
Alkalinity	88 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	4 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	105 mg/l
Specific Conductance	348 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS

STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 07/28/05

Job I.D.: Blacksnake #1/S-3
Temperature: 72°
Discharge: 0.351

Parameter	Results	
pH	6.7	
Alkalinity	76	mg/l $CaCO_3$
Acidity	0	mg/l $CaCO_3$
Total Suspended Solids	4	mg/l
Total Iron	0.01	mg/l
Total Manganese	0.06	mg/l
Sulfate	100.3	mg/l
Specific Conductance	345	umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 08/26/05

Job I.D.: Blacksnake #1/S-3
Temperature: 70°
Discharge: 0.354

Parameter	Results
pH	6.6
Alkalinity	70 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	2 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	88.6 mg/l
Specific Conductance	341 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 09/28/05

Job I.D.: Blacksnake #1/S-3
Temperature: 65°
Discharge: 0.383

Parameter	Results
pH	6.6
Alkalinity	74 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	2 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	96 mg/l
Specific Conductance	342 umhos/cm

Signed: Dale Hensley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 10/27/05

Job I.D.: Blacksnake #1/S-3
Temperature: 56°
Discharge: 0.394

Parameter	Results
pH	6.9
Alkalinity	86 mg/l $CaCO_3$
Acidity	0 mg/l $CaCO_3$
Total Suspended Solids	6 mg/l
Total Iron	0.01 mg/l
Total Manganese	0.06 mg/l
Sulfate	116.2 mg/l
Specific Conductance	346 umhos/cm

Signed: Dale Heasley

KENTUCKY RESOURCE LABS
P.O. Box 350
Manchester, KY 40962
606-598-2605

WATER ANALYSIS STREAM

TO: Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

Permit No.: 807-0339
County: Bell
Sampled by: Lab
Date: 11/28/05

Job I.D.: Blacksnake #1/S-3
Temperature: 48°
Discharge: 0.428

Parameter	Results	
pH	6.8	
Alkalinity	90	mg/l $CaCO_3$
Acidity	0	mg/l $CaCO_3$
Total Suspended Solids	8	mg/l
Total Iron	0.01	mg/l
Total Manganese	0.06	mg/l
Sulfate	110	mg/l
Specific Conductance	351	umhos/cm

Signed: Dale Hensley

ATTACHMENT 18.1.A

DETERMINATION OF PROBABLE HYDROLOGIC CONSEQUENCES

Surface Water

Monitoring

The monitoring system is designed to collect background data at locations that will provide optimum information on characteristics of watersheds to be affected by the mining operation. The monitoring sites were chosen to facilitate the proposed mining area and is shown on the enlarged maps.

Samples collected were analyzed for acidity, alkalinity, total iron, total manganese, sulfate, total suspended solids, and specific conductance. In addition to the laboratory tests, field collected data include pH, discharge in cfs, and temperature.

This particular operation site did not contain available existing data that were site specific for each watershed. Discharge, temperature, and pH measurements were made concurrently with the collection of the laboratory sample. No two sets of collected data were taken closer than two weeks apart. Also, the collected samples were taken during normal flow periods. None were collected during a storm event or immediately thereafter.

Peak Discharge Rates

Although discharge rates were measured at the monitoring station, none were taken during peak conditions. Discharge rates at site S-1 ranged from 0.084 to 0.121 cfs, at S-2 rates ranged from 0.22 to 0.285 cfs and at S-3 they ranged from 0.346 to 0.428 cfs.

Expected peak discharge rates for the watersheds above each pond were calculated in the pond designs. Values for premining peak inflow for the 100 year storm event at the pond site, as well as values for the combined discharge or principal and emergency spillways during a 100 year storm event were calculated. Premining peak inflow values were greater than discharge values. Comparison of discharges at peak flows indicates a slower release of effluent at peak times.

Construction of the sediment ponds and diversion ditches will control flows from the area. Large precipitation events will be held in sediment structures and slowly release, thereby, reducing any potential for flooding or lower lying streams.

ATTACHMENT 18.1.A (1)

Settleable Solids

Currently, there is no premining disturbance in the watershed of the proposed mine site above monitoring stations S-1, S-2 and S-3. However, as reflected by water reports from the monitoring station, suspended solids concentrations were low. Values ranged from 2 to 8 mg/l at S-1, from 6 to 12 mg/l at S-2 and from 2 to 8 mg/l at S-3. These indicate a very acceptable quality of effluent in regard to sediment load concentrations in the vicinity of the permit area. Adjacent areas are similar to those in the vicinity of the mine.

Construction of sediment ponds will provide a mechanism for settlement of solids entering runoff from disturbed areas. Ponds constructed as designed by the approved Kentucky Graphical Method or sediment program analysis will provide for an effluent that will meet standards of 0.5 ml/l of settleable solids.

Low-Flow Discharge Rates

Average or low-flow discharge rates are low in the immediate watersheds affected by the mining permit. Mining will, therefore, have negligible impacts on stream flows. There are no downstream surface water users on the permit area or immediately adjacent areas.

Conductance, pH, and Other Parameters

As we previously discussed, suspended solids in background data samples were considered virtually negligible. Mining will possibly increase these values somewhat, but is not expected to cause excessive readings. Regular monitoring of effluent is proposed to ensure that levels do not exceed acceptable limits.

Values of pH are also consistent throughout the monitoring period. Values ranged from 6.7 to 6.9 at station S-1, from 6.7 to 6.9 at station S-2 and from 6.6 to 6.9 at station S-3, depicting an acceptable quality runoff. These values are expected to remain acceptable during mining since liming and other methods will be used to establish vegetation. Overall, conditions of overburden were non-acidic though topsoil and subsoil will be applied covering the final graded slopes to a depth of 4'.

Alkalinity values at S-1 ranged from 14 to 28 mg/l, at S-2 ranged from 72 to 86 and at S-3 ranged from 70 to 90 mg/l. Acidity values were 0 to 10 mg/l at S-1 and values were 0 mg/l at S-2 and S-3 for all samples.

Only a trace of iron was measured in samples collected. Values reflected a range from 0.01 to 0.02 for all samples.

ATTACHMENT 18.1.A (2)

Conductivity ranged from 230 to 244 (umhos) in samples at S-1, from 291 to 306 in samples at S-2 and from 341 to 351 in samples at S-3, reflecting an acceptable condition also. Sulfate values ranged from a low of 50.0 to a high of 58.2 mg/l at S-1, from a low of 76.2 to a high of 85.8 mg/l at S-2 and from a low of 88.6 to a high of 116.2 mg/l at S-3.

Manganese values were 0.06 mg/l in all samples at S-1, values were 0.06 mg/l in all samples at S-2 and values were 0.06 mg/l in all samples at S-3.

Proper construction of ponds, ditches, and the implementation of proper reclamation efforts will prevent the occurrence of potentially acidic conditions to lower lying waters. Constant monitoring of waters and other mine site conditions will further insure that proper quality standards are maintained. No special treatment of waters or soils is expected other than the application of lime and fertilizer. However, should treatment become necessary, a plan will be implemented immediately in accordance with requirements reflected by samples of waters or soil taken at the time.

ATTACHMENT 18.1.B

GROUND WATER SYSTEMS

Water Quality

Ground water is generally supplied by infiltration of surface water on ridges and slopes above the valley where dip flows govern. Water quality varies but is sufficient to be used as a domestic source.

Mining is not expected to affect ground waters of the area adversely since non-acidic overburden exists. Quantities of ground water should increase somewhat due to the surface disturbance. Loosening of rock materials will allow greater infiltration of surface waters. Therefore, ground water recharge capacities should increase as a result of rock fracturing. Once backfilling of all highwalls has been accomplished and vegetation has been established, holding capacities of areas mined will increase somewhat due to voids created within the material. Runoff velocities will be reduced to premining conditions and greater infiltration should occur. Ground water quantity diminution is, therefore, not expected. Lower lying streams hypothetically will see as light increase in average yearly base flows due to the greater subsurface water retention.

Potential for Acid Drainage

As was discussed in the geologic statement previously, the quality of overburden reflects a non-acidic condition. Values of P.A. were much lower than N.P. values. Therefore, alkaline material exists with corresponding high pH values. This, of course, limits the self-propagating conditions occurring from chemical reactions serving to lower pH. This, then, minimizes the potential for creating conditions favorable for pyrite oxidation by ferric iron and oxygen creating sulfate salts. Rather, alkaline material, like that found in this overburden, reduces the potential for acid drainage.

One (1) ground water monitoring station was needed for this site. Site G-1 is shown on the maps and is located below the proposed mining area to best reflect conditions of ground waters of the area.

Values of pH for the site ranged from 6.3 to 6.4 at G-1. Alkalinity values were 86 to 96 mg/l at G-1.

Dissolved iron and dissolved manganese were low in samples taken at site G-1. Iron values were from 0.12 to 0.18 mg/l in samples from G-1. Manganese values were very low in all samples ranging only from 0.06 to 0.08 mg/l for samples from G-1.

ATTACHMENT 18.1.B (1)

Sulfate values were found to range from 8.3 to 30.7 mg/l at G-1, showing an average quality.

Conductivity ranged from 148 to 182 umhos/cm at G-1, which are also considered acceptable.

Overall water appears to be normal for the area and generally acceptable quality for domestic use. Mining efforts should not adversely impact the ground water regime. Ponds and ditches are proposed to eliminate the potential for water leaving the site without first passing through an approved sediment facility. This provides for drainage control and allows monitoring for both surface and ground waters.

Additionally, mining will be conducted according to regulation requiring elimination of the highwall. This will reduce the potential for continued weathering of strata within the highwall. Finally, reclamation efforts will ensure that slopes are properly graded and that vegetation is established to minimize erosion. Proper amounts of fertilizer and lime will also be applied to create acceptable growing conditions for vegetation and establish adequate pH levels in the soil.

ATTACHMENT 18.2.A

DESCRIPTION OF PROTECTIVE MEASURES

As was discussed previously in the PHC, potential adverse hydrologic consequences are virtually negligible. Water qualities and quantities should vary little in lower lying streams and these slight variations are not expected to be considered adverse or permanent. Once sediment control facilities are constructed, flows should approximate the pre-mining conditions except in large precipitation events.

Therefore, protective measures in regard to the hydrologic balance shall only include maintenance of sediment ponds, construction of ditches, and prompt vegetation of disturbed areas as given in the plan of operation for this particular site. Compliance with regulations regarding effluent are expected and indicated in the pond designs, the discussion provided in the geologic section of this application, and the PHC of the previous item. No special protective measures are proposed. However, should a problem arise with either quantity or quality, immediate attention and resolution will be provided in accordance with regulations and Departmental requirements.

As discussed in the geologic section no acid or toxic drainage is expected. Overburden materials indicated an excess of alkaline strata with higher potentials for acid neutralization. Analysis based upon volume further indicated non-acid conditions in overburden. Monitoring of ponds is required on a regular basis and will reflect any increase in parameters; indicating a potential rise in acid forming conditions. Should this occur, immediate treatment will be employed using chemicals as necessary to reduce excessive parameter values to acceptable limits.

Control of on-site drainage, as well as discharge of effluent to lower lying streams, will be accomplished by the use of sediment ponds and diversion ditches as necessary. Locations of these facilities are shown on the enlarged maps and designs are given within the application.

All mining activities will be conducted in a manner that facilitates reclamation which will restore approximate pre-mining recharge capacities. Care will be taken to prevent excess compaction of the surface to allow proper infiltration of surface water, thereby allowing normal recharge capacities to approximate pre-mining conditions.

ATTACHMENT 18.2.A (2)

Therefore, no diminution of potential supplies is expected. However, should any potential water supplies of area residents be depleted, additional water wells will be drilled, a cistern constructed or residents will be connected to city water to replace the supply.

Likewise, adjacent areas will not be affected by the proposed operation. Control of sediment and water quality will be achieved on the mine-site so that effluent from the site is acceptable. Water quality will thereby remain acceptable in adjacent downstream areas. No acid or toxic drainage will be allowed to flow untreated to off-site areas. Water supplies or adjacent areas are not expected to be affected.

ATTACHMENT 18.2.B

Replacement of Drinking Water Should Adverse Impact Occur

Should diminution, contamination or interruption of any water source occur as an adverse impact of mining, the requirements of 405 KAR 16:060 section 8 will apply. These will include: providing drinking water within 48 hours of notification by the Cabinet; providing a temporary water supply connected to plumbing within 2 weeks; and providing a permanent water supply within 2 years. All other requirements of Section 8 will apply. A copy of the regulation is attached.

ATTACHMENT 19.1.A

The proposed mining operation is not expected to affect surface or underground sources of water. Mining will only temporarily alter flows across the area proposed for coal removal. Overburden removal and creation of a highwall will change velocities. Also, diversion ditches will redirect flows as shown on the drainage plan. Though these minor deviations in flow direction will occur, flow quantities and overall flow patterns will not be greatly affected.

Ponds will reduce sediment loads from surface run-off from the mining area. No other form of contamination or degradation is expected. However, should any unforeseen problem arise, treatment will be conducted within the appropriate sediment structure.

Therefore, no alternate water supply source is proposed.

ATTACHMENT 19.2.A

Contamination, interruption and diminution of surface or ground waters is not expected to occur due to the proposed mining operation. However, should any of these occur, city water is available to all residents in the area. In addition, if the proposed mining operation is proven to cause any contamination, diminution or interruption of ground water, the company will incur the costs to insure that residents are connected to city water.

20. Prime Farmland Investigation

20.1 Based on the applicant's review of relevant information and the performance of an on-site investigation of the permit area, the applicant proposes a negative determination on 252.09 acres of this permit. This request is based on the following:

☒ 252.09 acres should not be considered prime farmland due to the slope being greater than 10% or the soil is very rocky or the area floods during a growing season more than once every two years thus reducing crop yields, etc. Documentation demonstrating this assertion is submitted as "Attachment 20.1.A".

☐ ______________ acres should not be considered prime farmland as it has not been historically used as cropland. The standard departmental surface owner and third party affidavits are submitted as "Attachment 20.1.B and 20.1.C". Applicant should provide a narrative explaining why the acreage has not been farmed. This narrative should reference the history of nearby and adjacent lands.

☐ ______________ acres should not be considered prime farmland as demonstrated by the following U.S. Soil Conservation Service statement.

The land designated on the USGS topographic map attached to permit application no. __________ has

☐ no prime farmland soils
☐ some prime farmland soils
☐ all prime farmland soils

Name ______________________________ Title ______________________________

Signature ______________________________ Date ______________________________

20.2 For applicants claiming an exemption from prime farmland reconstruction submit proper documentation as "Attachment 20.2.A" to demonstrate that a permit had been obtained prior to August 3, 1977, or that the other requirements of 405 KAR 8:050, Section 3, have been met.

N/A

20.3 Identify the acreage of prime farmland to be restored. Provide as "Attachment 20.3.A" the prime farmland restoration plan.

N/A

21. Land Use Information

21.1 Describe the capability of the proposed permit area, before any mining, to support a variety of land uses. Consideration shall be given to soil and foundation, topography, vegetative cover and hydrology. Submit as "Attachment 21.1.A".

See Attachment 21.1.A

21.2 Provide an estimate of the permit area's potential productivity expressed in average of food, fiber, forage, or wood products. Provide as "Attachment 21.2.A".

See Attachment 21.2.A

21.3 Describe the existing uses of the lands adjacent to the proposed permit areas and identify any local land use classifications of the proposed permit area. Submit as "Attachment 21.3.A".

See Attachment 21.3.A

ATTACHMENT 21.1.A

CAPABILITY OF PROPOSED PERMIT AREA

As previously described within this application, land slopes in the area of the proposed mine site are generally considered steep with flatter slopes occurring near the valley floor.

Capabilities of the alluvium at the valley floor are considerably higher than that of the steeper slopes. Soils are deeper and slopes are much more suited for agricultural production. Row crops are considered feasible in this area since erosion potential is reduced. Only the areas very near the larger streams are considered questionable due to infrequent flooding.

However, the steeper slopes above the valley are somewhat less capable of supporting a wide variety of agricultural uses. Soils are shallow and rocky in most areas. Drainage is considered excessive with high potential for erosion on unvegetated, unprotected slopes. Due primarily to steepness and soil depth, the area is limited to woodland production and/or grazing or pasture lands. Crop planting and harvesting is not feasible since limitations for necessary equipment use is severe.

Capabilities of woodland production and pasture or grazing lands are relatively high with proper management primarily necessary during initial planting.

ATTACHMENT 21.2.A

Potential productivities of this particular mine area are considered relatively high and would justify intensive levels of management.

Woodland production would require the highest level of management due to the severity of plant competition. This competition exists since sufficient moisture is available during growing seasons. Generally, low quality trees that tolerate shade establish themselves in the understory of layer stands and thereby hinder desirable trees from starting once the saw-log sized trees are removed.

Slope steepness would require immediate vegetation, of disturbed areas, with grasses and legumes to prevent erosion until tree species could dominate and stabilize slopes.

ATTACHMENT 21.3.A

Areas in the vicinity of the proposed mine site consist of land use similar to that found within the proposed permit boundaries. Attached maps delineate vegetation type and land use of the areas. No local land use classification is associated with the site.

The land use includes the following:

<u>Forest Lands</u>

These areas are not managed for timber production though hardwoods of logging size do exist. Primarily, however, pole timber sized trees cover the area. Areal productivity varies with aspect and land form along with many other considerations. Though some pine and spruce exist, the area is primarily covered with hardwoods including oak, hickory, ash and yellow poplar.

21.4 Describe the consideration which has been given to making the proposed postmining activities consistent with surface owner plans and applicable state and local land use plans and programs. Submit as "Attachment 21.4.A".

See Attachment 21.4.A

21.5 Attach copies of the comments concerning the proposed postmining land use from legal or equitable owner of record of the surface area to be affected. Also, attach any comments from federal, state, and local government agencies which would have to initiate, implement, approve, or authorize the proposed land use following reclamation. Submit as "Attachment 21.5.A, 21.5.B" etc.

N/A - No change is post-mining land use is proposed.

21.6 Indicate existing land uses within the proposed permit area:

☒ Forestland (40)	252.09	ac.	☐ Developed Water Resources (53)		ac.
☐ Pastureland (20)		ac.	☐ Residential (11)		ac.
☐ Cropland (21)		ac.	☐ Industrial/ Commercial (13)		ac.
☐ Fish and Wildlife (01)		ac.	☐ Undeveloped (60)		ac.
☐ Recreation (02)		ac.			
☐ Mined Lands (30)		ac.			

Clearly delineate on the Environmental Resources Map, the boundaries of each land use checked above.

21.7 If active coal mining is being conducted within the proposed permit area or if previous mining has been conducted within the proposed permit area, provide the following information: If not applicable, check here ☒.

Premining Land Use(s)	Acres

21.8 If any land use (other than mining) has been in existence less than five years prior to the date of this application, describe the historic land use. Submit this description as "Attachment 21.8.A". If not applicable, check here ☒.

21.9 If previous mining has occurred within the proposed permit area, describe the type of mining used, coal seam or other strata mined, areal extent of such mining, and approximate dates of the disturbances. Submit as "Attachment 21.9.A". All areas of prior disturbance shall be shown on the MRP Map. If not applicable, check here ☒.

21.10 Indicate the proposed postmining land use(s) of the permit area:

☒ Forestland (40)	252.09	ac.	☐ Developed Water Resources (53)		ac.
☐ Pastureland (20)		ac.	☐ Residential (11)		ac.
☐ Cropland (21)		ac.	☐ Industrial/ Commercial (13)		ac.
☐ Fish and Wildlife (01)		ac.			
☐ Recreation (02)		ac.			

21.11 Describe how the proposed postmining land use(s) will be achieved and identify any necessary support or management activities which will be used. Submit as "Attachment 21.11.A".

See Attachment 21.11.A

ATTACHMENT 21.4.A

The premining land use for this proposed operation is classified as forestland. Reconnaissance of the area indicates trees to be present on the area proposed for surface disturbance, as well as the area overlaying the proposed underground portion. As discussed in the vegetation types section of the application, hardwoods dominate in the area.

Post mining landuse of forestland is also proposed after mining activities have ceased. Once final grading has been completed, the area will be seeded immediately in accordance with the vegetation plan. Seeding is required to adequately minimize erosion and reduce the possibilities of adverse effects to water quality and/or fish and wildlife habitat. Silt structures will, however, be utilized as the primary control mechanism use in reduction of settleable solids to lower lying streams.

Trees are then to be planted over the area according to the revegetation plan. Plantings and survival rate will be in accordance with 405 KAR 16:200 section 7. Virginia pine seedlings will be planted at the rate of 600 per acre with an expected survival rate of 400 per acre at the end of the five (5) year liability period as required by 405 KAR 16:200 Section 6.

The landuse restoration plans will be conducted in a timely manner and will be carried out under the supervision of a registered professional engineer. He will ensure that final grading and drainage will be compatible with the surrounding areas and will achieve adequate land stability.

The proposed postmining landuse will not pose any further actual or probable threat of water flow diminution or pollution. Therefore, this request is made in compliance with the landowners request for a postmining landuse of forestland. No particular support or management activities are necessary on the site.

ATTACHMENT 21.9.A

As can be seen from the MRP map, portions of the proposed area have been previously mined. Mining was conducted on these areas by conventional mining methods using dozers, loaders, drills and trucks. The dozers and loaders removed overburden that had been blasted using conventional methods also. Material has been pushed and/or loaded on trucks and transported to storage areas. Once coal was removed, overburden was placed back on the bench and finally graded. Seeding and mulching has provided revegetation on the areas disturbed. Some areas contain only sparse vegetation while others have a better cover. Erosion has occured on some parts of the old disturbance. Most prominent are the areas where drains concentrate the flows.

This proposed operation intends to mine through the old disturbance, at locations shown on the MRP map, and completely reclaim those particular areas to current reclamation standards. Vegetation will be re-established on all newly disturbed or redisturbed areas.

The extent of previous mining in shown on the MRP map through the date associated with this mining are not known.

Nally & Hamilton Entrprises, Inc.
Application No. December 21, 2005
December 21, 2005

Application Item 21.11: Fish and Wildlife Enhancement Plan

Based on the Division's environmental review, it has been determined that the application **will** require a fish and wildlife enhancement plan, as specified in 405 KAR 8:030/040, Section 36(1). This plan must be submitted as an attachment to application item 21.11.

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
COMMERCE CABINET

Ernie Fletcher
Governor

#1 Game Farm Road
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

George Ward
Secretary

Dr. Jonathan W. Gassett
Commissioner

January 11, 2006

Ms. Susan Wind, Supervisor
Critical Resources Review Section
DSMRE/Division of Permits
#2 Hudson Hollow,
Frankfort, KY 40601

RE: Nally & Hamilton Enterprises, Inc.
Application #807-0339
Bell County, Kentucky

Dear Ms. Wind,

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has reviewed the information provided by your staff concerning the above-referenced permit application and attended a site visit with DSMRE personnel on January, 9, 2006. KDFWR offers the following comments:

X The applicant proposes to place fill material into intermittent/perennial portions of the affected streams. KDFWR will not request an aquatic survey of the affected streams beyond the scope of survey required for mitigation and stream restoration, as required by the US Army Corps of Engineers.

X KDFWR recommends to the applicant the following measures for appropriate stream channel restoration:

1) The stream channel should be reconstructed/restored following natural stream channel design concepts. The mitigation stream channel design should be referenced to streams of similar size in the area or constructed to be similar to the original stream dimensions.

2) The gradient and profile of the constructed stream should be consistent with the original stream. The newly constructed stream channel should parallel the original stream profile (stream gradient, width, depth, pool/riffle ratio, and habitat).

3) The channel should be excavated in such a manner that low flows are concentrated. This can be accomplished by utilization of the V-shaped channel. Additionally, an irregular bottom contour to create deeper pool areas is beneficial.

4) All disturbed areas should be revegetated with species beneficial to wildlife as soon as construction ceases. KDFWR requests the riparian area to be restored with native vegetation for a minimum width of 100 feet on each side of the channel. The riparian area is important to the overall health of the stream by contributing shade, nutrients, stable stream banks, cooler water temperatures, and a buffer zone.

5) KDFWR recommends the applicant implement adequate sediment control measures when conducting construction of the stream channel. Best management practices (BMP's), such as immediate vegetation of dam outslopes, silt fences, and straw bales, will assist in control of sedimentation and minimize impacts on aquatic resources.

Should you require any information or have any questions, please feel free to contact me at (502) 564-5448, ext 367.

Sincerely,

Marla Barbour Callaghan

Marla Barbour Callaghan
Fisheries Biologist III
Assistant Project Leader, Environmental Section

Xc: Environmental Section Files

ATTACHMENT 21.11.A

The land use restoration plans will be conducted in a timely manner and will be carried out under the supervision of a registered professional engineer. He will ensure that final grading and drainage will be compatible with the surrounding areas and will achieve adequate land stability.

All areas are to be seeded, immediately after final grading and placement of topsoil, as set forth in the revegetation plan. This will eliminate any possible adverse effects to water quality or fish and wildlife. Silt structures are also designed to contain runoff from disturbed areas.

No particular support or management activities are required other than mowing of hay at least annually. Harvesting of hay will provide weed control that will reduce competition of plant species. Liming and/or fertilizing will be conducted prior to initial seeding in accordance with requirements depicted by laboratory soil analysis. Though it is not expected, additional lime or fertilizer will be periodically applied as needed. Any bare areas or erosion points will be regraded or scarified and reseeded as required during the bonding period.

21.12 If the proposed postmining land use(s) represent a change from the existing or premining land use(s), provide the following information:

(a) A discussion of the feasibility, i.e. suitability, capability, cost effectiveness of the proposed postmining land use(s). Submit as "Attachment 21.12.A".

(b) A schedule for achieving the proposed postmining land use(s). Submit as "Attachment 21.12.B".

(c) A discussion of how the proposed postmining land use(s) will be achieved within a reasonable time frame. Submit as "Attachment 21.12.C".

(d) A separate map showing the proposed postmining land use(s). Submit as "Attachment 21.12.D".

If section 21.12 is not applicable, check here ☒.

22. Vegetation Information

22.1 Provide as "Attachment 22.1.A", a map and narrative description of the existing vegetative types and plant communities within the proposed permit and any proposed reference area. This description shall include adequate information to predict the potential success for re-establishing vegetation on the proposed permit area.

See Attachment 22.1.A - 22.1.A (1)

22.2 Complete the following table to describe the plan for revegetating the proposed permit area.

Proposed Postmining Land Use Forestland	Rate per Acre	Acreage	Planting Dates
Permanent Grass: Orchard Grass Timothy	 5 lbs. 5 lbs.	 252.09	 March - June 1 and Aug. 30 - Dec. 1
Legumes: Kobe Lespedeza	 3 - 5 lbs.	 252.09	 " "
Trees: White Oak Norhthern Red Oak Shagbark Hickory Black Locust White Ash	 60 stems 60 stems 60 stems 60 stems 60 stems	 252.09 " " " "	 " " " " "
Temporary Plants: Annual Rye	 15 - 20 lbs.	 252.09	 " "
Mulch: Hay or Straw	 1500 lbs.	 252.09	 "
Small Grains: N/A			

ATTACHMENT 22.1.A

DESCRIPTION OF VEGETATION TYPES

Forest

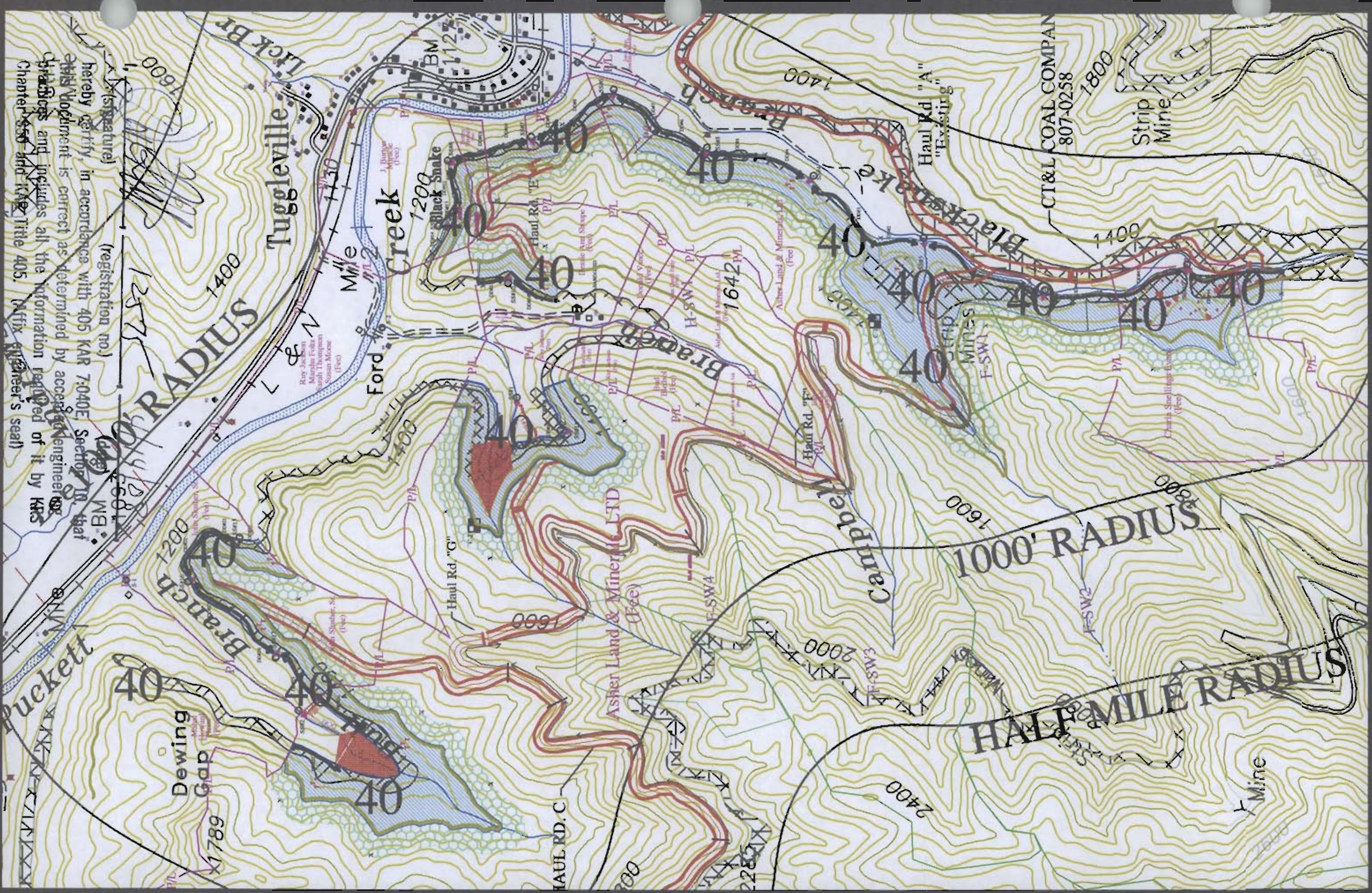
This vegetation type occurs on gently sloping to steep areas and is composed of mostly hardwood species with pine trees occurring in association. The trees are mostly pole-timber size with some saw-timber occurring in various locations. The major forest cover type is oak-yellow poplar pine. Species composition varies with past land use and site conditions.

The three dominant tree species of the area are southern red oak, yellow poplar, and shortleaf pine. Common associates are scarlet oak, black oak, red maple, white oak, mocker nut hickory, Virginia pine and black gum. American beech is also a common associate and in some moist sites such as north and east facing side slopes, foot slopes, and concave land forms.

Under story plants of the area are composed of various tree, shrub, and herbaceous species. They include flowering dogwood, black oak, red maple, American Beech, mocker nut hickory, sour wood, devil's walking-stick, blackberry, Japanese honeysuckle, false-Solomon's seal, striped pipsissiwa, strawberry-bush, and green brier. Other common under story components which are more prevalent on moist sites include redbud, umbrella magnolia, poison ivy, spice bush, papaw, and Christmas fern.

Grass-Legume

These areas have been seeded with tall fescue, serecia lespedeza, Korean Lespedeza, and red clover. Foxtail and other weeds have seeded in naturally and have become quite prominent in places. Moderate to frequent mowing of these fields has been conducted with some grazing of most of the area.



ATTACHMENT 22.1.A (1)

807-0339

Vegetation Map

Scale:1=1200

20=Grassland 30=Undeveloped 40=Forest

22.3 Are alternate soil stabilizers in lieu of mulch being requested? ☐ YES ☒ NO. If "YES", justify this proposal, identify acreage for which this variance is requested and describe the nature of the soil stabilizer. Provide as "Attachment 23.3.A".

22.4 Provide, as "Attachment 22.4.A", detailed descriptions of:

(a) The methods to be used in planting, seeding and mulching, including irrigation, pest and disease control measures.

(b) The measures to be used to determine the success of revegetation as required by 405 KAR 16:200 and 405 KAR 18:200.

(c) The soil testing plan for evaluating the results of topsoil handling and reclamation procedures related to revegetation.

See Attachment 22.4.A - 22.4.A (1)

23. Soils Resources Information

23.1 Is soil survey information for the proposed permit area available from the U.S. Soil Conservation Service? ☒ YES ☐ NO. If "YES", use the appropriate information to provide a description of existing soils that will be disturbed within the proposed permit area.

See Attachment 23.1.A - 23.1.A (2)

23.2 Does the applicant propose to use selected overburden materials as a supplement or substitute for topsoil? ☐ YES ☒ NO. If "YES", provide the following information:

(a) A geologic cross-section of the proposed permit area identifying the proposed alternate material(s) to be used. Submit as "Attachment 23.2.A".

(b) The results of chemical and physical analyses of the existing soils and the proposed alternate materials conducted in accordance with 405 KAR 16:050. Submit as "Attachment 23.2.B".

(c) Certification by a qualified soil scientist or agronomist that the alternate material is equal to, or more suitable than, the existing topsoil. Submit as "Attachment 23.2.C".

23.3 Describe, as "Attachment 23.3.A", how topsoil or alternate topsoil materials will be removed, stored, stabilized, protected, and redistributed in the proposed permit area. Indicate on the MRP Map where topsoil and/or alternate topsoil stockpiles will be located.

See Attachment 23.3.A

24. Surface Blasting Plan

24.1 Is surface blasting proposed for the permit area? ☒ YES ☐ NO.

24.2 Will blasting be conducted within 1000' of any building used as a dwelling, public building, school, church, commercial, community, or institutional building? ☒ YES ☐ NO. If "YES", submit as "Attachment 24.2.A", an anticipated blast design prepared and signed by a certified blaster with this application, or at a time prior to the blasting operation. If the design will be submitted after permit issuance, the design shall be provided thirty days prior to the anticipated blasting and such blasting may not be initiated until DSMRE approval is obtained.

A blast design will be submitted to the regional office 30 dayprior to blasting.

24.3 Will blasting be conducted within 500' of an active or abandoned underground mine? ☐ YES ☒ NO. If "YES", attach the blast designs and for active mines the appropriate MSHA Blasting Approval Form as "Attachment 24.3.A".

ATTACHMENT 22.4.A

This operation will be re-vegetated in a timely manner once final activities have ceased. The area will be scarified prior to seeding. If necessary, a disc, bog harrow, or chisel plow will be utilized to break up soil.

The soil testing plan for this operation will be conducted on the mining site immediately after final activities have ceased. The plan will include several random field tests to determine pH levels. These tests are for early indications of soil characteristics to aid in seeding, fertilizing, and lime requirements. A series of soil samples will also be collected at various points to equally represent the entire disturbed area. One sample will be taken for every ten acres of disturbance. These samples will undergo a more accurate laboratory analysis to determine existing soil characteristics. In particular, a buffer pH reading will be taken. A minimum reading of 5.5 will be attained before bond release is requested. Readings of less than 5.5 will indicate the need for lime applications. Rates of lime to be applied will be based on the degree of acidity in the buffer pH reading and the potential acidity reading.

Once the area is completely prepared, seeding will be employed according to application rates and species specified in the re-vegetation plan. Seeding of disturbed areas shall be conducted during the first normal period for favorable planting conditions after final activities have ceased. This is to be accomplished either by hand, hydro-seeder, or a combination of the two. If available, a hydro-seeder will be used on most of the area. However, some inaccessible areas will require hand seeding.

Fertilizers will be added to the hydro-seeder to be spread simultaneously with seed mixtures. In areas where hand seeding is used, fertilizers will be added prior to the spreading of seed mixtures.

Suitable mulch shall be used on the area to control erosion, promote germination of seeds, or increase the moisture retention capacity of the soil. Amounts and application rates are specified in the re-vegetation plan. Success standards for ground cover and productivity shall be measured as described in 405 KAR 16:18:200 Section 5. Ground cover shall be at least ninety (90) percent, and productivity shall be at least ninety (90) percent of the average yield for that hay in the county in the three years prior to the year of measurement as determined from "Kentucky

ATTACHMENT 22.4.A (1)

Agricultural Statistics 1989 - 1990", and "Kentucky Agricultural Statistics 1990 -1991", "Kentucky Agricultural Statistics 1991 - 1992", and "Kentucky Agricultural 1993 - 1994", with a statistical confidence of ninety (90) percent.

Ground cover and productivity shall equal the approved standard for the last two consecutive years of the responsibility period. The period of extended responsibility under the performance bond requirements of 405 KAR Chapter 10 will begin after the final seeding and will continue for not less than five years.

Ground cover and productivity of living plants on the re-vegetated area within the permit area shall be at least 90% of the technical standards, as required by TRM #19.

ATTACHMENT 23.1.A

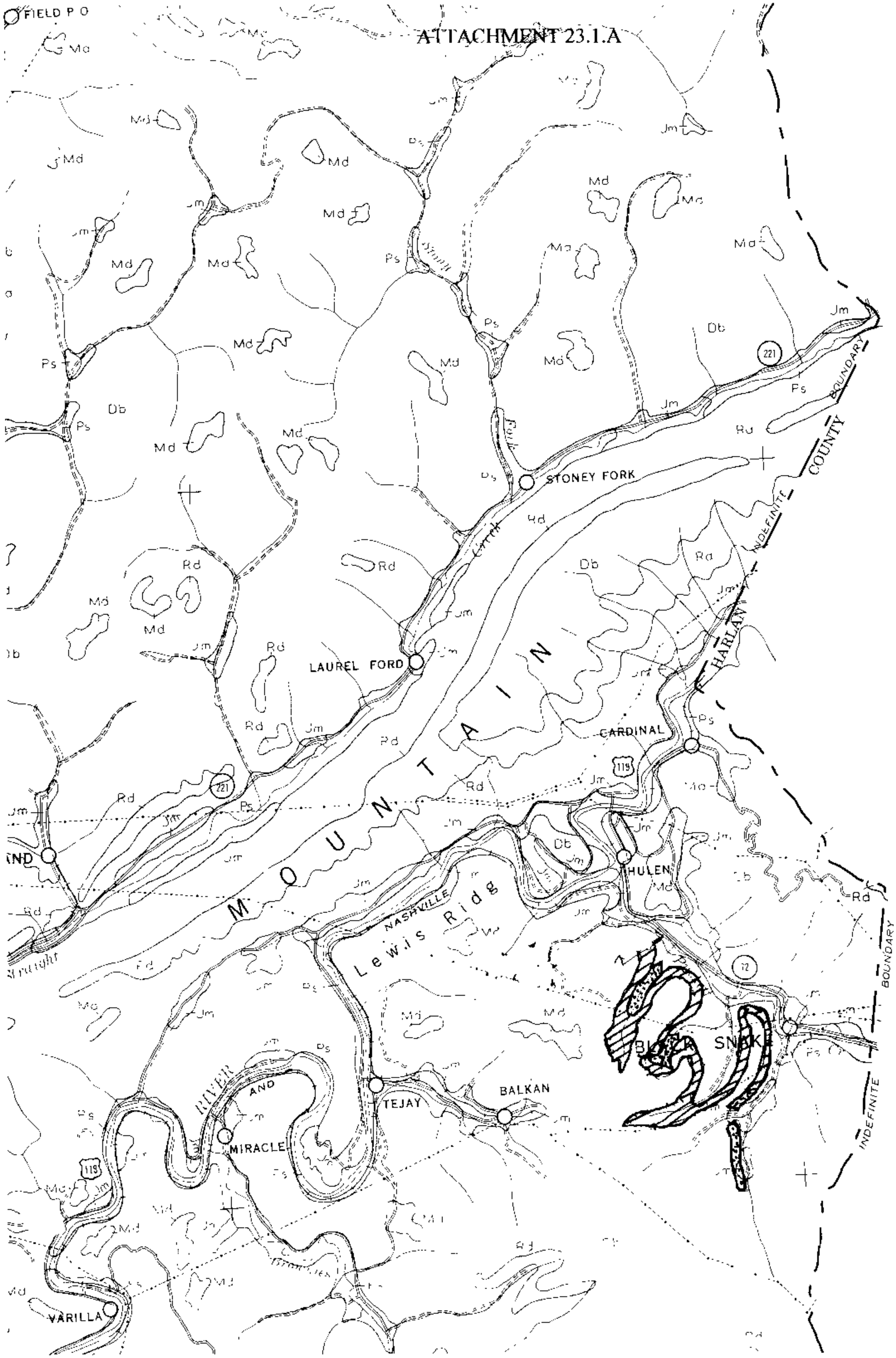


TABLE 8.—*Acreage and proportionate extent, by counties, of soils and land*

Soil or land type	Capability class or subclass	Bell		Breathitt		Clay		Floyd		Harlan		Johnson	
		Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Sequatchie fine sandy loam, 6 to 12 percent slopes.	IIIe	------	------	120	1.7	100	0.6	70	1.8	------	------	70	2.0
Stendal gravelly fine sandy loam	IIw	90	1.1	60	.8	420	2.5	60	1.5	140	1.7	70	2.0
Stendal fine sandy loam	IIw	20	.3	------	------	------	------	40	1.0	------	------	------	------
Stendal silt loam	IIw	------	------	70	1.0	260	1.6	------	------	150	1.8	40	1.1
Strip mine	None	------	------	------	------	40	.2	------	------	------	------	------	------
Tyler silt loam	IIIw	------	------	100	1.4	140	.8	------	------	60	.7	10	.3
Wellston silt loam, 6 to 12 percent slopes.	IIIe	------	------	------	------	------	------	------	------	------	------	------	------
Wellston silt loam, 12 to 20 percent slopes.	IVe	20	.3	------	------	------	------	------	------	------	------	------	------
Wellston silt loam, 12 to 20 percent slopes, eroded.	IVe	------	------	------	------	------	------	------	------	------	------	------	------
Whitwell loam	IIw	------	------	60	.8	120	.7	------	------	40	.5	------	------
Zaleski silt loam, 2 to 6 percent slopes	IIe	------	------	------	------	------	------	20	.5	------	------	20	.6
Total		7,880	100.0	7,160	100.0	16,650	100.0	3,910	100.0	8,130	100.0	3,510	100.0

[1] Less than 0.1 percent.

(Db) Dekalb-Muskingum-Berks association: Dominantly moderately deep, steep to very steep, very stony soils in mountainous areas

This soil association makes up parts of all 14 counties and is rough, broken, mountainous, and deeply dissected by many small streams. Ridgetops in the association are very narrow and generally very stony, and side slopes are very steep, are very stony, and are marked by rock outcrops in a few places. The valley floors consist of narrow flood plains that are bordered by strongly sloping colluvial soils. Figure 3 shows the relationship of the major soils in this association to parent material and topography.

The Dekalb, Muskingum, and Berks soils make up about 96 percent of the association and occupy the ridgetops and very steep side slopes. All of these soils are generally very stony.

The Dekalb soils, which account for about 70 percent of this association, are shallow to moderately deep over sandstone and siltstone. They have a fine sandy loam or loam surface layer and a subsoil that contains many stone fragments.

The Muskingum soils make up approximately 19 percent of the association. They are shallow to moderately deep over interbedded siltstone and shale and have a silt loam surface layer and subsoil.

The Berks soils account for about 7 percent of the association. They are shallow to moderately deep over interbedded siltstone and shale. Their surface layer is silt loam, and their subsoil contains many stones and fragments of shale.

The Jefferson, Stendal, and Pope soils make up about 3 percent of the association and occur on the lower foot slopes and on flood plains. The Jefferson soils are deep, are well drained, and generally have a gravelly loam or stony loam surface layer and a clay loam or loam subsoil. The somewhat poorly drained Stendal and the well-drained Pope soils are on flood plains and consist of deep silt loam to fine sandy loam.

Also in this soil association, but accounting for less than 1 percent of it, are Wellston, Enders, Rarden, and Upshur soils, mostly on ridgetops; Barbourville, Hayter, Cotaco, Zaleski, Holston, Allegheny, Monongahela, Tyler, Purdy, Sequatchie, and Whitwell soils on the lower foot slopes and benches; and Philo, Atkins, Bruno, Huntington, and Newark soils on the narrow flood plains.

The following kinds of miscellaneous land make up a small acreage of this association: (1) Built-up areas consisting of villages, towns, mining camps, and railroad and highway rights-of-way on the valley floors and their adjacent foot slopes; (2) Rock land consisting of many small areas of sandstone outcrops, of bouldery and very stony land, and of limestone outcrops along Pine Mountain; (3) stony and sandy alluvial land along some of the streams; and (4) a few small areas in which the surface layers of rock have been removed from the underlying coal. Mine spoil and waste are prominent in parts of the association that have been mined extensively for coal. Drift and auger coal mines are common. Auger mine trails, shown on county soil maps by a special symbol, average between 40 and 80 feet in width and follow the contour of the mountains.

This soil association is largely in hardwood forest, but small, scattered areas have been cleared and are used for row crops, meadow or pasture, or are idle. Although the dominant Dekalb, Muskingum, and Berks soils are droughty and low in natural fertility, they are well suited to trees if woodland management is good. The Jefferson soils on foot slopes and the Pope and Stendal soils on flood plains are moderately low to moderately high in natural fertility. These soils generally respond well to additions of lime and fertilizer and to other good management. The less extensive soils range from moderately low to moderately high in natural fertility. On the steep slopes erosion is a severe hazard.

ATTACHMENT 23.1.A (2)

PERMIT NUMBER

Dashed lines indicate soil does not occur in county.

Soil or land type	Capability subclass	Bell		Breathitt		Clay		Floyd		Harlan		Johnson	
		Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Dekalb fine sandy loam, 12 to 20 percent slopes.	VIe	----	----	----	----	60	2.8	----	----	----	----	----	----
Dekalb stony loam, 12 to 20 percent slopes.	VIs	----	----	90	1.9	40	1.9	40	0.5	----	----	20	0.5
Dekalb stony loam, 12 to 20 percent slopes, severely eroded.	VIIs	----	----	----	----	----	----	----	----	----	----	----	----
Dekalb stony loam, 20 to 30 percent slopes.	VIIs	140	2.2	60	1.2	70	3.3	110	1.4	140	1.5	70	1.8
Dekalb stony loam, 20 to 30 percent slopes, severely eroded.	VIIs	80	1.2	----	----	20	1.0	40	.5	20	.2	30	.8
Dekalb-Muskingum-Berks stony soils, 30 to 50 percent slopes.	VIIs	100	1.5	260	5.3	30	1.4	250	3.1	460	5.0	100	2.6
Dekalb-Muskingum-Berks stony soils, 30 to 50 percent slopes, severely eroded.	VIIs	----	----	60	1.2	----	----	50	.6	100	1.1	----	----
Dekalb-Muskingum-Berks stony soils, 50+ percent slopes.	VIIs	210	3.2	430	8.8	20	1.0	370	4.6	440	4.8	300	7.7
Dekalb-Muskingum-Berks stony soils, 50+ percent slopes, severely eroded.	VIIs	----	----	90	1.8	----	----	130	1.6	100	1.1	50	1.3
Muskingum-Gilpin silt loams, 6 to 12 percent slopes.	IIIe	----	----	40	.8	----	----	----	----	----	----	20	.5
Muskingum-Gilpin silt loams, 6 to 12 percent slopes, severely eroded.	IVe	----	----	----	----	----	----	----	----	----	----	----	----
Muskingum-Gilpin silt loams, 12 to 20 percent slopes.	IVe	100	1.5	----	----	30	1.4	20	.3	40	.4	30	.8
Muskingum-Gilpin silt loams, 12 to 20 percent slopes, severely eroded.	VIe	----	----	----	----	20	1.0	----	----	----	----	----	----
Muskingum-Gilpin silt loams, 20 to 30 percent slopes.	VIe	100	1.5	----	----	----	----	30	.4	60	.7	----	----
Rock land	VIIs	5,840	88.9	3,870	79.0	1,810	86.2	6,970	87.0	7,820	85.2	3,260	84.0
Total		6,570	100.0	4,900	100.0	2,100	100.0	8,010	100.0	9,180	100.0	3,880	100.0

[1] Less than 0.1 percent.

Forestry, wildlife, and recreation are good uses for soils in this association. Many small, fairly smooth areas of Dekalb, Muskingum, Berks, and Jefferson soils occur throughout the association and are fair to good for pasture and meadow. The Pope, Stendal, and other soils on the narrow flood plains produce good to high yields of many kinds of crops.

About 94 percent of this soil association consists of soils in capability subclass VIIs, and 1 percent, of soils in subclass VIe. The remaining 5 percent of the association consists of soils in capability subclasses IIe, IIw, IIs, IIIe, IIIw, IVe, IVw, IVs, and VIIe, and of small areas of miscellaneous land.

(Dg) Dekalb-Muskingum-Gilpin-Jefferson association: Dominantly steep, moderately deep, silty soils in hilly areas

This soil association occurs only in Johnson and Lawrence Counties. It is hilly and is dissected by many small streams. Valleys and ridgetops are narrow, and side slopes are steep. The valley floors are flood plains that are bordered by strongly sloping colluvial soils. Figure 4 shows the relationship of the major soils in this association to the parent material and topography.

The Dekalb soils, which make up about 46 percent of the soil association, are on ridgetops and moderately steep to steep side slopes. These soils are excessively drained, are moderately deep to shallow, and are underlain by sandstone and siltstone. Their surface soil is fine sandy loam or loam; their subsoil contains many stone fragments.

The Muskingum soils are somewhat excessively drained. They account for about 26 percent of the association, and they occur with the Gilpin soils on ridgetops and on moderately steep to steep side slopes. The Muskingum soils have a silt loam surface layer and subsoil and are moderately deep to shallow over siltstone and shale. Some areas are stony, and a few rocks crop out in places.

The Gilpin soils, which are well drained and somewhat excessively drained, amount to about 7 percent of the soil association. They occur with the Muskingum soils on the ridgetops and moderately steep to steep side slopes. Generally, Gilpin soils are moderately deep over siltstone and shale. They have a surface layer of silt loam and a subsoil of heavy silt loam or light silty clay loam.

Jefferson soils make up approximately 6 percent of the association and occur on the lower foot slopes. They are deep, are well drained, and generally have a gravelly loam surface layer and a clay loam or loam subsoil.

The Pope soils account for about 3 percent of the association and occur on bottoms along the streams. These soils are deep, are well drained, and generally have a silt loam to fine sandy loam surface layer and subsoil.

ATTACHMENT 23.3.A

TOPSOIL HANDLING PLAN

All topsoil will be removed, stored, and redistributed in accordance with 405 KAR 16:050. After clearing the vegetation and before disturbance of the area, the existing topsoil will be separately removed and segregated from other material.

Existing topsoil varies in thickness on the permit area by past last use, land form and aspect. Measured depths ranged from 6 to 8 inches with an average of about 7 inches. On areas with less than 6 inches of topsoil, a 6 inch layer that includes the A horizon and the upper B horizon will be removed and the mixture segregated and redistributed as the soil surface layer. Depth of unconsolidated material in 20 to 40 inches on most ridges and nose slopes and more than 50 inches on most side slope positions.

Topsoil and other materials removed will be stockpiled on a stable area within the permit area for less than one year, will not be disturbed, and will be protected from wind and water erosion, unnecessary compaction, and contaminants. The stockpile will be protected by an effective cover of annual rye grass (10 lbs./ac.), perennial grass (5 lbs./ac.) and orchard grass (15 lbs./ac.) seeded during the first normal period after removal for favorable growing conditions.

After final grading and before the replacement of topsoil and other materials, regraded land will be scarified to eliminate slippage surfaces and to promote root penetration. Topsoil and other materials will be redistributed in a manner that achieves an approximate uniform thickness, prevents excess compaction, and protects the topsoil from erosion. Nutrients and soil amendments will be applied to the redistributed surface soil layer in the amounts determined by approved laboratory soil tests, so that it supports the accepted post-mining land use and meets the re-vegetation requirements of 405 KAR 16:200.

24.4 Describe, in "Attachment 24.4.A", the blast warning, all-clear signals and site access control procedures to be used. Also, describe how all persons within one-half mile of areas affected by surface operations or facilities will be notified of the meaning of the blast signals.

See Attachment 24.4.A

24.5 Does the proposed surface mining operation include blasting operations using more than five (5) pounds of explosives? ☒ YES ☐ NO. If "YES", submit a sample copy of the blasting schedule to be published in a newspaper of general circulation in the locality of the blasting operation. Describe the procedure for circulating the schedule to the DSMRE regional office, local governments, public utilities, and to each resident within a one-half mile of areas affected by surface operations or facilities in accordance with 405 KAR 16:120, Section 3. Submit as "Attachment 24.5.A".

See Attachment 24.5.A - 24.5.A (1)

24.6 Describe how all residents within one-half mile of areas affected by surface operations or facilities will be informed about the procedure for requesting a preblast survey, and the procedures for recording and reporting to DSMRE the results of any requested preblast surveys. Submit this description as "Attachment 24.6.A".

See Attachment 24.6.A - 24.6.A (1)

24.7 Describe the procedures to be used for insuring that airblasts are controlled in accordance with 405 KAR 16:120 or 18:120. Submit description as "Attachment 24.7.A".

See Attachment 24.7.A

24.8 Describe the procedures to be used to control flyrock and how prevention of adverse impacts of blasting will be ensured in accordance with 405 KAR 16:120 or 18:120. Submit this description as "Attachment 24.8.A".

See Attachment 24.8.A - 24.8.A (3)

24.9 Will blast monitoring equipment be utilized in lieu of the scaled distance equations presented in Appendix C of 405 KAR 16:120 or 405 KAR 18:120? ☒ YES ☐ NO. If "YES", provide a description of the types, capabilities, sensitivities and locations of the equipment proposed for use. Submit this description as "Attachment 24.9.A".

See Attachment 24.9.A

25. Backfilling and Grading Plan

25.1 Describe the methods to be used for backfilling and grading the proposed permit area, including soil stabilization and compaction practices. Provide a map and/or appropriate cross-sections to illustrate and define the proposed postmining configuration of the permit area. If cross-sections are used identify the location of the cross section on the MRP map or other appropriate map. Provide this information as "Attachment 25.1.A".

See Attachment 25.1.A - 25.1.F

25.2 Is a variance requested from approximate original contour requirements for any portion of the proposed permit area? ☐ YES ☒ NO. If "YES", provide as "Attachment 25.2.A", the following information:

(a) A complete description, including location, of the area(s) for which a variance is requested.

(b) A detailed explanation of how the applicant meets the "criteria for approval" under one or more of the following regulations: (1) 405 KAR 8:050, Section 4, mountaintop removal; (2) 405 KAR 8:050, Section 6, steep slopes; (3) 405 KAR 16:190, Section 4, thin overburden; (4) 405 KAR 16:190, Section 5, thick overburden; (5) 405 KAR 16:190, Section 7, remining.

25.3 Provide complete calculations on spoil generation and disposal for the proposed permit area. Include a stability analysis to demonstrate that backfilled benches will meet a minimum static safety factor of 1.3. Submit this information as "Attachment 25.3.A".

See Attachment 25.3.A

ATTACHMENT 24.4.A

Prior to detonation of any blast, a warning signal will be sounded. The warning signal shall consist of a one (1) minute series of long blasts on a siren five minutes prior to blast signal. The blast signal shall consist of a series of short blasts one (1) minute prior to the shot. The siren used to sound these warnings shall be audible to a minimum of ½ mile. The sounding of the blast signal will be conducted after the area has been visually inspected for persons or domestic animals near the blast site. Once detonation has been accomplished, the site will again be visually inspected to insure safe conditions. A prolonged blast on the siren following the inspection of the blast area will be sounded to designate "all clear".

All roads leading to the site will be properly blocked to prohibit public access during blasting operations. Company vehicles or machinery will be used to block the roadway.

All persons within one-half mile of the site will be notified by mail or hand delivering of a copy of the blasting schedule which includes signals and times proposed for blasting. Further, the siren will be used to alert residents of immediate blasts. Also, signs will be erected on the site to inform the public approaching the site.

Each person within ½ mile of the permit area will be notified as to the meanings of audible signals.

Blasting will be conducted Monday through Saturday, each day not before sunrise or after sunset. There will be no scheduled blasting after sunset except in an emergency situation. Unscheduled blasting may occur in an emergency situation where weather, atmospheric conditions, operator safety, or public safety requires unscheduled detonation.

All unscheduled blast shall be conducted in accordance with 405 KAR 16:120 Section 4 (1) (b) 1-3 and (c).

ATTACHMENT 24.5.A

A copy of the blasting schedule will be mailed or hand delivered in some cases to residents within ½ mile of the site. Further, a copy will also be mailed to the Department for Natural Resources' Regional Office, all public utilities, and the local government. Mailing will be accomplished prior to any blasting on the site. Signs will be erected on the site to further inform the public of signals, etc....

All blasts will require notifying each resident within 500 feet of the blasting area, depending upon site specific conditions warranting, will be informed about impending blasts. This will be accomplished visiting each resident and verbally notifying them or by leaving a notice giving details of anticipated blasting time, location and warning signals.

A complete written report of unscheduled blasting or blasting at night will be filed by the permittee with the cabinet not later than three (3) days after the unscheduled blasting or the night blasting, not including Saturdays, Sundays, or legal holidays. The report shall include a detailed description of the reasons for the delay in blasting including why the blast could not be held over to the next day, identification of the time at which the blast was actually conducted, a description of the warning notices given, and a copy of the blast record required by Section 6 of 16:120.

Prior approval for conducting the blasting between sunset and sunrise will be obtained from the Office of Mine Safety and Licensing.

ATTACHMENT 24.5.A (1)

To Be Published in: Middlesboro Daily News and Harlan Daily Enterprise

NOTICE OF BLASTING SCHEDULE

Permit Number 807-0339

In accordance with the provisions of 405 KAR 16:120, Section 3, Nally & Hamilton Enterprises, Inc., P.O. Box 157, Bardstown, KY 40004, telephone number (606) 878-1500, shall conduct blasting operations on its 252.09 surface mine, permit number 807-0339, located 0.1 mile south from Old School Road's junction with KY 72 and located 1.02 mile southeast of Blacksnake in Bell County and 0.1 mile south from Harlan County.

Blasting will be conducted Monday through Saturday, each day not before sunrise or after sunset. There will be no scheduled blasting after sunset except in an emergency situation. Unscheduled blasting may occur in an emergency situation where weather, atmospheric conditions, operator safety, or public safety requires unscheduled detonation. Any major alteration of this blasting schedule will be published in this paper.

Control of the blasting area will be obtained by the blocking of any access roads near the area prior to blasting. Prior to detonation of any blast, a warning signal will be sounded. The warning signal shall consist of one (1) minute series of long blasts on a siren five minutes prior to the shot. The blast signal shall consist of a series of short blasts one (1) minute prior to the shot. The siren used to sound these warnings shall be audible to a minimum of ½ mile. The sounding of the blast signal will be conducted after the area has been visually inspected for persons or domestic animals near the blast site. Once detonation has been accomplished, the site will again be visually inspected to insure safe conditions. A prolonged blast on the siren following the inspection of the blast area will be sounded to designate "all clear".

ATTACHMENT 24.6.A

Blasting operations will not begin until all residents or owners of dwellings located within one-half mile of the permit area have been notified of how to request a preblast survey. This notice will be given at least thirty days prior to initiation of any blasts. This notification will be mailed or hand delivered to each resident and will inform the resident that he may make the request for a preblast survey in writing to the permittee or the Cabinet.

If a request is made, the permittee will promptly perform the survey prior to the initiation of blasting if the request has been made ten days or more before the planned blasting operations begin.

The results of any survey will be prepared and signed by the person who conducted the survey including any recommendations for adjustments to the blasting plan. The final report will then be kept on file in the office of the permittee or his engineer.

Copies of the report shall be promptly provided to the person requesting the survey and the Cabinet.

A signed copy of any preblast survey conducted will be submitted to appropriate Regional Office atfer completion of the survey.

ATTACHMENT 24.6.A (1)

NOTICE OF YOUR RIGHT TO REQUEST A PREBLASTING SURVEY

(name and address of resident or owner)

____
____
____
____
____

Telephone: ______________________________

Your home, school, church, shop or other manmade structure is located within 1/2 mile of the surface mining permit no. 807-0339, of Nally & Hamilton Enterprises, Inc. The mining operation is located in the Blacksnake area of Bell County. The latitude is 36°45'51", and longitude is 83°29'15".

Federal and state laws and regulations (405 KAR 16:120/18:120, Section 2) require that the coal permittee notify residents or owners of any manmade structures within 1/2 mile of the permit area of their to request a preblasting survey of the structure. This survey is conducted at no charge to the resident/owner and it is done at the resident's/owner's convenience.

It is not expected that the blasting will cause any problems or damage. However, a preblasting survey is required and conducted for the protection of the resident's/owner's property. The survey will determine and document the existing condition of the structure(s), and any physical factors that could reasonably be affected by the blasting. If wells are used for the water supply, a water sample will be taken and included with the survey. In addition, the permittee should be notified (by the resident/owner) if any changes are made to the structure so the survey can be updated. The resident or owner is advised to request a pre-blast survey if a structure is renovated, modified or added to subsequent to a preblasting survey.

Upon completion of the survey, the original copy will be on file at the mine office, one copy will be sent to the regional office of the Division of Mine Reclamation and Enforcement, (DMRE), and one copy will be sent to the resident/owner. If the resident/owner disagrees with the results of the survey, he can notify (in writing) both the permittee and DMRE. You can request the survey by writing either:

DMRE Regional Office Address:	Permittee Address:
Division of Mine Reclamation and Enforcement	Nally & Hamilton Enterprises, Inc.
1804 East Cumberland Avenue	P.O. Box 157
Middlesboro, KY 40965	Bardstown, KY 40004
Telephone (606) 248-6166	Telephone (606) 878-1500

Please include the following permit number in your request: 807-0339

Sincerely,

____

ATTACHMENT 24.7.A

As was previously discussed in a manner not to exceed values specified in Appendix A (Airblast Limitations). See Attachment 24.7.A (1) for Airblast limitations. Airblast will be controlled at any public building, school, church, commercial, community or institutional building outside the permit area. Airblast limitations will be maintained.

Periodic monitoring of airblasts shall be conducted to include monitoring as follows:

Three (3) consecutive blasts will be monitored at least one time during the period from January - June and three (3) consecutive blasts will be monitored at least one time during the period from July - December.

Airblast monitoring will be conducted at dwellings nearest the particular blast being detonated unless worst case conditions warrant otherwise.

Equipment will include an extension unit to the seismograph which shall have a flat frequency response of at least 200 Hz at the upper end.

If necessary, airblasts will further be reduced by use of loose material placed over the shot or by increasing the depth of stemming from the surface.

Records of each air blast, along with associated blasting records in accordance with 405 KAR 16:120 Section 6 will be kept at the company office for at least 5 years.

ATTACHMENT 24.7.A (1)

Appendix A of 405 KAR 16:120

Airblast Limitations

Lower frequency limit of measuring system in Hz (±3 dB)	Maximum level in dB
2 Hz or lower - flat response	133 peak
6 Hz or lower - flat response	129 peak

ATTACHMENT 24.8.A

Flyrock, including blasted material traveling along the ground, may not be cast from the blast site more than half the distance to the nearest structure and in no case beyond the boundary of the permit area.

Flyrock shall be controlled as necessary by increasing stemming of holes or by placement of loose material over the top of the blast. Other measures may include a blasting blanket constructed of steel wire mesh to restrict potential flyrock. Care will be taken to ensure that no hole to be detonated is excessively close to the "free edge" of the proposed shot area.

Every effort will be made to prevent adverse effects to area residents, utilities and roads. Special consideration will be given to any of these facilities prior to each blast. Planning will be employed to keep vibration, dust and noise associated with blasting to a minimum. However, safety will be the first consideration throughout the entire time of the operation.

The blasting plan will initially utilize scaled-distance equations. As blasting approaches any dwellings, utilities or other facilities, a seismograph will be utilized in conjunction with the equations. The pounds per delay will be considered along with seismic readings at the nearest dwelling. Weights may then be gradually increased until the approximate powder factor is reached or the peak particle velocity limits are approached as stated in Appendix B. This method will provide added safety precaution to aid in prevention of damages and violations.

The proposed mining operations will at all times ensure motorist safety on the public roads in the area. When blasting operations are within 800 feet of a public road, and to insure public safety, the applicant will require that traffic be stopped until the all-clear signal is sounded. Precautions may include industry accepted practices and/or stopping traffic. If traffic is stopped, flagmen will coordinate with the blaster to insure that traffic has been stopped. If traffic is not stopped, spotters will be posted on the roadway before each blast. The spotters will coordinate with the blaster to insure that all detonation, within the 800 feet of public roadways, will be during no traffic flow. Blasting should be avoided during periods of heavy usage or when school buses are picking up or returning children to their homes, unless weather conditions or an emergency warrant detonation. Access to the permit area will be closed prior to any blasting and the road will remain closed until the area is determined safe. Also, mining will be conducted in such a way to prevent spoil from leaving the permit area and entering the public road. Signs will be posted in areas where trucks will be entering and leaving the public roadways, adequate to alert traffic on said roads.

ATTACHMENT 24.8.A (1)

The certified blaster will be in charge of all blasting activities, including determination of the bounds of the blast area, after careful consideration of information such as location of dwellings and other structures to be protected, the driller's log, blast hole deviation data, laser-profile data, slant of the holes, blast hole loading data, condition of the highwall, presence of overhangs, back-breaks, voids, weathering and variations in the local geology, in controlling flyrock and preventing adverse impacts of blasting.

Written communication will be maintained between driller and certified blaster.

ATTACHMENT 24.8.A (2)

Railroad Protection Plan

All blasting to be conducted in the vicinity of the CSX Railroad will adhere to all regulations governing. Initially, care will be taken to ensure that rocks and debris from clearing, grubbing and mining will not reach the railroad or disrupt service of the line. When mining is active in the vicinity of the railroad, inspections of the track will be conducted at least daily or more often if conditions warrant. The solid berm on the outcrop of the coal seam will be left in tact as required by the regulations. This berm will prevent rocks and debris from rolling down the hill to the railroad right-of way.

Flyrock will not be permitted to leave the site as specified in the regulations. Any additional measures, deemed necessary by the registered/licensed blaster, will be employed to ensure conditions are not conducive to flyrock.

Prior to blasting, CSX Railroad personnel, including dispatchers will be notified 24 hours in advance of intended blasts. This notice will be given to allow CSX to schedule their trains accordingly and to resolve any issues of scheduling prior to the blasting. This plan will be approved by CSX prior to the blasting. This plan will be approved by CSX prior to blasting within 800 feet of the railroad.

Additionally, the track will be inspected, following each blast in the vicinity, to make sure the track is clear.

Flyrock shall be controlled as necessary by increasing stemming of holes or by placement of loose material over the top of the blast. Other measures may include a blasting blanket constructed of steel wire mesh to restrict potential flyrock. Care will be taken to ensure that no hole to be detonated is excessively close to the "free edge" of the proposed shot area.

Logos Engineering
P.O. Box 350
Manchester, Kentucky 40962

Don R. Roberts
Professional Engineer

Office (606) 598-6746
Fax (606) 598-1544

January 30, 2008

Mr. Steve Crum
Lexington Coal Development Office
333 West Vine Street
Suite 206
Lexington, KY 40507

RE: Nally & Hamilton Enterprises, Inc.
Permit No. 807-0339
Located in Bell County, Kentucky

Dear Mr. Crum:

Our consulting firm is working on a surface mining permit for Nally & Hamilton Enterprises, Inc. in the Blacksnake area in Bell County, Kentucky near the CSX line. The mining is proposed for disturbance to within 800 feet of the track. As a result of our application submitted, the Department for Natural Resources, Division of Mine Permits, is requesting an agreement from CSX regarding blasting/mining, etc. near their track.

We have enclosed a map of the proposed mine site for your review.

Please contact our office if you should have questions. Thank you for your assistance.

Sincerely,

Don R. Roberts -by bhs

Don R. Roberts
Professional Engineer

DRR/bhs

Enclosures

Attachment No. 24.9. A

Seismograph Monitoring

Seismograph monitoring will be conducted along with the use of weight distance equation.

SEISMOGRAPH TYPE : White, Alpha Seismite

CAPABILITY : Will record the maximum peak particle velocity. Both the largest or the peak particle velocities measured in three mutually perpendicular directions and vector the sum thereof.

SENSITIVITY : Range is from 0 to 5" per second particle velocity.

LOCATION : Nearest structure, Seismograph will be located at houses or other structures affected by the surface blasting as needed. However the seismograph will be located at the nearest structure if the scale distance equation is exceeded.

Blasts will be monitored at the nearest structure. Seismograph data will be obtained and used in determining if any limits are exceeded.

At least three (3) consecutive blasts will be monitored as per 405 KAR 16:120.

The appropriate Regional Office will be informed prior to switching the compliance method.

Seismic	Range	10 in/s (254 mm/s)
	Resolution	0.005 in/s (0.127 mm/s), to 0.000625 in/s (0.0159mm/s) with built in preamp
	Trigger Levels	0.005 to 10 in/s (0.127 to 254 mm/s) in steps of 0.001 in/s (0.01 mm)
	Frequency Analysis	National and Local Standards for all countries
	Accuracy	3% at 15 Hz
	Acceleration, Displacement	calculated using entire waveform, not estimated at peak
Air Linear	Range	88-148 dB (500 Pa peak)
	Resolution	0.1 dB above 120 dB (0.25 Pa)
	Trigger Levels	100-148 dB in 1 dB steps
	Accuracy	0.2 dB at 30 Hertz and 127 dB
A Weight (optional)	Range	50 to 110 dB in steps of 0.1 dB
Sampling Rate		Standard 1024 samples per second per channel to 16, 384 (8,192 for 8 channel)
Event Storage	Full Waveform events	300 standard, 900 and 1500 optional at standard sample rates of 1024'
	Summary Events	1750 standard, 5250 and 8750 optional at standard sample rates of 1024
Frequency Response	2 to 300 Hz	Ground and Air, independent of record time
Full Waveform Recording	Fixed Record Modes	Manual, single shot, continuous and programmed start/stop
	Fixed Record Time	1 to 100, 300 to 500 sec plus 0.25 sec pretrigger
	Auto Record	1 to 100, 300 to 500 sec plus 0.25

	Mode	sec pretrigger
Strip Chart Recording	Record Method	Record to memory and/or internal printer. Program interval 5, 15, 60 or 300 sec.
	Days Storage	3, 9 or 15 days at 5 second interval. 34, 107 or 180 days at 5 minute interval
Special Functions	Timer Operation	Programmed start/stop
	Self Check	Programmable daily Check
	Scaled Distance	Weight and distance stored with event
	Monitor Log	History printout programmable up to all events stored
	Measurement Units	Imperial or metric, dB or linear air pressure, or in units of custom sensors
	Location	Log GPS (Global Positioning System) data into record
Printer (BlastMate only)	Resolution	576 dots/line and 0.0049 inches (00.125mm) per dot
	Print Time	Less than 10 seconds for typical 1 second event with full analysis
	Paper Control	Paper tear slot or automatic paper takeup, seperate keys for feed and takeup
	Rated Life - print head	18 miles (30 km) of printing
	# of Copies	1 to 10 automatic, any number manual.
User Interface	Keyboard	64 domed tactile with seperate keys for common functions. (Minimate plus 8 keys)
	Display	4 line by 20 character high contrast backlit display with on line help
Battery Life	MiniMate Plus	10 days continuous recording, 25 days with timer
	BlastMate	30 days continuous recording, 70 days with timer, printing will decrease life
Dimensions	MiniMate Plus	3.2" x 3.6" x 6.3" (81 mm x 91 mm x 160 mm)
	BlastMate	10.6" x 14" x 6.5" (269 mm x 355 mm x 165 mm)
Weight	MiniMate Plus	3 lbs. (1.4 kg)
	BlastMate	14 lbs. (6.4 kg)

ATTACHMENT 25.1.A

CONTEMPORANEOUS RECLAMATION VARIANCE

A variance is being requested for time and distance to comply with the revised regulations, 405 KAR 16 : 020 Section 6, Supplemental Assurance. A variance is needed to meet marketing demands for different coal qualities, quantity, and the large amount of equipment and manpower and many different operations that need to be executed at the same time. The different working areas needed are for clearing & grubbing, topsoil removal, drill benching, drill operations, blasting area, overburden removal by dozer, overburden removal by loader trucks, final pit preparation, and coal loading areas. Each operation needs a separate working area so it will not interface with the other ongoing operation and to ensure continuous coal loading operations so that coal contracts can be met. The additional time is needed so that the highwall can be eliminated by progressive mining. We are requesting a distance of nine thousand (9,000) linear feet and a time of 360 days for backfilling and grading to approximate original contour. Supplemental assurance per each additional section (1,500 feet) will be submitted upon activation as concurrently as possible and in a timely manner in order to minimize the time period in which disturbed areas are exposed prior to reclamation. The proposed number of pits or working places that will be utilized at any one time will be (6) six to (15) fifteen.

SUPPLEMENTAL ASSURANCE BONDING CALCULATIONS:

The original bonding will initially apply to the original 1,500' of mining area. From the total of 9,000' requested under the Alternate Contemporaneous Reclamation standards a total of 7,500 feet will have an additional $50,000.00 of Supplemental Assurance Bond for each 1,500 foot section. Therefore, 7,500' divided by 1,500' = 5; 5 sections X $50,000.00=$250,000.00 in Supplemental Assurance Bond. The Supplemental Assurance Bond will be submitted as needed. Each section may contain multiple pits.

Summary:

9,000' total length of wall
9,000' - 1,500' (Initially bonded) = 7,500'
7,500' ÷ 1,500' sections = 5 additional sections
5 X $50,000.00 = $250,000.00 in Supplemental Assurance Bond

RAM #124 (reforestation) will be used for standards for backfilling and grading.

ATTACHMENT 25.1.A (1) 807-0339

CROSS SECTION MAP

NOT TO SCALE

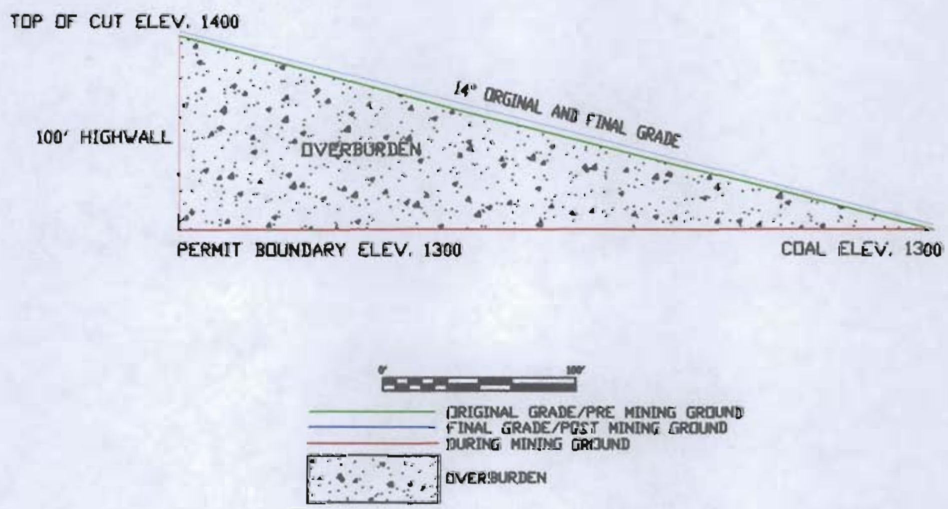
STATE OF KENTUCKY
DON R.
ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

* NOTE
WORST CASE BACKFILL B-B"

I, ____________ (signature), 12575 (registration no.), 01/28/08 (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

CROSS-SECTION A-A'

1"= 100'



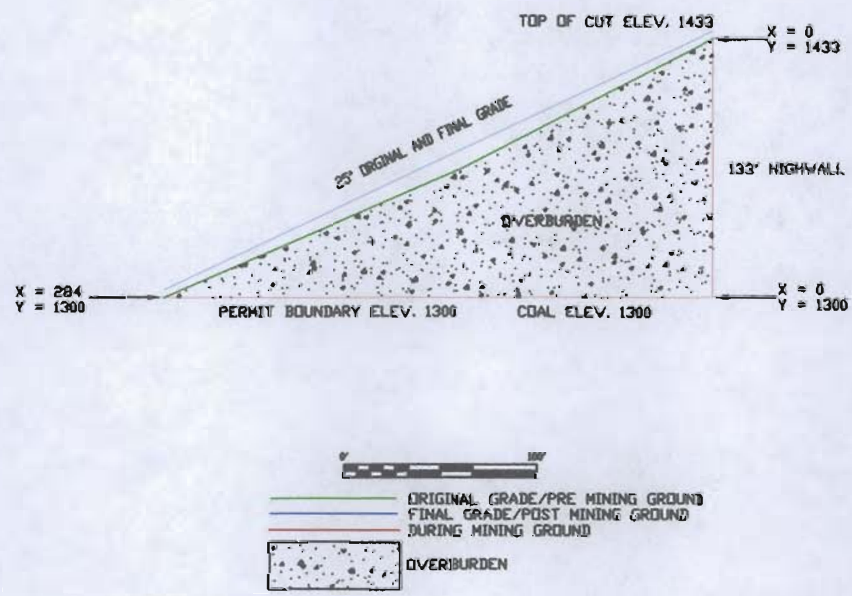
STATE OF KENTUCKY DON R. ROBERTS 12,575 LICENSED PROFESSIONAL ENGINEER

I, ______ (signature) 12575 (registration no.) 01/28/08 (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

CROSS-SECTION B'-B

1"= 100'

WORST CASE



STATE OF KENTUCKY
DON R.
ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, [signature] (signature), 12575 (registration no.) 01/28/08 (date)
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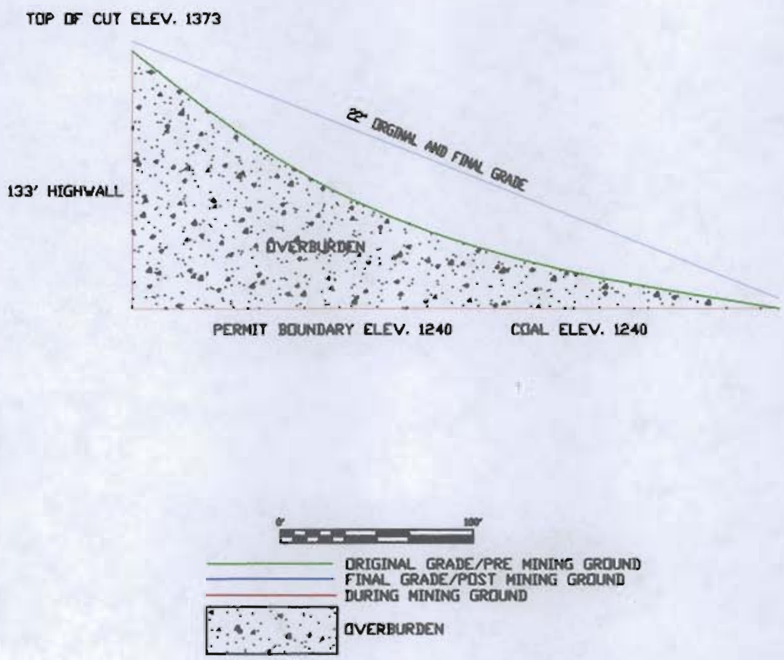
CROSS-SECTION C-C'

1"= 100'



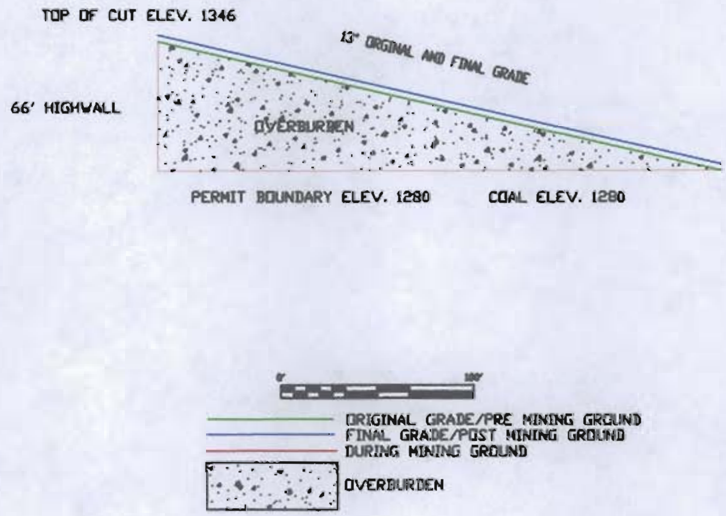
STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, [signature], 12575, 01/28/08
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

CROSS-SECTION D-D'

1"= 100'



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ______ (signature) 12575 (registration no.) 01/28/08 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

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REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENT), Windows 95
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INPUT FILE NAME  -C:\DATA\WCBBS1.DAT

TITLE -WORST CASE BACK FILL BLACKSNAKE 1

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS ( THREED = 0 )


CASE NO.  1   SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 3
 1  X COORD.= 0               Y COORD.= 1410
 2  X COORD.= 0               Y COORD.= 1300
 3  X COORD.= 230             Y COORD.= 1300

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1  X COORD.= 0               Y COORD.= 1410
 2  X COORD.= 230             Y COORD.= 1300

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
 1   99999.000       0.000
 2      -0.478

MIN. DEPTH OF TALLEST SLICE (DMIN) = 0
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1
LINE NO. (LINO)  BEG. NO. (NBP)  END NO. (NEP)
     1                1               3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.      COHESION      FRIC. ANGLE   UNIT WEIGHT
 1             200           30             125

NO SEEPAGE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

INPUT COORD. OF GRID POINTS 1,2,AND 3

POINT 1 X COORD. = 100    Y COORD. = 1600
POINT 2 X COORD. = 100    Y COORD. = 1400
POINT 3 X COORD. = 260    Y COORD. = 1400
```

X INCREMENT (XINC) = 20   Y INCREMENT (YINC) = 20
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY F. S. AT EACH CENTER WILL BE PRINTED
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
100	1600	3	1	214.709	36.247	0
100	1560	5	1	180.278	4.298	0
100	1520	5	1	148.661	2.168	0
100	1480	5	1	122.066	1.759	0
100	1440	11	3	90.726	1.833	0
100	1400	8	5	47.299	2.118	0
140	1600	5	1	236.008	2.564	0
140	1560	5	1	205.183	1.869	0
140	1520	5	1	178.045	1.662	0
140	1480	11	2	149.930	1.677	0
140	1440	11	8	111.107	1.767	0
140	1400	11	4	70.829	1.941	0
180	1600	5	1	261.725	1.719	0
180	1560	5	1	234.307	1.598	0
180	1520	5	1	210.950	1.600	0
180	1480	11	10	168.243	1.647	0
180	1440	11	10	129.418	1.718	0
180	1400	11	8	89.024	1.841	0
220	1600	5	1	290.689	1.553	0
220	1560	5	1	260.000	1.554	0
220	1520	5	1	220.000	1.589	0
220	1480	5	1	180.000	1.638	0
220	1440	5	1	140.000	1.709	0
220	1400	5	1	100.000	1.825	0
260	1600	5	1	301.496	1.603	0
260	1560	5	1	261.725	1.679	0
260	1520	5	1	222.036	1.805	0
260	1480	5	1	182.483	2.051	0
260	1440	5	1	143.178	2.676	0
260	1400	5	1	104.403	5.706	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

100	1640	1	1	250.799	1000.000	0
140	1640	5	1	269.258	5.288	0
180	1640	5	1	292.062	2.051	0
220	1640	5	1	318.277	1.630	0
260	1640	5	1	341.321	1.553	0
100	1680	1	1	287.924	1000.000	0
140	1680	3	1	304.138	36.226	0
180	1680	5	1	324.500	2.929	0
220	1680	5	1	348.281	1.819	0
260	1680	5	1	374.833	1.570	0
300	1680	5	1	386.394	1.673	0
300	1640	5	1	347.131	1.797	0
300	1600	5	1	308.058	2.016	0
300	1560	5	1	269.258	2.472	0
300	1520	5	1	230.868	3.757	0

300	1480	5	1	193.132	11.369	0
300	1440	1	1	156.525	1000.000	0
300	1400	1	1	122.066	1000.000	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	100.000	140.000	180.000	220.000	260.000	300.000
1680.000	1000.000	36.226	2.929	1.819	1.570	1.673
1640.000	1000.000	5.288	2.051	1.630	1.553	1.797
1600.000	36.247	2.564	1.719	1.553	1.603	2.016
1560.000	4.298	1.869	1.598	1.554	1.679	2.472
1520.000	2.168	1.662	1.600	1.589	1.805	3.757
1480.000	1.759	1.677	1.647	1.638	2.051	11.369
1440.000	1.833	1.767	1.718	1.709	2.676	1000.000
1400.000	2.118	1.941	1.841	1.825	5.706	1000.000

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 2 CENTERS

FACTOR OF SAFETY = 1.553 AT (260.000,1640.000)
FACTOR OF SAFETY = 1.553 AT (220.000,1600.000)

AUTOMATIC SEARCH WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCH FROM OTHER CENTER MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (260 1640) RADIUS 341.321
THE MINIMUM FACTOR OF SAFETY IS 1.553

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
260	1640	5	1	341.321	1.553	0
280	1640	5	1	343.657	1.634	0
240	1640	5	1	332.415	1.558	0
260	1660	5	1	360.694	1.538	0
260	1680	5	1	374.833	1.570	0
280	1660	5	1	363.456	1.599	0
240	1660	5	1	346.554	1.597	0
265	1660	5	1	361.697	1.546	0
255	1660	5	1	357.106	1.550	0
260	1665	5	1	364.177	1.545	0
260	1655	5	1	356.265	1.538	0

AT POINT (260 1660) RADIUS 360.694

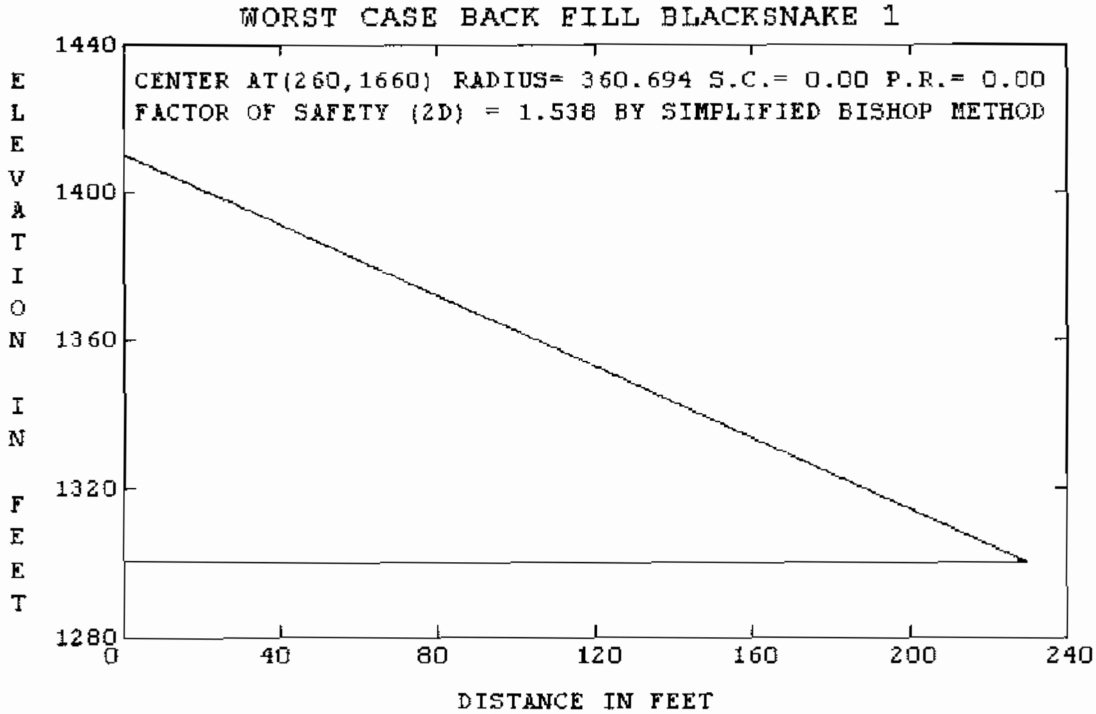
THE MINIMUM FACTOR OF SAFETY IS 1.538

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	SLICE SINE	TOTAL WEIGHT	EFFEC. WEIGHT	RESIS. MOMENT	DRIVING MOMENT
1	1	22.858	5.901	0.000	-.689	.169E+05	.169E+05	.482E+07	.419E+07
2	1	22.858	14.945	0.000	-.626	.427E+05	.427E+05	.905E+07	.964E+07
3	1	22.858	20.915	0.000	-.562	.598E+05	.598E+05	.123E+08	.121E+08
4	1	22.858	24.310	0.000	-.499	.695E+05	.695E+05	.144E+08	.125E+08
5	1	22.858	25.471	0.000	-.436	.728E+05	.728E+05	.155E+08	.114E+08
6	1	22.858	24.640	0.000	-.372	.704E+05	.704E+05	.154E+08	.945E+07
7	1	22.858	21.993	0.000	-.309	.628E+05	.628E+05	.142E+08	.700E+07

8	1	22.858	17.660	0.000	-.246	.505E+05	.505E+05	.119E+08	.447E+07
9	1	22.858	11.734	0.000	-.182	.335E+05	.335E+05	.854E+07	.220E+07
10	1	22.858	4.283	0.000	-.119	.122E+05	.122E+05	.419E+07	.524E+06
							SUM	.110E+09	.735E+08

AT CENTER (260.000 , 1660.000) WITH RADIUS 360.694 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.499
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.538



I, ______________, 12575, 09-12-06
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Spoil Calculations

Generated spoil	=	14,520,323 cy
Coal Removed:	=	1,267,228 cy
Remaining Spoil	=	13,253,095 cy
Swell 23%:	=	3,048,212 cy
Total Generated Spoil	=	16,301,306 cy
Storage: Return to A.O.C.	=	14,520,323 cy
Remaining Material:	=	1,780,984 cy

Hollow Fill Capacity		Storage
	HF#1	457,299 cy
	HF#2	1,159,052 cy
	Total	1,616,351 cy

The remaining 164633 cy of excess spoil will be distributed throughout the bench storage area (163.6 acres) at a depth of 0.62'

I, [signature] (signature), 12575 (registration no.), 06/12/06 (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

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REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENT), Windows 95
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INPUT FILE NAME  -C:\DATA\TBS4.DAT

TITLE -Nally & Hamilton Enterprises worst case backfill of 31 degrees DNR#

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0

TWO-DIMENSIONAL ANALYSIS ( THREED = 0 )


CASE NO.  1   SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 3
 1  X COORD.= 0                Y COORD.= 1410
 2  X COORD.= 0                Y COORD.= 1300
 3  X COORD.= 184              Y COORD.= 1300

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1  X COORD.= 0                Y COORD.= 1410
 2  X COORD.= 184              Y COORD.= 1300

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
 1   99999.000       0.000
 2      -0.598

MIN. DEPTH OF TALLEST SLICE (DMIN) = 0
NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0
NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5
ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1
NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1
LINE NO. (LINO)  BEG. NO. (NBP)  END NO. (NEP)
      1                 1              3

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.      COHESION      FRIC. ANGLE   UNIT WEIGHT
 1              200           30            125

NO SEEPAGE
USE GRID
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

INPUT COORD. OF GRID POINTS 1,2,AND 3

POINT 1 X COORD. = 80      Y COORD. = 1575
POINT 2 X COORD. = 80      Y COORD. = 1400
POINT 3 X COORD. = 220     Y COORD. = 1400
```

X INCREMENT (XINC) = 16   Y INCREMENT (YINC) = 16
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
ONLY F. S. AT EACH CENTER WILL BE PRINTED
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
80	1575	1	1	183.371	1000.000	0
80	1540	1	1	152.643	1000.000	0
80	1505	5	1	124.197	3.903	0
80	1470	5	1	100.000	1.705	0
80	1435	5	1	83.815	1.533	0
80	1400	11	10	46.913	1.750	0
115	1575	5	1	201.122	10.470	0
115	1540	5	1	173.566	2.568	0
115	1505	5	1	149.164	1.591	0
115	1470	5	1	129.711	1.402	0
115	1435	11	3	102.798	1.464	0
115	1400	11	9	67.777	1.596	0
150	1575	5	1	222.991	2.059	0
150	1540	5	1	198.494	1.504	0
150	1505	5	1	177.553	1.348	0
150	1470	11	2	154.937	1.359	0
150	1435	11	8	122.199	1.416	0
150	1400	11	8	88.935	1.506	0
185	1575	5	1	247.891	1.438	0
185	1540	5	1	226.108	1.313	0
185	1505	5	1	205.002	1.302	0
185	1470	5	1	170.003	1.339	0
185	1435	5	1	135.004	1.396	0
185	1400	5	1	100.005	1.494	0
220	1575	5	1	275.000	1.286	0
220	1540	5	1	242.685	1.316	0
220	1505	5	1	208.137	1.392	0
220	1470	5	1	173.770	1.539	0
220	1435	5	1	139.718	1.897	0
220	1400	5	1	106.283	3.370	0

GRID IS EXPANDED AS FOLLOWS SO MINIMUM FACTOR OF SAFETY FALLS WITHIN THE GRID

80	1610	1	1	215.407	1000.000	0
115	1610	1	1	230.705	1000.000	0
150	1610	5	1	250.000	4.386	0
185	1610	5	1	272.443	1.796	0
220	1610	5	1	297.321	1.387	0
255	1610	5	1	318.027	1.328	0
255	1575	5	1	284.018	1.424	0
255	1540	5	1	250.282	1.605	0
255	1505	5	1	216.947	2.024	0
255	1470	5	1	184.231	3.464	0
255	1435	4	1	152.532	21.431	0
255	1400	1	1	122.642	1000.000	0

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	80.000	115.000	150.000	185.000	220.000	255.000
1610.000	1000.000	1000.000	4.386	1.796	1.387	1.328
1575.000	1000.000	10.470	2.059	1.438	1.286	1.424
1540.000	1000.000	2.568	1.504	1.313	1.316	1.605
1505.000	3.903	1.591	1.348	1.302	1.392	2.024
1470.000	1.705	1.402	1.359	1.339	1.539	3.464
1435.000	1.533	1.464	1.416	1.396	1.897	21.431
1400.000	1.750	1.596	1.506	1.494	3.370	1000.000

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 3 CENTERS

FACTOR OF SAFETY = 1.328 AT (255.000,1610.000)
FACTOR OF SAFETY = 1.286 AT (220.000,1575.000)
FACTOR OF SAFETY = 1.302 AT (185.000,1505.000)

AUTOMATIC SEARCH WILL BE MADE ONLY ON THE CENTER WITH THE SMALLEST F.S. MORE SEARCH FROM OTHER CENTER MAY BE NEEDED TO ENSURE THAT MINIMUM F.S. IS OBTAINED.

AT POINT (220 1575) RADIUS 275.000
THE MINIMUM FACTOR OF SAFETY IS 1.286

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC.	RADIUS	LOWEST F.S.	WARNING
220	1575	5	1	275.000	1.286	0
236	1575	5	1	279.873	1.315	0
204	1575	5	1	262.376	1.334	0
220	1591	5	1	284.888	1.320	0
220	1559	5	1	261.490	1.289	0
224	1575	5	1	277.894	1.279	0
228	1575	5	1	278.498	1.289	0
224	1579	5	1	280.601	1.283	0
224	1571	5	1	273.936	1.284	0

AT POINT (224 1575) RADIUS 277.894

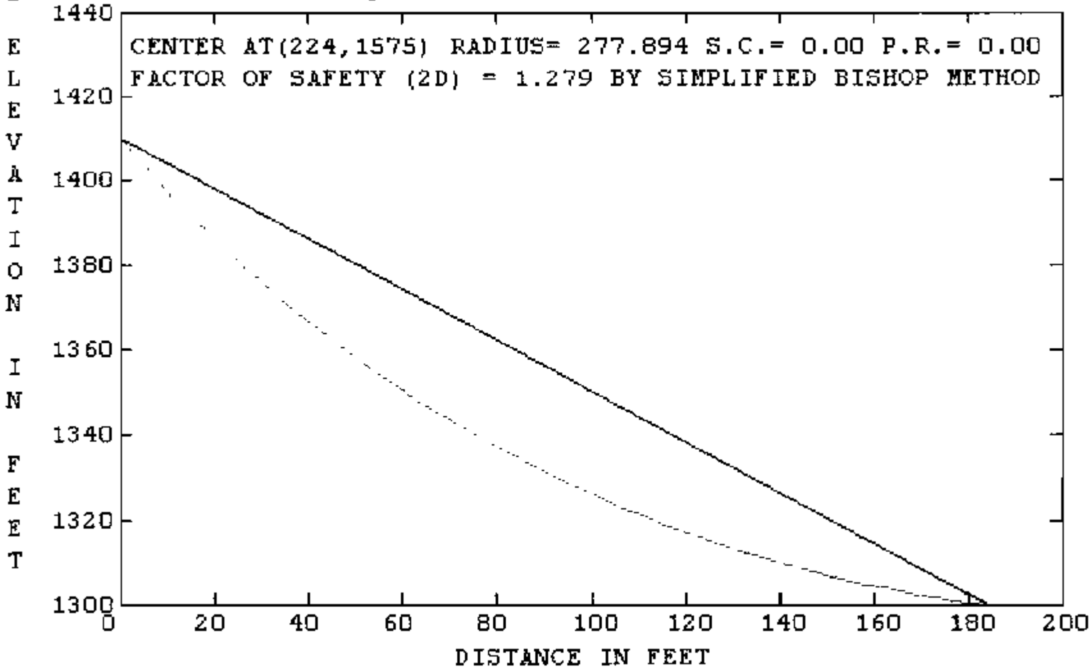
THE MINIMUM FACTOR OF SAFETY IS 1.279

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	SLICE SINE	TOTAL WEIGHT	EFFEC. WEIGHT	RESIS. MOMENT	DRIVING MOMENT
1	1	18.330	6.224	0.000	-.771	.143E+05	.143E+05	.306E+07	.305E+07
2	1	18.330	15.340	0.000	-.705	.351E+05	.351E+05	.544E+07	.688E+07
3	1	18.330	21.027	0.000	-.639	.482E+05	.482E+05	.727E+07	.855E+07
4	1	18.330	24.039	0.000	-.573	.551E+05	.551E+05	.849E+07	.877E+07
5	1	18.330	24.845	0.000	-.507	.569E+05	.569E+05	.906E+07	.802E+07
6	1	18.330	23.756	0.000	-.441	.544E+05	.544E+05	.897E+07	.667E+07
7	1	18.330	20.990	0.000	-.375	.481E+05	.481E+05	.825E+07	.501E+07
8	1	18.330	16.704	0.000	-.309	.383E+05	.383E+05	.691E+07	.328E+07
9	1	18.330	11.010	0.000	-.243	.252E+05	.252E+05	.498E+07	.170E+07
10	1	18.330	3.989	0.000	-.177	.914E+04	.914E+04	.248E+07	.449E+06
							SUM	.649E+08	.524E+08

AT CENTER (224.000 , 1575.000) WITH RADIUS 277.894 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.239
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.279

Nally & Hamilton Enterprises worst case backfill of 31 degrees



12575 12/19/05

(signature) (registration no.) (date)

...certify, in accordance with 405 KAR 7:040, Section 10, that ... document is correct as determined by accepted engineering ... includes all the information required of it by KRS ... KAR Title 405. (Affix engineer's seal)

25.4 Describe the measures to be used to seal or manage mine openings, exploration holes, auger holes, bore holes, wells and other openings within the proposed permit area. Provide design specifications for ensuring stability of each permanent entry seal and down slope barrier. Include all maps, drawings, etc., required to adequately support the description of the proposed measures. Submit this information as "Attachment 25.4.A".

See Attachments 25.4.A - 25.4.A (1)

26. Disposal of Excess Spoil

26.1 Are any excess spoil disposal structures proposed for use in the permit area? ☒ YES ☐ NO. If "YES", provide the following information for each proposed structure:

Facility I.D.	Type of Fill	Storage Volume	Type of Underdrain	Natural Ground Slope	Latitude	Longitude
HF #1	Hollow Fill	457,299 cy	Sandstone	11%	36-46-2.3	83-30-46
HF #2	Hollow Fill	1,159,052 cy	Sandstone	8%	36-46-22.7	83-31-17

ATTACHMENT 25.4.A

This proposed operation includes surface and auger/highwall mining only. Therefore, no mine openings will be created unless an underground application is filed and approved by the Department.

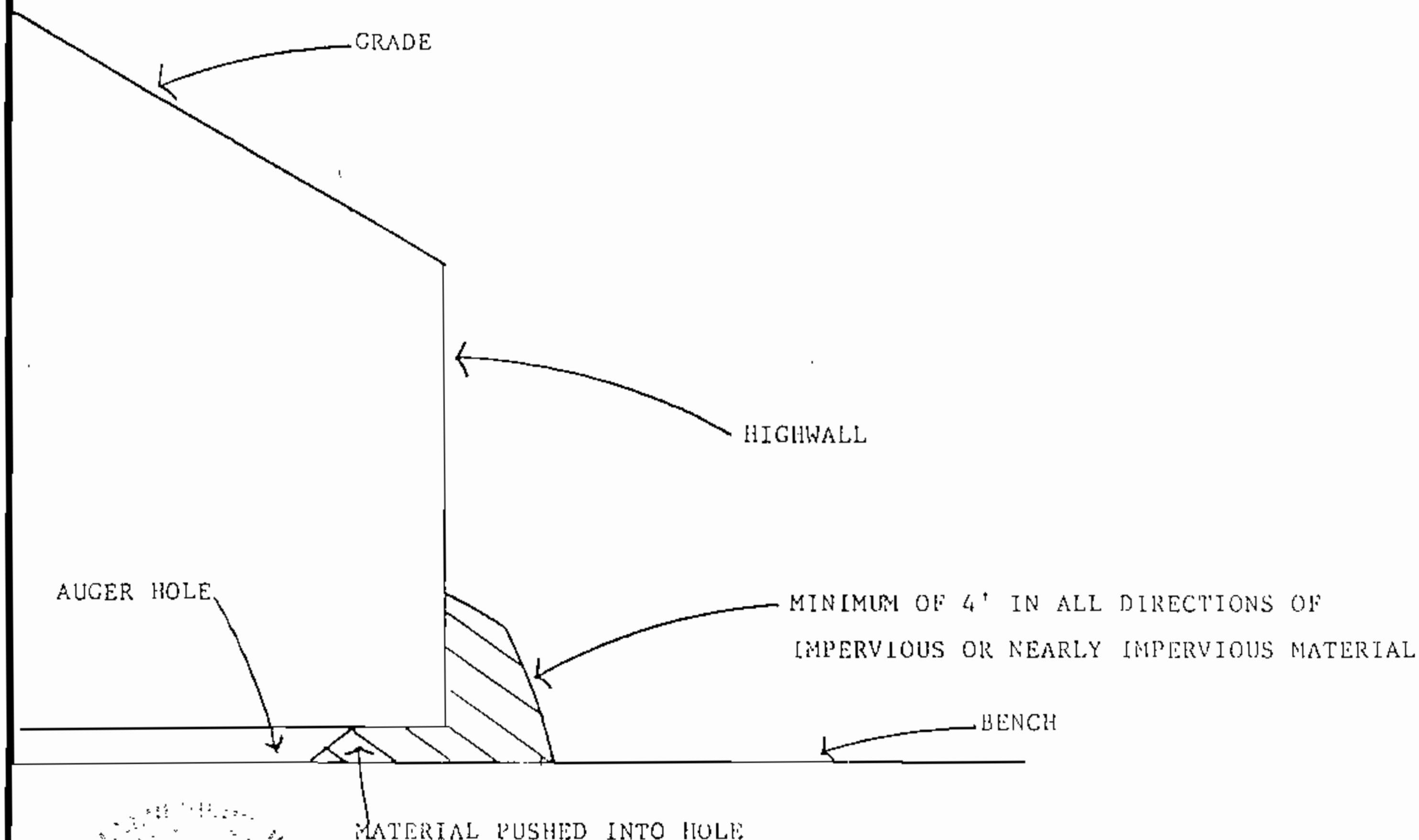
All drilled holes such as exploration points, bored blast holes, monitoring wells, etc... will be completely filled and sealed after use. These holes will be filled either with cuttings from drilling or with earth from the mine site or an adjacent area. Once the holes are filled to within 12 inches of the top, rocks will then be placed in the remaining portion of the hole. These rocks are to be approximately the size of the hole so that they will have to be forced into place. This prevents the top of the filled hole from settling and posing any danger to animals, etc... When the hole has been completely filled, additional earth material will then be placed over the rock and mounted over the hole.

All auger/highwall mining holes will be properly sealed also. Once auger/highwall mining is completed, holes will be sealed by forcing spoil into the openings. Where available, clay material will be used to seal openings. Heavy equipment will force the clay into the bored openings as far as possible. This procedure creates a plug to seal of any drainage from the openings. As noted in the backfilling plan, all high walls will be eliminated, thereby further sealing auger/highwall mining holes. However, where auger/highwall mining is employed, the high wall will be backfilled to a minimum depth of five (5) feet over the top of the coal seam.

Each auger/highwall mining hole discharging water containing toxic-forming or acid forming material shall be plugged within seventy-two (72) hours after completion by backfilling and compacting at least 4 feet of non-toxic, non-combustible, impervious material into the hole to a depth sufficient to a form watertight seal. All discharges shall be treated as necessary to meet the requirements of 405 KAR 16:070, Section 1 (1) (g) until the hole is properly sealed; and each auger/highwall mining hole not discharging water containing acid-forming of toxic-forming material shall be sealed, as above described, to close the opening within thirty (30) days following completion.

SEALING OF AUGER HOLES

NOT TO SCALE



ATTACHMENT 25.4.A (1)

807-0339

26.2 Did construction of any of the above structures start prior to January 18, 1983? ☐ YES ☒ NO. If "YES", provide the information required by 405 KAR 8:030, or 8:040, Sections 25 for existing structures. Submit this information as "Attachment 26.2.A".

26.3 For each proposed excess spoil disposal structure provide a detailed plan (including, but not limited to, all engineering design calculations, cross-sections, maps and designs). Each plan shall meet the requirements of 405 KAR 8:030, Section 27; 405 KAR 8:040, Section 28; 405 KAR 16:130; and 405 KAR 18:130.

See Attachments 26.3.A - 26.3.D

27. Coal Mine Waste

27.1 Will any coal processing waste or underground development waste be generated or disposed of within the proposed permit area? ☐ YES ☒ NO. If "YES", provide the following information for each disposal area:

Facility I.D.	Type	Storage Volume Cu. Yds.	Latitude	Longitude	Anticipated Construction Date

27.2 Did construction of any of the above structures begin prior to January 18, 1983? ☐ YES ☒ NO. If "YES", provide the information required by 405 KAR 8:030, or 8:040, Section 25 for existing structures. Submit this information as "Attachment 27.2.A".

27.3 Will any coal mine waste be disposed of in abandoned underground mines? ☐ YES ☒ NO. If "YES", provide as "Attachment 27.3.A", the information to satisfy the requirements of 405 KAR 8:040, Sections 27 and 28.

ATTACHMENT 26.3.A

Construction Specifications For Durable Rock Hollow Fills

Clearing and Grubbing

Initially, clearing and grubbing of portions of the fills will be conducted. These areas will include underdrains, the toe area where rock checks are to be constructed and the upper portions of the fills where dumping will be initiated. Clearing and grubbing may include the entire footprint of the fill to facilitate the Indiana bat habitat handling plan especially concerning, as a minimum, removal of trees during tree cutting periods of mid-November through the end of March.

Material cleared and grubbed will be windrowed along the outside edge of the fills but within the permitted area. This material will serve as a barrier for sediment and provide a wildlife enhancement area.

Rock Check Structures

Rock check dams will be constructed below each fill to minimize siltation below each fill area. These structures will also assist with entrapment of debris that might affect proper functioning of sediment ponds. Period maintenance will ensure that the rock check structures are free of debris as well as sediment build up. Sediment will be removed, prior to final construction of the underdrain and placement of material at the final toe, to ensure that the underdrain functions properly.

Underdrain Construction

The underdrain will be constructed in accordance with designs and drawings attached. The underdrain channel will be prepared by removing organic material and topsoil initially. The channel will be constructed to design depth and width. Durable rock will then be placed in the channel. Underdrain material will be taken from strata designated in the stratigraphic column having an acceptable SDI value. Care will be taken to ensure that underdrain materials are blasted, transported and otherwise handled to maximize integrity relating to its use in the underdrain. Only the most competent materials will be used in underdrain construction.

ATTACHMENT 26.3.A (1)

Initially, the underdrain will be constructed from the top rim of the fill down to the toe. Care will be taken to ensure that the underdrain is not interrupted or improperly constructed prior to placement of fill material.

In no case will outcrop or degraded material be used in underdrain construction. This material will not be placed in or around the drain in a manner that may cause plugging. A minimum of 4 feet of non-degraded material will be used to cover the underdrain to prevent crushing by equipment or plugging of the drain.

Placement of Material

Once underdrains are installed, end dumping will begin around the top perimeter of the fill. Dumping locations will change periodically to promote fill stability by interlocking dumped material. Dumping may also be conducted at lower elevations within the fill if deemed necessary by the Department or by the operator to ensure proper construction. However, in no case will dumping occur outside the footprint of the fill or in any area where the underdrain is not properly constructed.

Keyway cuts are not necessary since fills are designed to toe out on slopes of less than 36%.

Areal reconnaissance did not reveal any springs, abnormal seepages or apparent stability problems. Should springs or seepages be encountered, the underdrain will be extended to intercept these areas to drain off flow. No adverse geologic conditions were noted including faults or underground mines.

ATTACHMENT 26.3.A (2)

SDI

An SDI analysis was run on each strata to be placed in the fills and each revealed a value higher than 90%. Therefore, of the material to be place in fills 100% is considered durable material. This, of course, does not include topsoil or coal. Results of SDI analysis are shown on attached geologic sheets.

ATTACHMENT 26.3.A (3)

All organic material shall be removed from the disposal area and the topsoil will be removed and segregated pursuant to 405 KAR 16:050 Section 1(5)(a) before the material is place in the disposal area.

A system of underdrains constructed of durable rock shall be installed along the natural drainage system, shall extend from the toe to the head of the fill and contain lateral drains to each area of potential drainage or seepage. In constructing the underdrains, no more than ten (10) percent of the rock may be larger than twenty-five (25) percent of the width of the drain. No rock shall be used in underdrains if it tends to easily disintegrate and thereby clog the drain or if it is acid-forming or toxic-forming. The minimum size of the main underdrain shall be:

Total amount of fill material	Perdominant type of fill material	Drain size in feet	
		Width	Height
Less than 1 million cubic yards	Sandstone	10	4
	Shale	16	8
More than 1 million cubic yards	Sandstone	16	8
	Shale	16	16

ATTACHMENT 26.3.A (4)

Construction of excess spoil disposal structures will initially begin with removal of any topsoil available. Topsoil will be stockpiled in areas designated on the map. Following removal of topsoil, construction of underdrains will be conducted as described by designs. Underdrains will extend throughout the width of each site. Once in place, material will be placed in a controlled manner as required by laws and regulations. Material to remain permanently will be placed in lifts of 4 feet maximum. Final grading will be employed once all material to remain has been fully placed. The surface will rescarified if necessary and seeding and mulching will be conducted.

Clearing and grubbing will remove all organic materials from the fill footprint. This will be conducted only as fill capacity is needed. However, in all cases, organic material will be removed prior to placement of material. Additionally, all soils associated with the interface layer will be removed to expose the competent bedrock in the fill footprint.

ATTACHMENT 26.3.B 807-0339

CERTIFICATION OF DESIGN

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ____________________ , (Signature) (Engineer's Seal) 12575 (Registration No.), 01/28/08 (Date Certified),

hereby certify, in accordance with 405 KAR 7:040, Section 10, that the design of each of the following facilities, whose design is included in this application, Application # 807-0339 :

a) is in accordance with accepted engineering practices and recognized professional standards;
b) complies with the design requirements of KRS Chapter 350 and KAR Title 405; and
c) provided that the facility is properly constructed, operated and maintained, is adequate for the facility to meet the applicable performance standards of KRS Chapter 350 and KAR Title 405 insofar as such performance can reasonably be predicted by accepted engineering practices.

FACILITY TYPE: Excess Spoil Disposal Fills
(One facility type only)

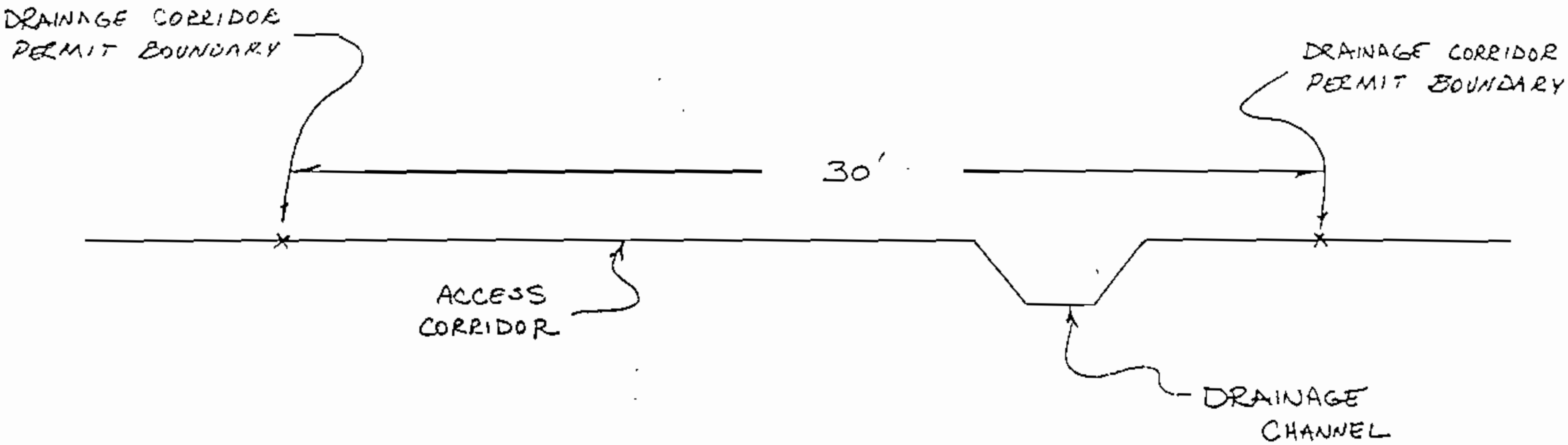
FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN	FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN
HF #1	----	01/28/08			
HF #2	----	01/28/08			

TYPES OF FACILITIES:

- -- sedimentation pond
- -- excess spoil disposal fill
- -- temporary water impoundment
- -- permanent water impoundment
- -- coal processing waste impoundment
- -- coal processing waste dam
- -- coal processing waste bank
- -- road
- -- postmining land use plan
- -- permanent ditches

* Show hazard class, if applicable.

DRAINAGE CORRIDOR CROSS SECTION



STATE OF KENTUCKY
DON R. ROBERTS 12,575
LICENSED PROFESSIONAL ENGINEER

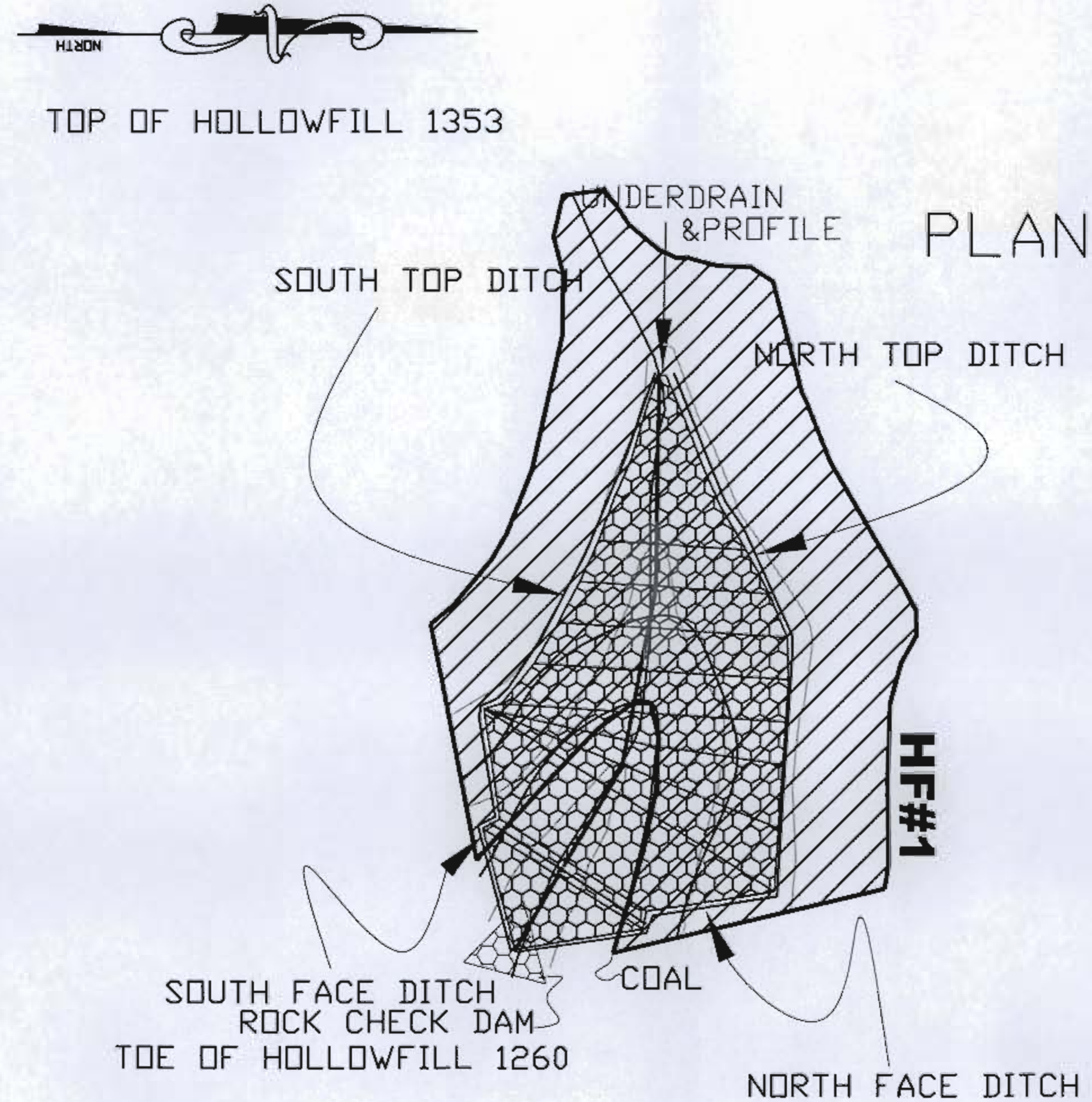
SCALE: 1" = 5'

ATTACHMENT 26.3.B (1)

807-0339

807-0339
ATTACHMENT 26.3.C

HOLLOW FILL #1



PLAN VIEW
1"=200'

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

I, [signature] 12575 01-28-08
(signature) (registration no.) (date)

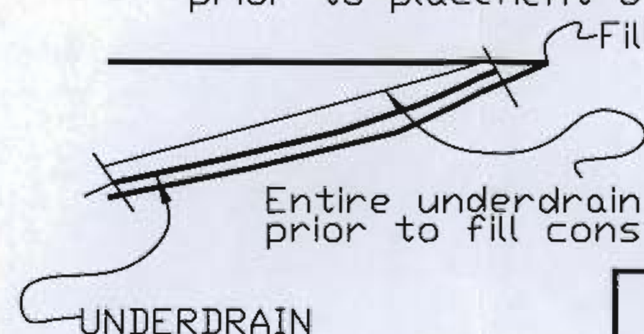
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

807-0339

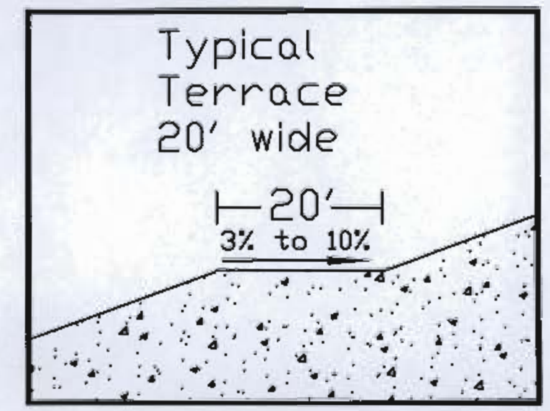
ATTACHMENT 26.3.C (1)

HOLLOW FILL #1

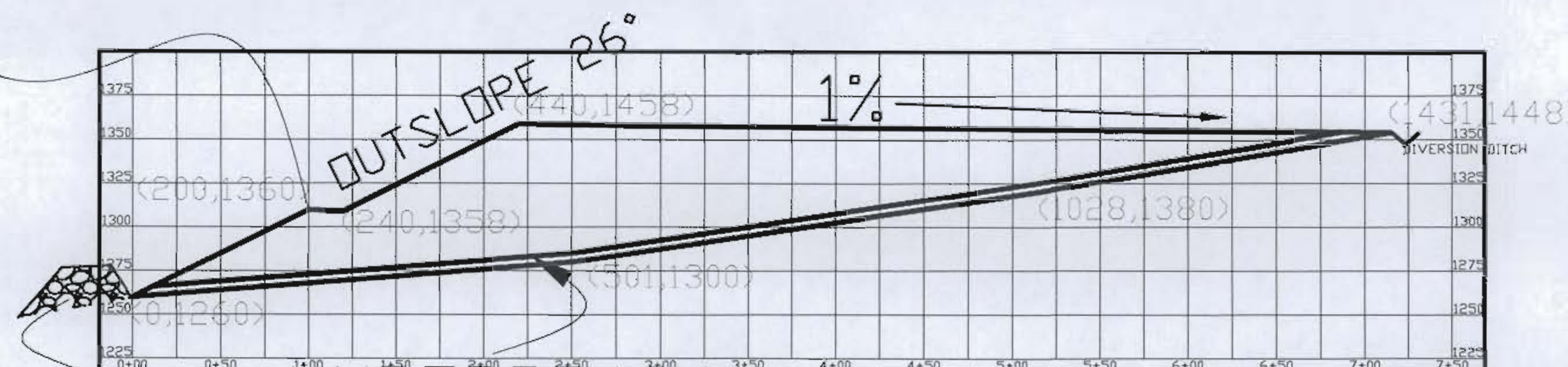
The entire underdrain will be constructed prior to placement of material.



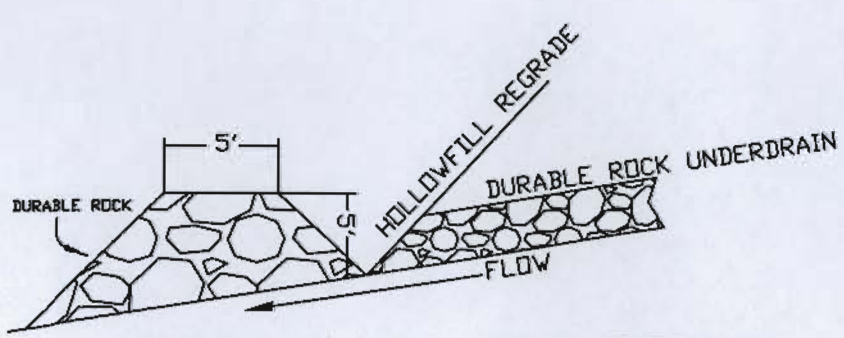
PROFILE VIEW
1″=100′



All terraces slope at 3% to 10% toward uphill face



ROCK CHECK DAM UNDERDRAIN 13.2% NATURAL GROUND SLOPE



ROCK CHECK DAM DETAIL

NO SCALE

STATE OF KENTUCKY ★ DON R. ROBERTS 12,575 ★ LICENSED PROFESSIONAL ENGINEER

I, [signature], 12575, 01-28-08,
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

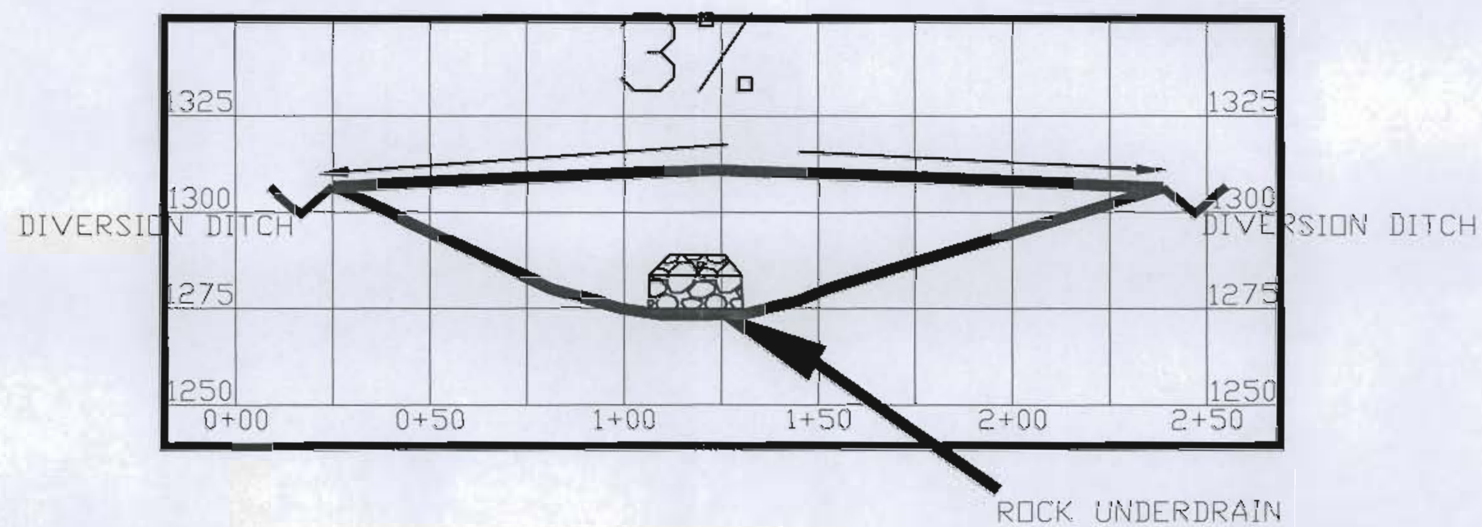
807-0339

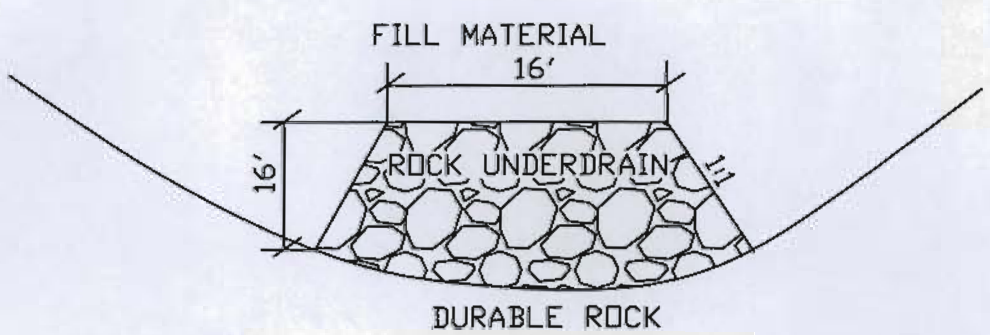
ATTACHMENT 26.3.C (2)

HOLLOW FILL #1

CROSS-SECTION VIEW

1"=50'





ROCK UNDERDRAIN DETAIL

NO SCALE

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

I, ______ (signature) 12575 (registration no.) 1-28-08 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

HOLLOW FILL NO. 1

COMPUTATION OF VOLUME

ELEV. FT.	AREA FT.^2	AVG. AREA FT^2	INT. FT.	STORAGE YD.^3	TOTAL YD.^3
1200.0	0				
		35925	40	53222	
1240.0	71849.39				53222
		139327	40	206411	
1280.0	206804.83				259632
		266850	20	197667	
1300.0	326895.89				457299
				TOTAL	457299

ELEV. TOP OF FILL 1300

ELEV TOE OF FILL 1200

AVERAGE OUTSLOPE 26^{0}

```
REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EARTHWORKS)
THIS 2004 VERSION IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO

                              LOGOS ENGINEERING

INPUT FILE NAME  -C:\REAME2004\blacksnakefill1circularfail.DAT

TITLE -blacksnake1fill1circular

NO. OF STATIC AND SEISMIC CASES (NCASE) = 2

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1

TWO-DIMENSIONAL ANALYSIS ( THREED = 0 )


CASE NO.  1   SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 4
 1  X COORD.= 0            Y COORD.= 1260
 2  X COORD.= 250          Y COORD.= 1280
 3  X COORD.= 514          Y COORD.= 1320
 4  X COORD.= 716          Y COORD.= 1354

NO. OF POINTS ON BOUNDARY LINE 2 = 5
 1  X COORD.= 0            Y COORD.= 1260
 2  X COORD.= 100          Y COORD.= 1310
 3  X COORD.= 120          Y COORD.= 1310
 4  X COORD.= 220          Y COORD.= 1359
 5  X COORD.= 716          Y COORD.= 1354

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
 1       0.080       0.152       0.168
 2       0.500       0.000       0.490      -0.010


UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.      COHESION      FRIC. ANGLE   UNIT WEIGHT
 1             200           30             125

USE PORE PRESSURE RATIO
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 0

PORE PRESSURE RATIO (RU) = 0.05

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0
LOCATION OF MOMENT CENTER: X0 =  0    Y0 =  2500
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED (NSUB = 1)
```

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 4
1 X COORD.= 0 Y COORD.= 1260
2 X COORD.= 250 Y COORD.= 1280
3 X COORD.= 514 Y COORD.= 1320
4 X COORD.= 716 Y COORD.= 1354

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 4.649

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	71.600	0.080	1.896E+04	8.170E+03	1.019E+03	.88E+05	.11E+05	1.618
2	1	28.400	0.080	1.630E+04	1.423E+04	1.774E+03	.76E+05	.10E+05	1.940
3	1	20.000	0.080	1.300E+04	1.898E+04	2.367E+03	.61E+05	.83E+04	2.245
4	1	23.200	0.080	1.643E+04	2.493E+04	3.109E+03	.77E+05	.11E+05	2.633
5	1	71.600	0.080	7.119E+04	4.985E+04	6.217E+03	.33E+06	.46E+05	3.744
6	1	5.200	0.080	6.376E+03	5.205E+04	6.491E+03	.30E+05	.42E+04	3.816
7	1	30.000	0.080	3.666E+04	6.468E+04	8.066E+03	.17E+06	.24E+05	4.294
8	1	36.400	0.152	4.178E+04	5.489E+04	6.846E+03	.20E+06	.52E+05	4.017
9	1	71.600	0.152	7.307E+04	3.821E+04	4.765E+03	.34E+06	.91E+05	3.476
10	1	71.600	0.152	6.099E+04	2.494E+04	3.111E+03	.29E+06	.75E+05	2.940
11	1	71.600	0.152	4.892E+04	1.508E+04	1.881E+03	.23E+06	.59E+05	2.361
12	1	12.800	0.152	7.472E+03	1.368E+04	1.706E+03	.35E+05	.90E+04	2.249
13	1	58.800	0.168	2.890E+04	5.079E+03	6.334E+02	.14E+06	.38E+05	1.377
14	1	71.600	0.168	2.307E+04	-2.732E+02	-3.408E+01	.11E+06	.29E+05	1.543
15	1	71.600	0.168	9.763E+03	6.500E-03	0.000E+00	.46E+05	.96E+04	0.000
		SUM					.22E+07	.48E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.124 AND FACTOR OF SAFETY IS 4.649

CASE NO. 2 SEISMIC COEFFICIENT (SEIC) =0.100

SLIP SURFACE NO. 1

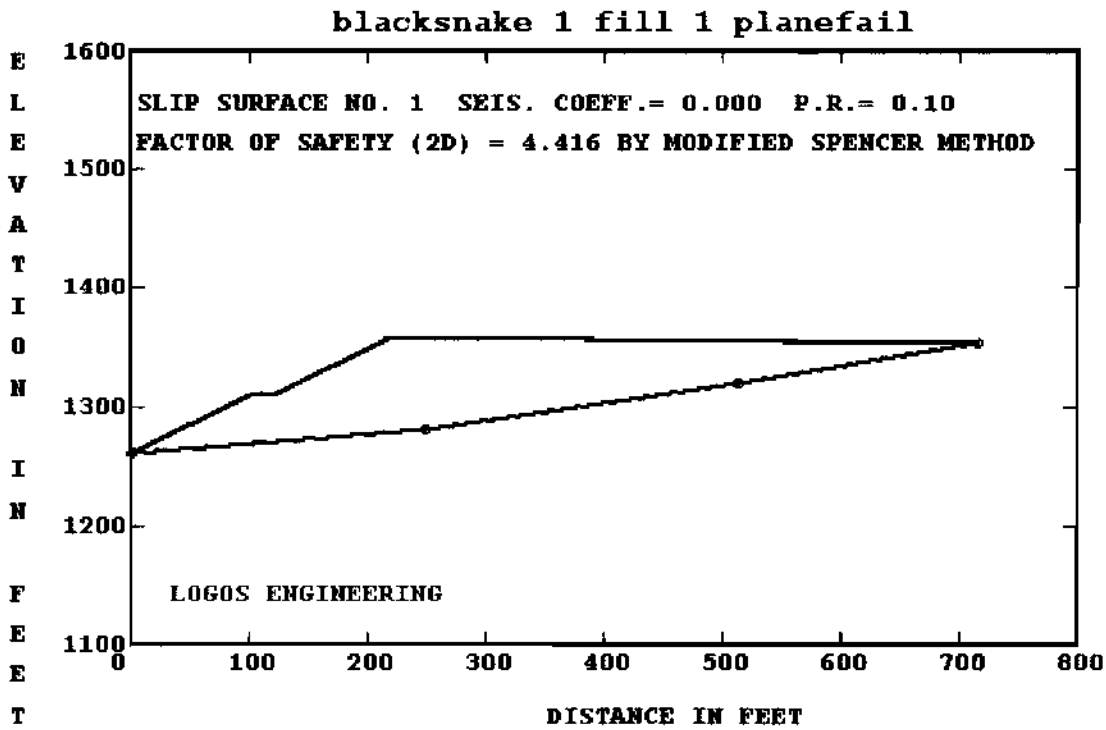
FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 2.573

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	71.600	0.080	3.551E+04	1.077E+04	7.908E+03	.92E+05	.25E+05	14.053
2	1	28.400	0.080	3.016E+04	1.760E+04	1.293E+04	.78E+05	.23E+05	10.490
3	1	20.000	0.080	2.403E+04	2.285E+04	1.678E+04	.62E+05	.19E+05	10.387
4	1	23.200	0.080	3.035E+04	2.934E+04	2.155E+04	.78E+05	.24E+05	11.529
5	1	71.600	0.080	1.312E+05	5.534E+04	4.065E+04	.34E+06	.11E+06	8.260
6	1	5.200	0.080	1.173E+04	5.758E+04	4.230E+04	.30E+05	.95E+04	7.636

7	1	30.000	0.080	6.746E+04	7.047E+04	5.176E+04	.17E+06	.55E+05	7.044
8	1	36.400	0.152	7.275E+04	5.866E+04	4.309E+04	.19E+06	.85E+05	9.582
9	1	71.600	0.152	1.273E+05	3.878E+04	2.849E+04	.33E+06	.15E+06	15.138
10	1	71.600	0.152	1.065E+05	2.334E+04	1.[illegible]15E+04	.28E+06	.12E+06	21.785
11	1	71.600	0.152	8.559E+04	1.233E+04	9.058E+03	.22E+06	.98E+05	31.762
12	1	12.800	0.152	1.310E+04	1.083E+04	7.955E+03	.34E+05	.15E+05	34.000
13	1	58.800	0.168	5.021E+04	2.099E+03	1.542E+03	.13E+06	.60E+05	112.057
14	1	71.600	0.168	4.045E+04	-2.347E+03	-1.724E+03	.11E+06	.45E+05	-28.066
15	1	71.600	0.168	1.773E+04	-9.766E-03	0.000E+00	.46E+05	.16E+05	0.000
		SUM					.22E+07	.85E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.100
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.634 AND FACTOR OF SAFETY IS 2.573



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, [signature] 12575 1/24/08
(signature) (registration no.) (date)
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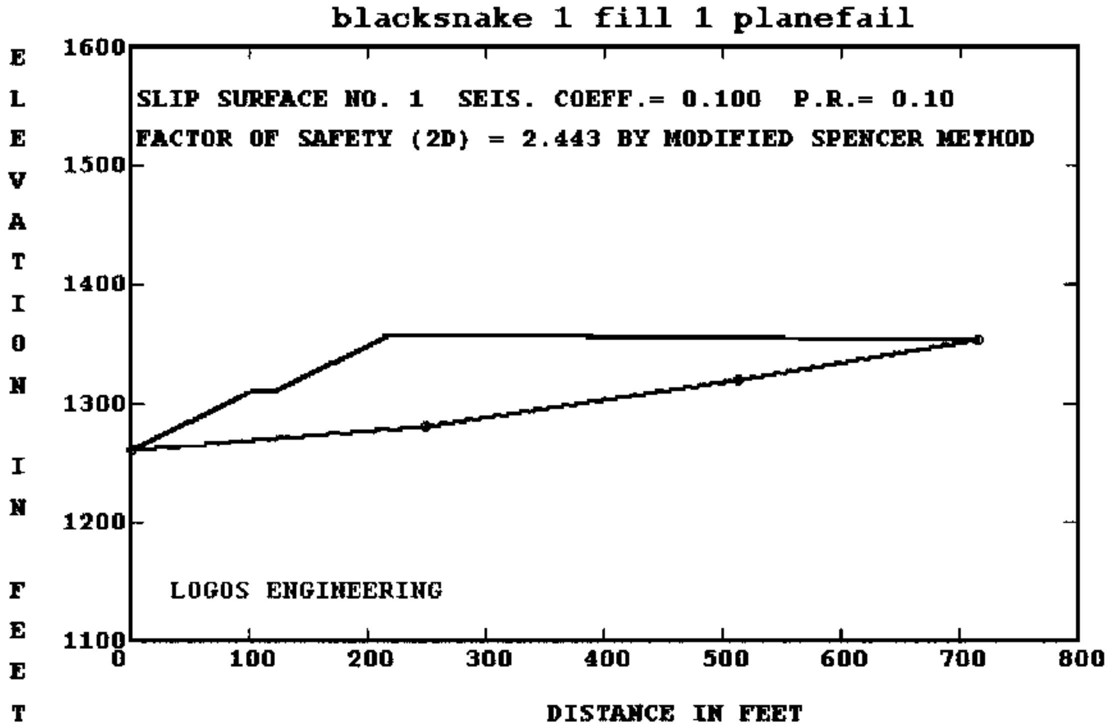

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

12575 4/24/08

(signature) (registration no.) (date)

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REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EARTHWORKS)
THIS 2004 VERSION IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO

                              LOGOS ENGINEERING

INPUT FILE NAME  -C:\REAME2004\blacksnake fill 1 planefailure no interface.DAT

TITLE -blacksnake 1 fill 1 planefail

NO. OF STATIC AND SEISMIC CASES (NCASE) = 2

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1

TWO-DIMENSIONAL ANALYSIS ( THREED = 0 )


CASE NO.  1   SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 4
 1  X COORD.= 0            Y COORD.= 1260
 2  X COORD.= 250          Y COORD.= 1280
 3  X COORD.= 514          Y COORD.= 1320
 4  X COORD.= 716          Y COORD.= 1354

NO. OF POINTS ON BOUNDARY LINE 2 = 5
 1  X COORD.= 0            Y COORD.= 1260
 2  X COORD.= 100          Y COORD.= 1310
 3  X COORD.= 120          Y COORD.= 1310
 4  X COORD.= 220          Y COORD.= 1359
 5  X COORD.= 716          Y COORD.= 1354

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
 1       0.080       0.152       0.168
 2       0.500       0.000       0.490      -0.010


UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.       COHESION      FRIC. ANGLE   UNIT WEIGHT
 1              200            30            125

USE PORE PRESSURE RATIO
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 1

PORE PRESSURE RATIO (RU) = 0.1

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0
LOCATION OF MOMENT CENTER: X0 =  0    Y0 =  2300
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED (NSUB = 1)
```

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 4

1	X COORD.= 0	Y COORD.= 1260
2	X COORD.= 250	Y COORD.= 1280
3	X COORD.= 514	Y COORD.= 1320
4	X COORD.= 716	Y COORD.= 1354

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 4.416

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	71.600	0.080	1.907E+04	8.285E+03	1.031E+03	.85E+05	.11E+05	1.611
2	1	28.400	0.080	1.632E+04	1.436E+04	1.788E+03	.72E+05	.10E+05	1.937
3	1	20.000	0.080	1.301E+04	1.912E+04	2.381E+03	.58E+05	.83E+04	2.242
4	1	23.200	0.080	1.644E+04	2.508E+04	3.122E+03	.73E+05	.11E+05	2.630
5	1	71.600	0.080	7.115E+04	4.996E+04	6.219E+03	.32E+06	.46E+05	3.739
6	1	5.200	0.080	6.369E+03	5.215E+04	6.492E+03	.28E+05	.42E+04	3.811
7	1	30.000	0.080	3.662E+04	6.474E+04	8.060E+03	.16E+06	.24E+05	4.288
8	1	36.400	0.152	4.170E+04	5.487E+04	6.832E+03	.19E+06	.52E+05	4.007
9	1	71.600	0.152	7.295E+04	3.807E+04	4.740E+03	.33E+06	.91E+05	3.458
10	1	71.600	0.152	6.092E+04	2.473E+04	3.079E+03	.27E+06	.75E+05	2.912
11	1	71.600	0.152	4.889E+04	1.485E+04	1.849E+03	.22E+06	.59E+05	2.318
12	1	12.800	0.152	7.473E+03	1.345E+04	1.675E+03	.33E+05	.90E+04	2.202
13	1	58.800	0.168	2.892E+04	4.869E+03	6.062E+02	.13E+06	.38E+05	1.292
14	1	71.600	0.168	2.315E+04	-4.066E+02	-5.062E+01	.10E+06	.29E+05	1.551
15	1	71.600	0.168	9.897E+03	3.357E-04	0.000E+00	.44E+05	.96E+04	0.000
		SUM					.21E+07	.48E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.124 AND FACTOR OF SAFETY IS 4.416

CASE NO. 2 SEISMIC COEFFICIENT (SEIC) =0.100

SLIP SURFACE NO. 1

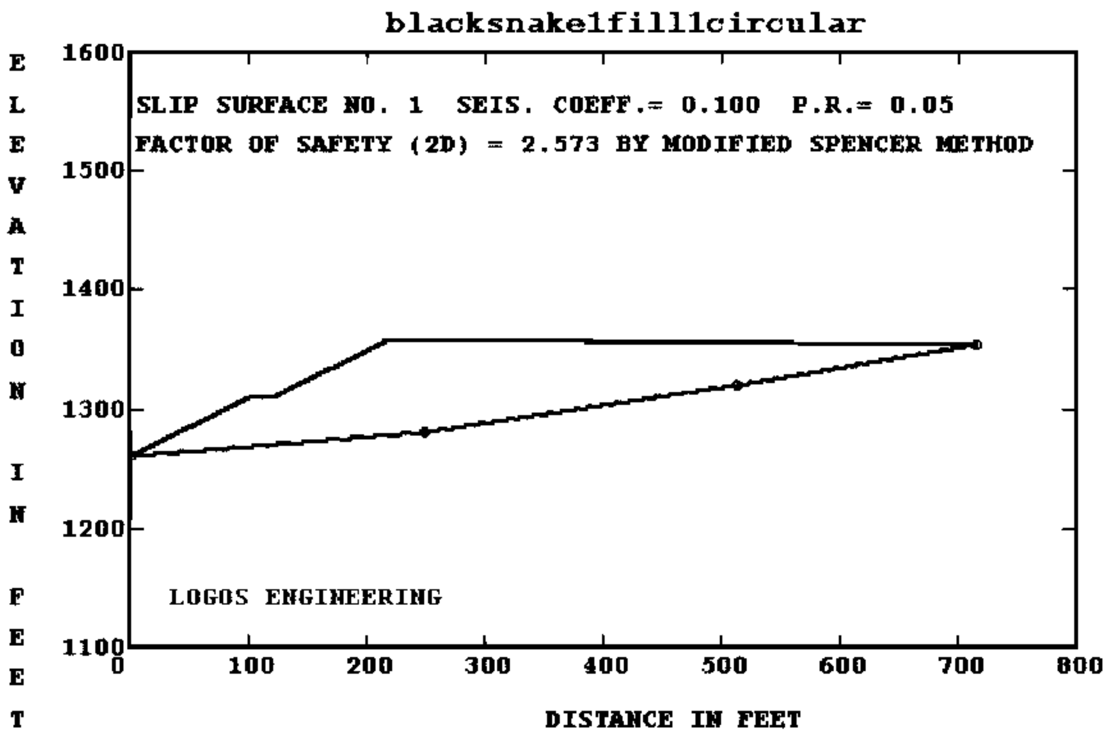
FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 2.443

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	71.600	0.080	3.585E+04	1.109E+04	8.111E+03	.88E+05	.25E+05	14.215
2	1	28.400	0.080	3.026E+04	1.802E+04	1.318E+04	.74E+05	.23E+05	10.910
3	1	20.000	0.080	2.409E+04	2.333E+04	1.707E+04	.59E+05	.19E+05	10.883
4	1	23.200	0.080	3.042E+04	2.989E+04	2.186E+04	.75E+05	.24E+05	12.070
5	1	71.600	0.080	1.313E+05	5.603E+04	4.098E+04	.32E+06	.11E+06	8.907
6	1	5.200	0.080	1.174E+04	5.827E+04	4.262E+04	.29E+05	.95E+04	8.289

7	1	30.000	0.080	6.749E+04	7.119E+04	5.207E+04	.17E+06	.55E+05	7.692
8	1	36.400	0.152	7.248E+04	5.914E+04	4.326E+04	.18E+06	.85E+05	10.461
9	1	71.600	0.152	1.269E+05	3.887E+04	2.843E+04	.31E+06	.15E+06	16.578
10	1	71.600	0.152	1.062E+05	2.316E+04	1.694E+04	.26E+06	.12E+06	24.036
11	1	71.600	0.152	8.544E+04	1.201E+04	8.784E+03	.21E+06	.98E+05	35.408
12	1	12.800	0.152	1.309E+04	1.050E+04	7.678E+03	.32E+05	.15E+05	38.000
13	1	58.800	0.168	5.017E+04	1.730E+03	1.265E+03	.12E+06	.60E+05	146.263
14	1	71.600	0.168	4.056E+04	-2.612E+03	-1.911E+03	.10E+06	.45E+05	-27.164
15	1	71.600	0.168	1.802E+04	-2.441E-04	0.000E+00	.45E+05	.16E+05	0.000
		SUM					.21E+07	.85E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.100
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.632 AND FACTOR OF SAFETY IS 2.443



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ____________, 12575, 01-25-08
(signature) (registration no.) (date)

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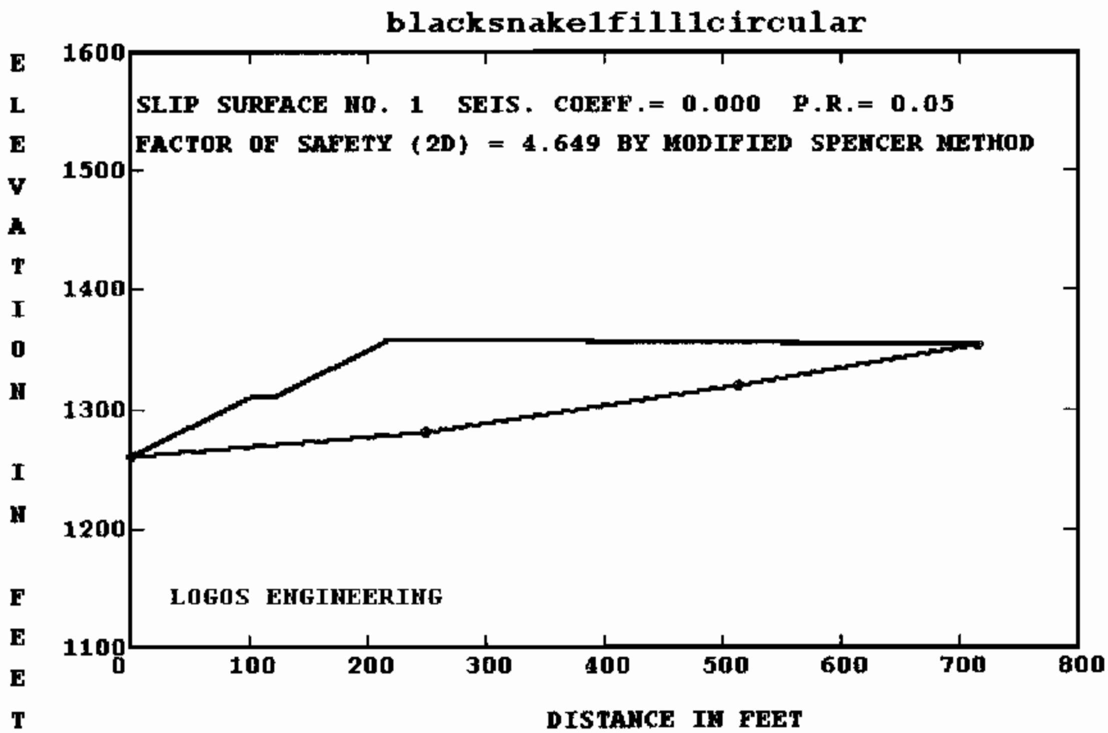


I, [signature], 12575, 01-25-08
(signature) (registration no.) (date)

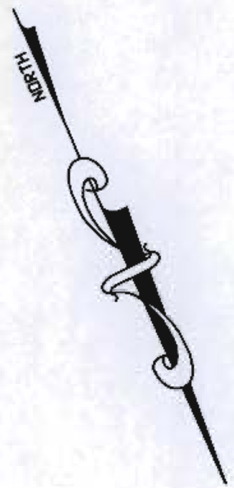
hereby certify, in accordance [illegible] 405 KAR 7:040E, Section 10, that this document is [illegible] by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

LICENSED PROFESSIONAL ENGINEER

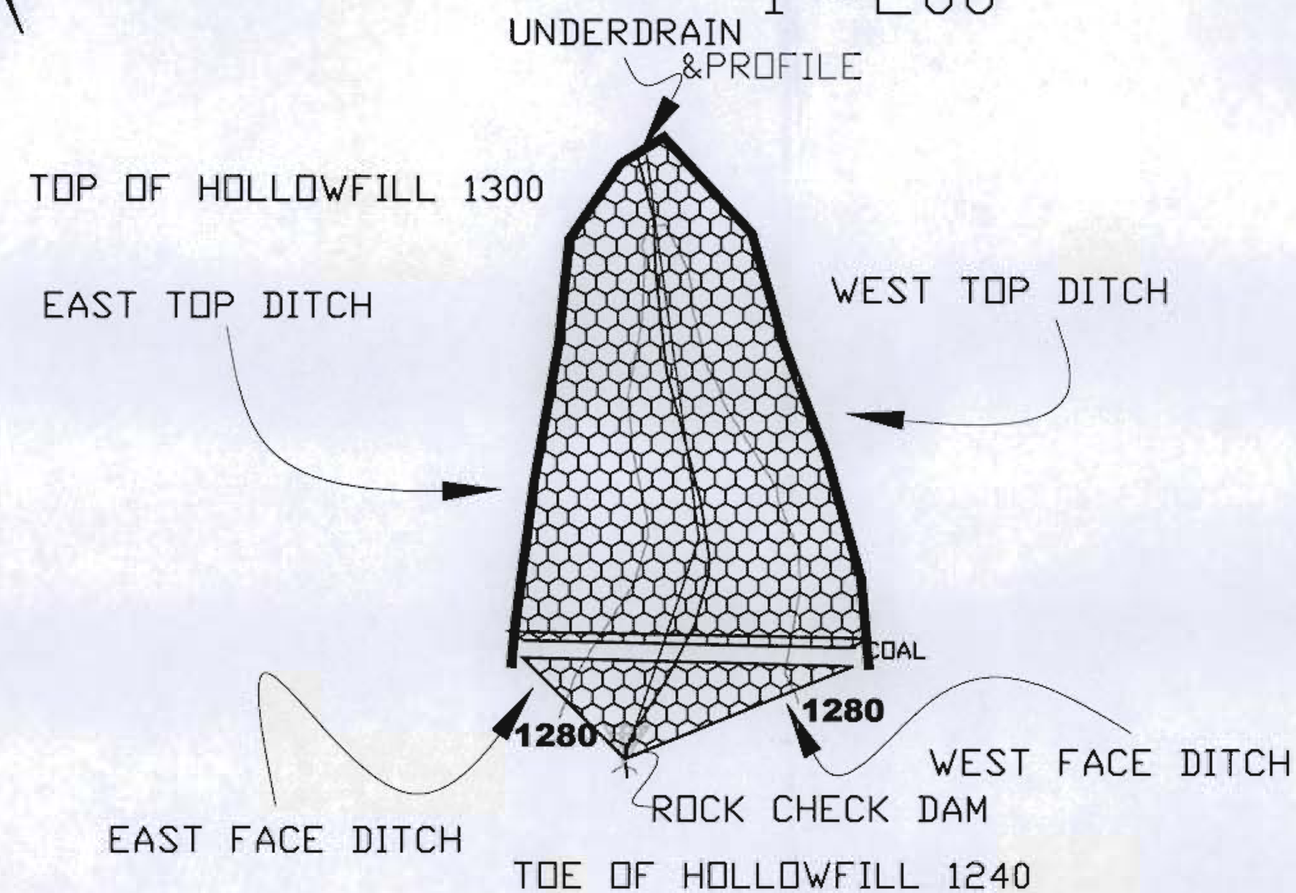
807-0339

ATTACHMENT 26.3.D

HOLLOW FILL #2



PLAN VIEW
1"=200'



STATE OF KENTUCKY
DON R. ROBERTS
12,575
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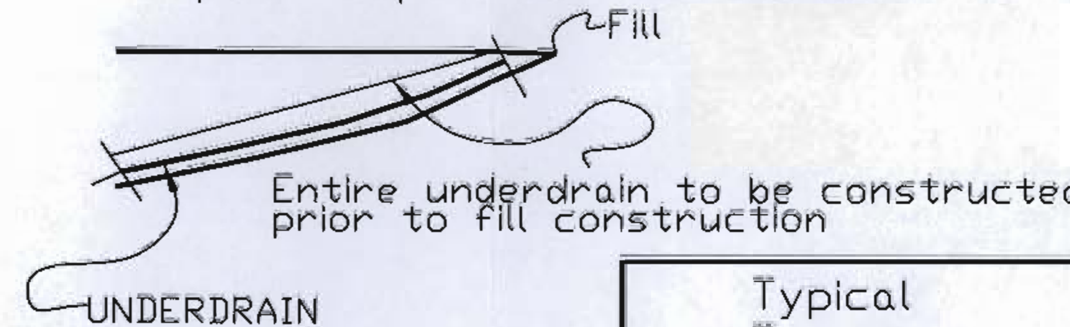
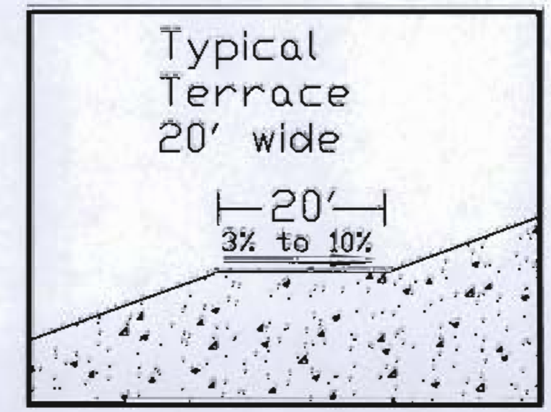
ATTACHMENT 26.3.D (1)

HOLLOW FILL #2

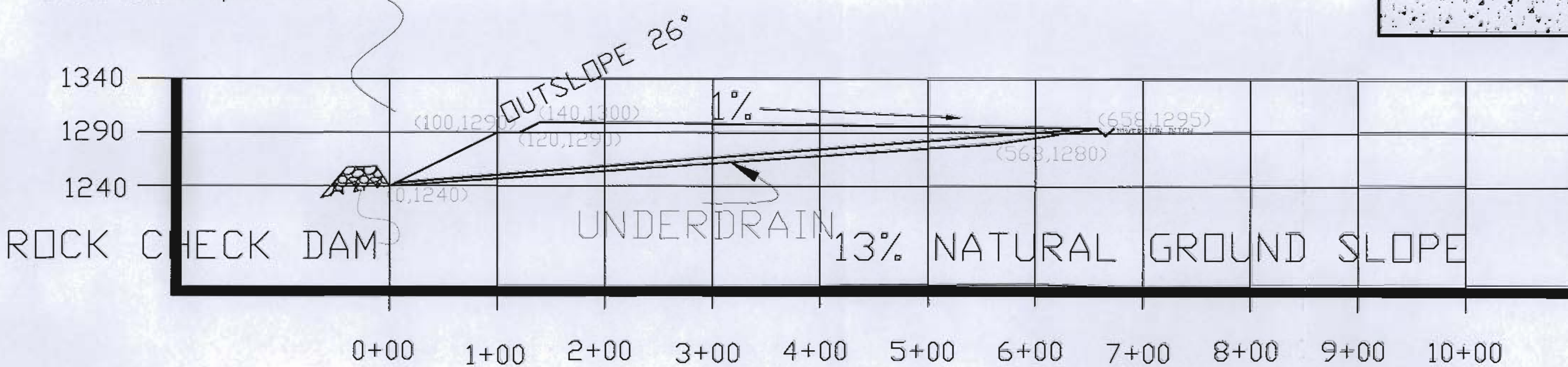
PROFILE VIEW
1"=100'

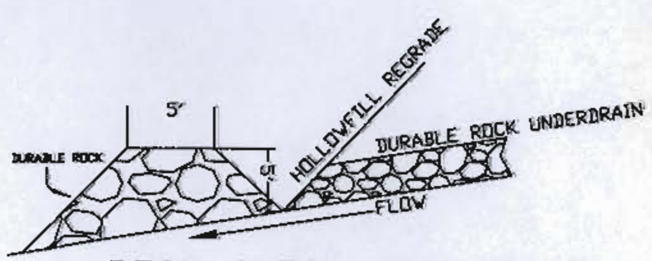
The entire underdrain will be constructed prior to placement of material.





All terraces slope at 3% to 10% toward uphill face





ROCK CHECK DAM DETAIL
NO SCALE

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

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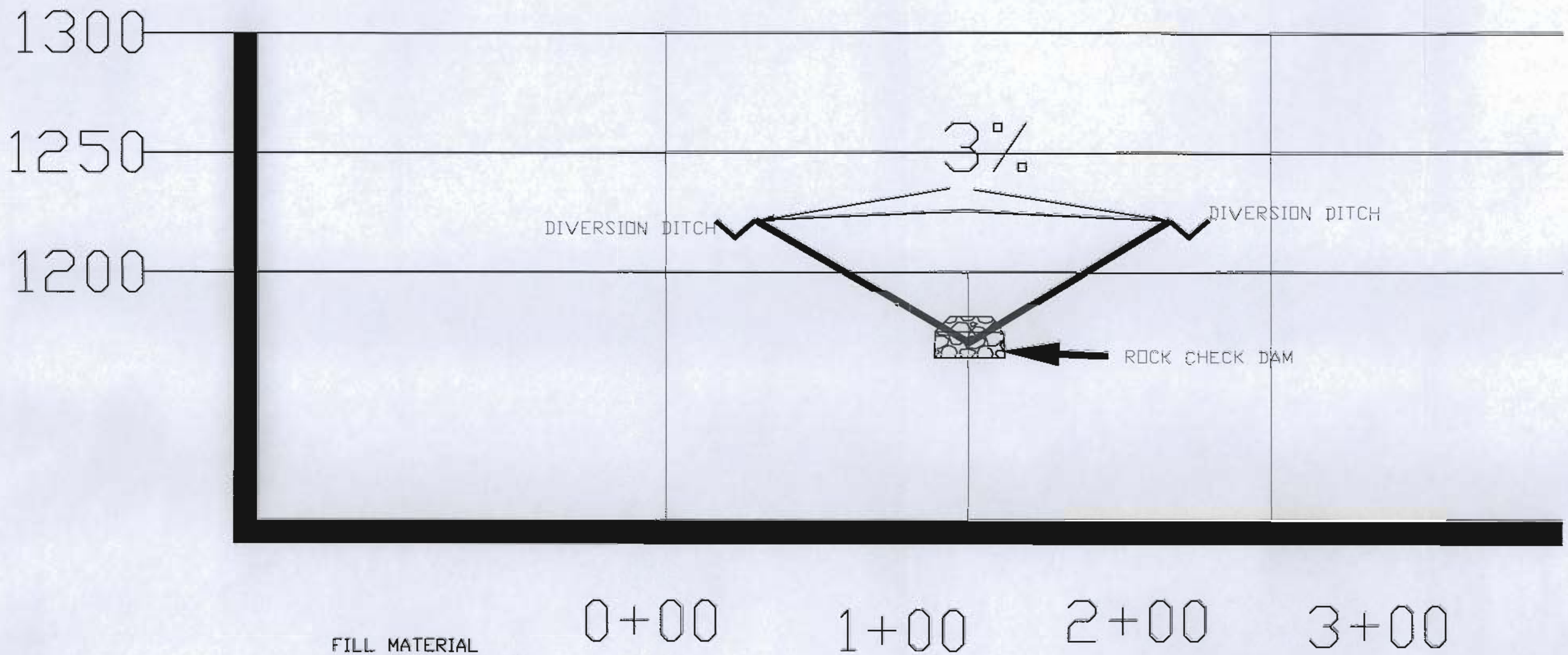
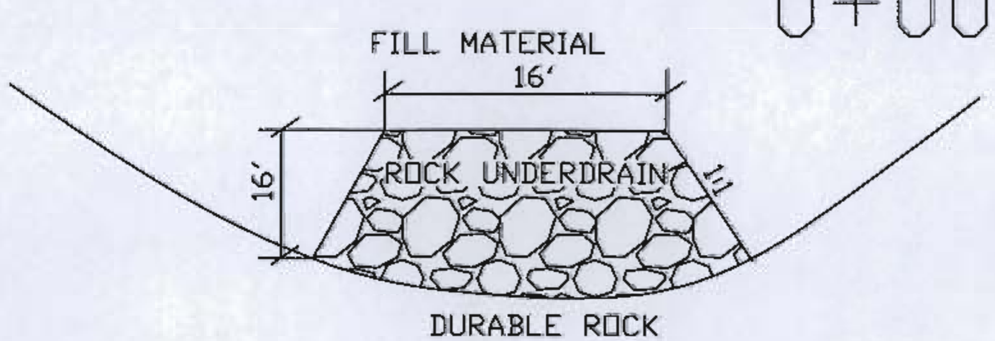
807-0339
ATTACHMENT 26.3.D (2)

HOLLOW FILL #2 CROSS-SECTION VIEW

1"=50'





ROCK UNDERDRAIN DETAIL

NO SCALE

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

4. ______ 12575 1-28-08
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

HOLLOW FILL NO. 2

COMPUTATION OF VOLUME

ELEV. FT.	AREA FT.^2	AVG. AREA FT^2	INT. FT.	STORAGE YD.^3	TOTAL YD.^3
1160.0	0				
		29910	40	44311	
1200.0	59819.51				44311
		121339	40	179761	
1240.0	182857.57				224072
		334339	40	495317	
1280.0	485820.5				719389
		593546	20	439663	
1300.0	701270.63				1159052
				TOTAL	1159052

ELEV. TOP OF FILL 1300

ELEV TOE OF FILL 1160

AVERAGE OUTSLOPE 26^{0}

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EARTHWORKS)
THIS 2004 VERSION IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO

LOGOS ENGINEERING

INPUT FILE NAME -C:\REAME2004\BLACKSNAKE 1 FILL 2 CIRCULAR FAIL NO INTERFACE.DAT

TITLE -BLACKSNAKE 1 FILL2 CIRCULARFAIL NO INTERFACE

NO. OF STATIC AND SEISMIC CASES (NCASE) = 2

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1

TWO-DIMENSIONAL ANALYSIS (THREED = 0)

CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 3

1	X COORD.= 0	Y COORD.= 1240
2	X COORD.= 563	Y COORD.= 1280
3	X COORD.= 658	Y COORD.= 1295

NO. OF POINTS ON BOUNDARY LINE 2 = 5

1	X COORD.= 0	Y COORD.= 1240
2	X COORD.= 100	Y COORD.= 1290
3	X COORD.= 120	Y COORD.= 1290
4	X COORD.= 140	Y COORD.= 1300
5	X COORD.= 658	Y COORD.= 1295

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.071	0.158		
2	0.500	0.000	0.500	-0.010

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
1	200	30	125

USE PORE PRESSURE RATIO
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 1

PORE PRESSURE RATIO (RU) = 0.05

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0
LOCATION OF MOMENT CENTER: X0 = 0 Y0 = 2300
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED (NSUB = 1)

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 3
1 X COORD.= 0 Y COORD.= 1240
2 X COORD.= 563 Y COORD.= 1280
3 X COORD.= 658 Y COORD.= 1295

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 8.121

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	65.800	0.071	9.444E+03	1.214E+03	9.779E+01	.77E+05	.83E+04	0.324
2	1	34.200	0.071	1.108E+04	1.523E+03	1.227E+02	.90E+05	.11E+05	0.561
3	1	20.000	0.071	7.597E+03	1.646E+03	1.326E+02	.62E+05	.75E+04	0.709
4	1	11.600	0.071	4.580E+03	1.708E+03	1.376E+02	.37E+05	.45E+04	0.795
5	1	8.400	0.071	3.620E+03	1.737E+03	1.400E+02	.29E+05	.36E+04	0.864
6	1	57.400	0.071	2.449E+04	1.950E+03	1.571E+02	.20E+06	.24E+05	1.304
7	1	65.800	0.071	2.532E+04	2.337E+03	1.883E+02	.21E+06	.25E+05	1.682
8	1	65.800	0.071	2.238E+04	2.877E+03	2.318E+02	.18E+06	.22E+05	1.954
9	1	65.800	0.071	1.943E+04	3.571E+03	2.877E+02	.16E+06	.19E+05	2.160
10	1	65.800	0.071	1.649E+04	4.417E+03	3.560E+02	.13E+06	.16E+05	2.332
11	1	65.800	0.071	1.355E+04	5.417E+03	4.365E+02	.11E+06	.13E+05	2.490
12	1	36.600	0.071	6.264E+03	6.039E+03	4.867E+02	.51E+05	.57E+04	2.575
13	1	29.200	0.158	4.024E+03	2.396E+03	1.931E+02	.33E+05	.77E+04	2.533
14	1	65.800	0.158	4.674E+03	2.441E-04	0.000E+00	.38E+05	.71E+04	0.000
		SUM					.14E+07	.17E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.080 AND FACTOR OF SAFETY IS 8.121

CASE NO. 2 SEISMIC COEFFICIENT (SEIC) =0.100

SLIP SURFACE NO. 1

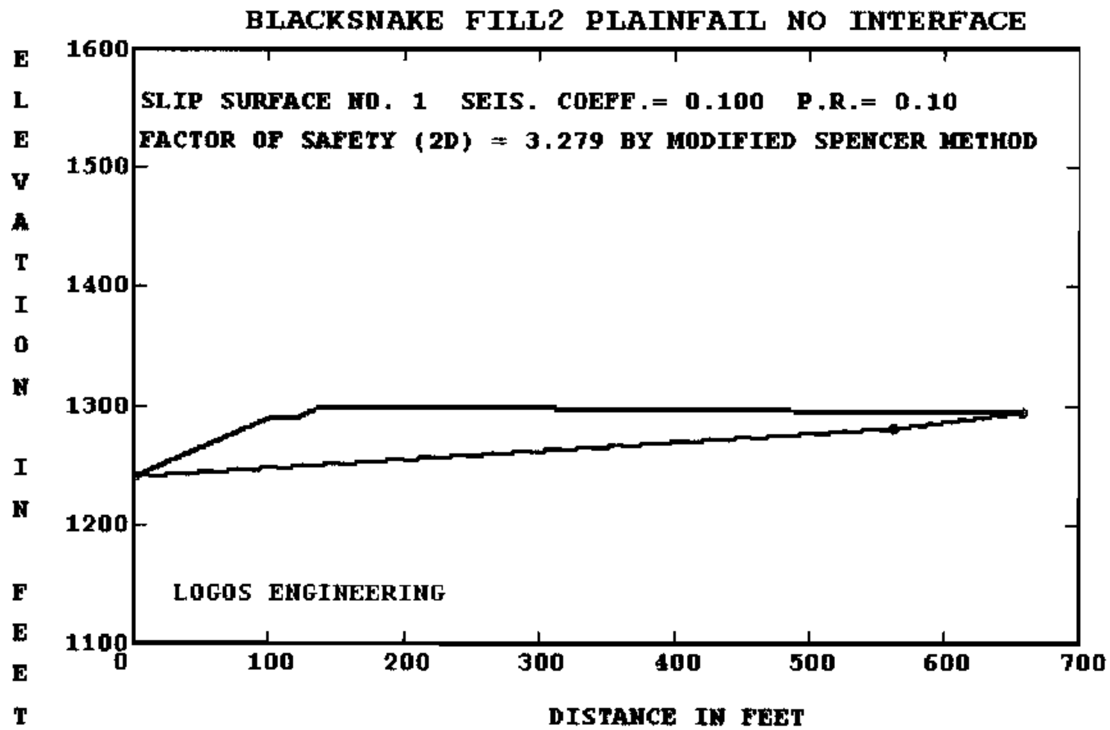
FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 3.446

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	65.800	0.071	2.248E+04	2.512E+03	2.339E+03	.78E+05	.20E+05	-4.292
2	1	34.200	0.071	2.594E+04	2.514E+03	2.341E+03	.90E+05	.26E+05	-82.373
3	1	20.000	0.071	1.774E+04	2.280E+03	2.123E+03	.61E+05	.18E+05	-170.300
4	1	11.600	0.071	1.069E+04	2.108E+03	1.962E+03	.37E+05	.11E+05	-240.329
5	1	8.400	0.071	8.443E+03	1.919E+03	1.786E+03	.29E+05	.87E+04	-320.116
6	1	57.400	0.071	5.712E+04	6.801E+02	6.331E+02	.20E+06	.59E+05	-2010.801
7	1	65.800	0.071	5.912E+04	-1.584E+02	-1.475E+02	.20E+06	.60E+05	13287.180
8	1	65.800	0.071	5.233E+04	-3.760E+02	-3.500E+02	.18E+06	.53E+05	7173.250
9	1	65.800	0.071	4.554E+04	2.739E+01	2.550E+01	.16E+06	.45E+05	-114337.200

10	1	65.800	0.071	3.875E+04	1.052E+03	9.790E+02	.13E+06	.38E+05	-3230.451
11	1	65.800	0.071	3.196E+04	2.697E+03	2.511E+03	.11E+06	.30E+05	-1291.046
12	1	36.600	0.071	1.484E+04	3.881E+03	3.613E+03	.51E+05	.14E+05	-888.339
13	1	29.200	0.158	8.898E+03	6.793E+02	6.324E+02	.31E+05	.12E+05	-5047.721
14	1	65.800	0.158	1.078E+04	6.104E-05	0.000E+00	.38E+05	.12E+05	0.000
		SUM					.14E+07	.41E+06	

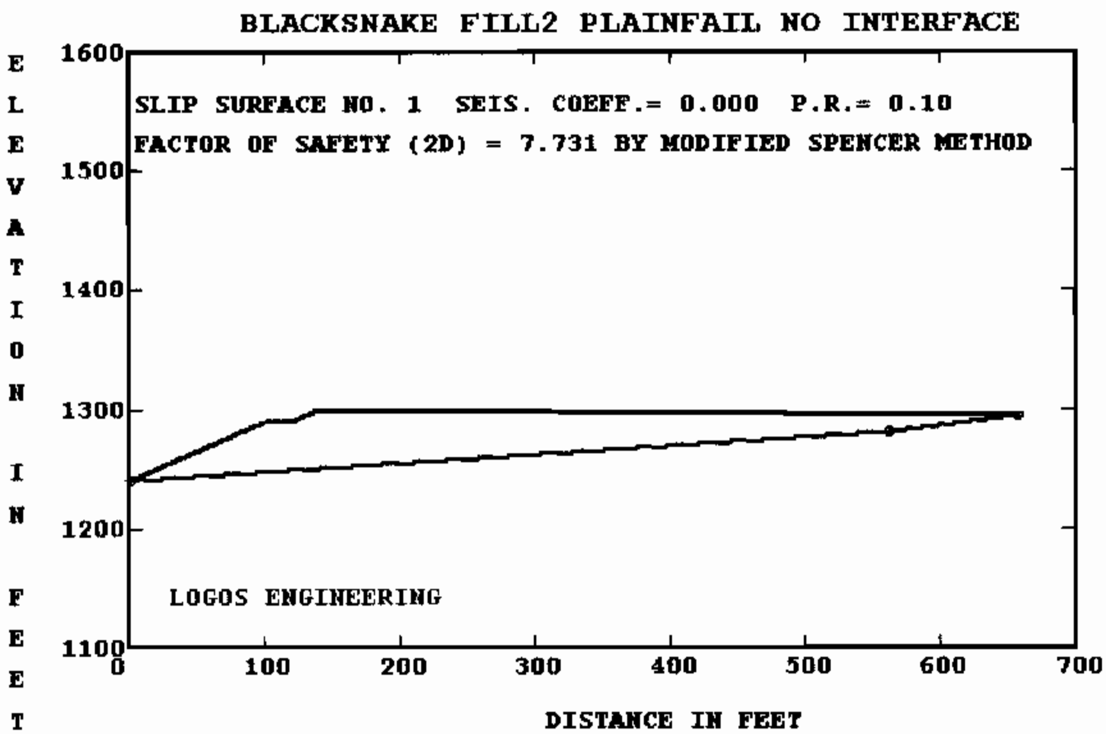
FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.100
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.750 AND FACTOR OF SAFETY IS 3.446



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, (signature) 12575 (registration no.) 1/24/08 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)



I, [illegible] 12575 1/24/08
(engineer) (registration no.) (date)
hereby certify in accordance with 405 KAR 7:040E, Section 10 this document [illegible] determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

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REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EARTHWORKS)
THIS 2004 VERSION IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO

                          LOGOS ENGINEERING

INPUT FILE NAME  -C:\REAME2004\BLACKSNAKE 1 FILL 2 PLANEFAIL NO INTERFACE.DAT

TITLE -BLACKSNAKE FILL2 PLAINFAIL NO INTERFACE

NO. OF STATIC AND SEISMIC CASES (NCASE) = 2

NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1

TWO-DIMENSIONAL ANALYSIS ( THREED = 0 )


CASE NO.  1   SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 3
 1  X COORD.= 0              Y COORD.= 1240
 2  X COORD.= 563            Y COORD.= 1280
 3  X COORD.= 658            Y COORD.= 1295

NO. OF POINTS ON BOUNDARY LINE 2 = 5
 1  X COORD.= 0              Y COORD.= 1240
 2  X COORD.= 100            Y COORD.= 1290
 3  X COORD.= 120            Y COORD.= 1290
 4  X COORD.= 140            Y COORD.= 1300
 5  X COORD.= 658            Y COORD.= 1295

LINE NO. AND SLOPE OF EACH SEGMENT ARE:
 1       0.071       0.158
 2       0.500       0.000       0.500      -0.010


UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.      COHESION      FRIC. ANGLE   UNIT WEIGHT
 1             200           30             125

USE PORE PRESSURE RATIO
NO. OF SLICES (NSLI) = 10
NO. OF ADD. CIRCLES (NAC) = 3
ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
NUMBER OF FORCES (NFO)= 0
SOFT SOIL NUMBER (SSN)= 1

PORE PRESSURE RATIO (RU) = 0.1

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0
LOCATION OF MOMENT CENTER: X0 =  0    Y0 =  2300
ONLY A SUMMARY TABLE IS PRINTED (NPRT = 0)
SLICES WILL BE SUBDIVIDED (NSUB = 1)
```

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 3

1	X COORD.= 0	Y COORD.= 1240
2	X COORD.= 563	Y COORD.= 1280
3	X COORD.= 658	Y COORD.= 1295

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 7.731

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	65.800	0.071	9.485E+03	1.255E+03	1.011E+02	.74E+05	.83E+04	0.324
2	1	34.200	0.071	1.107E+04	1.553E+03	1.252E+02	.86E+05	.11E+05	0.567
3	1	20.000	0.071	7.585E+03	1.664E+03	1.341E+02	.59E+05	.75E+04	0.720
4	1	11.600	0.071	4.572E+03	1.718E+03	1.385E+02	.35E+05	.45E+04	0.810
5	1	8.400	0.071	3.613E+03	1.740E+03	1.403E+02	.28E+05	.36E+04	0.882
6	1	57.400	0.071	2.444E+04	1.905E+03	1.535E+02	.19E+06	.24E+05	1.347
7	1	65.800	0.071	2.528E+04	2.251E+03	1.814E+02	.20E+06	.25E+05	1.739
8	1	65.800	0.071	2.235E+04	2.765E+03	2.229E+02	.17E+06	.22E+05	2.004
9	1	65.800	0.071	1.942E+04	3.448E+03	2.779E+02	.15E+06	.19E+05	2.192
10	1	65.800	0.071	1.650E+04	4.299E+03	3.465E+02	.13E+06	.16E+05	2.342
11	1	65.800	0.071	1.357E+04	5.319E+03	4.287E+02	.11E+06	.13E+05	2.480
12	1	36.600	0.071	6.282E+03	5.959E+03	4.802E+02	.49E+05	.57E+04	2.555
13	1	29.200	0.158	4.041E+03	2.332E+03	1.880E+02	.32E+05	.77E+04	2.533
14	1	65.800	0.158	4.738E+03	-4.883E-04	0.000E+00	.37E+05	.71E+04	0.000
		SUM					.13E+07	.17E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.080 AND FACTOR OF SAFETY IS 7.731

CASE NO. 2 SEISMIC COEFFICIENT (SEIC) =0.100

SLIP SURFACE NO. 1

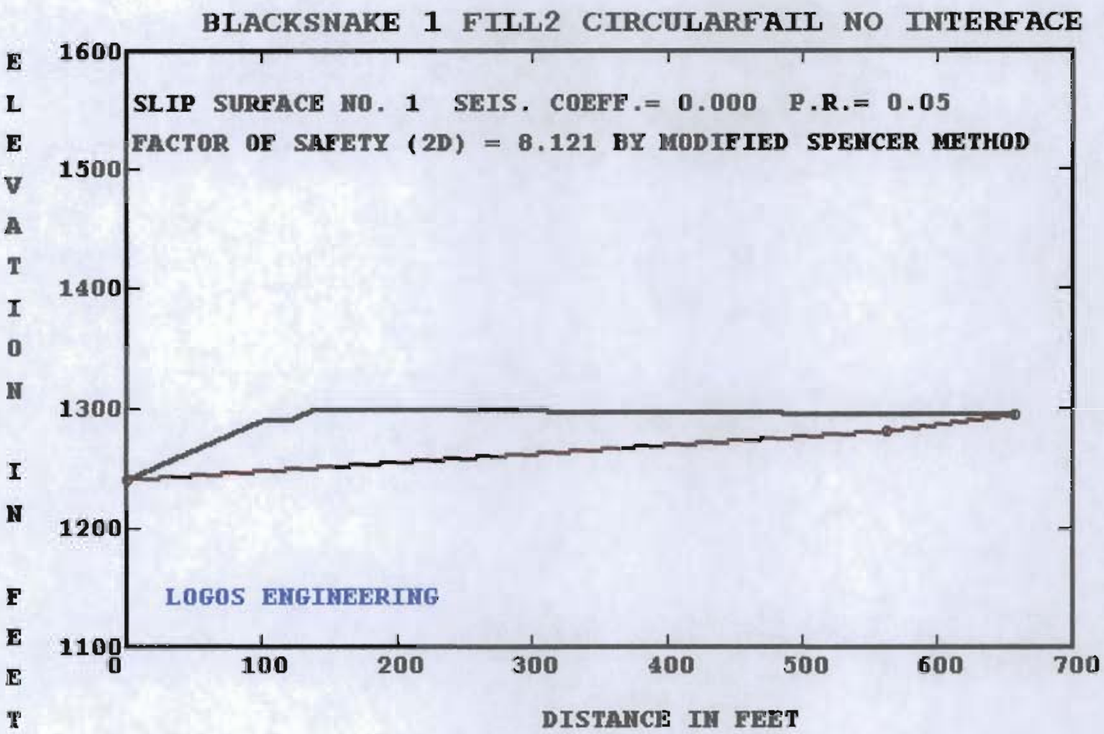
FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 3.279

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

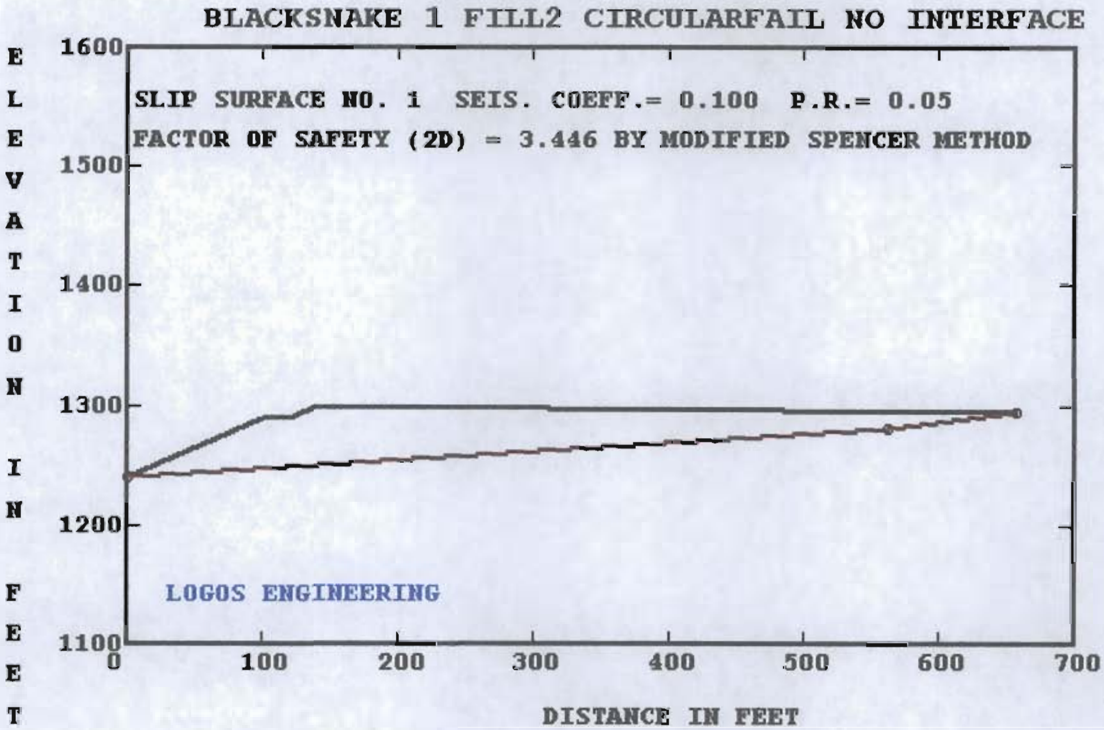
SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
					0.000E+00				0.000
1	1	65.800	0.071	2.261E+04	2.641E+03	2.458E+03	.74E+05	.20E+05	-2.705
2	1	34.200	0.071	2.591E+04	2.617E+03	2.436E+03	.85E+05	.26E+05	-76.463
3	1	20.000	0.071	1.771E+04	2.350E+03	2.188E+03	.58E+05	.18E+05	-161.592
4	1	11.600	0.071	1.067E+04	2.156E+03	2.007E+03	.35E+05	.11E+05	-230.656
5	1	8.400	0.071	8.422E+03	1.948E+03	1.813E+03	.28E+05	.87E+04	-310.544
6	1	57.400	0.071	5.698E+04	5.762E+02	5.364E+02	.19E+06	.58E+05	-2360.084
7	1	65.800	0.071	5.901E+04	-3.729E+02	-3.472E+02	.19E+06	.60E+05	5648.217
8	1	65.800	0.071	5.226E+04	-6.568E+02	-6.114E+02	.17E+06	.53E+05	4129.729
9	1	65.800	0.071	4.552E+04	-2.754E+02	-2.564E+02	.15E+06	.45E+05	11486.330

10	1	65.800	0.071	3.877E+04	7.712E+02	7.179E+02	.13E+06	.38E+05	-4468.353
11	1	65.800	0.071	3.203E+04	2.483E+03	2.312E+03	.11E+06	.30E+05	-1427.404
12	1	36.600	0.071	1.490E+04	3.723E+03	3.466E+03	.49E+05	.14E+05	-944.297
13	1	29.200	0.158	8.914E+03	5.356E+02	4.986E+02	.30E+05	.12E+05	-6536.325
14	1	65.800	0.158	1.094E+04	3.052E-04	0.000E+00	.36E+05	.12E+05	0.000
		SUM					.13E+07	.41E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.100
BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.750 AND FACTOR OF SAFETY IS 3.279



I, ________ 12575 01-25-08
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)



I, _____ (signature) 12575 (registration no.) 01-25-08 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

27.4 Will coal mine waste materials, from activities located outside the proposed permit area, be disposed of within the proposed permit area? ☐ YES ☒ NO. If "YES", provide as "Attachment 27.4.A", a detailed discussion (based on relevant hydrologic, geotechnical, physical, and chemical analyses) to make a showing in accordance with 405 KAR 16:140 or 18:140, Section 1, that the disposal of such waste will not:

(a) Adversely affect water quality, water flow, or vegetation;
(b) Create public health hazards; and
(c) Cause instability in the disposal area(s).

27.5 Provide a detailed plan (including all engineering design calculations, cross-sections, maps and drawings) for each proposed structure. Each plan shall meet the applicable requirements of 405 KAR 8:030, Section 34, or 405 KAR 8:040, Section 34, as appropriate. The plan(s) shall be provided as "Attachment 27.5.A, 27.5.B, etc."

N/A

28. Disposal of Waste Other Than Coal, Soil or Rock

28.1 Provide as "Attachment 28.1.A", a description of the measures to be used for the temporary storage and final disposal of waste such as: grease, lubricants, paints, flammable liquids, garbage, abandoned machinery, timber, brush, and other combustibles generated during the mining activities. Show all storage and/or disposal sites on the MRP Map.

See Attachment 28.1.A

29. Toxic Materials Handling Plan

29.1 Based on the results of the premining geologic sampling program, identify all acidic or toxic strata which will be encountered during the proposed mining operation:

Site No.	Thickness	Lithology	Elevation	Potential Acidity	Neutralization Potential

N/A

ATTACHMENT 28.1.A

This operation does not propose the disposal of any type of waste or combustible material other than ordinary timber and/or brush. As was stated previously in the backfilling and grading plan, this timber and/or brush will be windrowed on the solid berm to remain above the coal outcrop.

No disposal of paint, grease, garbage, abandoned machinery, or other combustibles is proposed. Should disposal of any of these become necessary, they will be hauled to a state approved landfill.

Any garbage affiliated with the operation will be stored in leakproof barrels or containers until their removal from the site.

ATTACHMENT 29.1.A

In the geologic information found at item 15, there are no strata that have PA equal to or greater than the NP except for the topsoil/subsoil samples. In the topsoil/subsoil samples the organic matter, leaves, roots, etc., is the cause for the slightly higher PA values. However, none of the other strata have PA to NP ratio of 1 or less. Additionally, the acid/base account clearly indicates a non-acid condition in both sample points. Therefore, no segregation of strata is necessary or proposed.

However, should any indication of potential acid production be encountered, lime or other necessary additives will be applied. Mixing of overburden will neutralize any mildly acid producers encountered, though none are evident from sampling. Once each pit is backfilled and finally graded, sampling of the surface layer may be periodically conducted to determine its potential for establishing vegetation. Necessary nutrients will be added as necessary during seeding to ensure an adequate growth potential.

29.2 Describe how acidic and/or toxic strata will be handled to avoid contamination of surface and ground water resources within, and adjacent to the proposed permit area, and to minimize adverse effects on plant growth and land uses. Submit the description, if applicable, as "Attachment 29.2.A".

None

30. Surface and Ground Water Monitoring

30.1 Provide a detailed description of the in-stream surface water quality and quantity monitoring program to be used during the mining and reclamation operations. The description shall specifically address all of the following:

(a) the location of each sampling point and the rationale for selection
(b) the frequency of sample collection
(c) the method(s) to be used for sample collection
(d) the parameters to be tested
(e) the procedures to be used for reporting the analytical results of the testing program to DSMRE

Submit the description as "Attachment 30.1.A", and show the location of all monitoring points on the MRP Map.

See Attachment 30.1.A

30.2 Submit as "Attachment 30.2.A", a description of the applicant's proposed KPDES point source discharge monitoring program. Discharges from sediment ponds, underground mines and other similar discharge points within the proposed permit area shall be monitored. The description shall, at a minimum, address: (a) the frequency of sample collection; (b) the parameters to be tested; and (c) the procedures to be used for reporting the analytical results of the laboratory tests. Show the location of all sampling points on the MRP Map.

See Attachment 30.2.A

30.3 Provide, as "Attachment 30.3.A", a detailed description of the ground water quality and quantity monitoring program to be used during the mining and reclamation operations. The description shall specifically address all the following:

(a) the location of each sampling point and the rationale for selection
(b) the frequency of sample collection
(c) the method(s) to be used for sample collection
(d) the parameters to be tested
(e) the procedures to be used for reporting the results of the laboratory testing program to DSMRE

Show the location of all sampling points on the MRP Map.

See Attachment 30.3.A

30.4 Provide a detailed description of each monitoring point proposed for use in the ground water monitoring program. The description shall address:

(a) the aquifer(s) to be monitored
(b) the construction specifications of each monitoring point
(c) the adequacy of each monitoring point, taking into account design, construction, and location to fulfill its intended use

Submit the description as "Attachment 30.4.A".

See Attachment 30.4.A

ATTACHMENT 30.1.A

Monitoring of surface water quality and quantity during the mining operation will be conducted at the instream monitoring stations as shown on the enlarged maps. These locations should best reflect changes or problems with water quality or quantity and would better indicate the source of any problems.

Samples will be taken by "grab" type procedures once each quarter or as required by the Department. Lab tests will be conducted immediately to ensure accurate representation of the surface water characteristics. All Sampling procedures and lab analysis will be in accordance with EPA requirements.

Parameters analyzed will include discharge, temperature, pH, acidity, alkalinity, total iron, total manganese, total suspended solids, sulfate, and total dissolved solids.

Discharges of water from areas disturbed by surface mining activities shall at all times be in compliance with all applicable will all applicable federal and state water quality standards including the effluent limitations guidelines for coal mining promulgated by U.S. EPA in 40 CFR 434.

A regular report of all measurements will be supplied to the Department within one (1) month of sample collection.

ATTACHMENT 30.2.A

All monitoring of the KPDES point source discharge monitoring program will be conducted. Points of monitoring are identical to those described and shown on the maps. Likewise, procedures and frequencies, as well as reporting requirements, are to be conducted as described in Attachment 30.1.A.

No monitoring of underground mines or points other than sediment ponds and background data collection points are proposed.

ATTACHMENT 30.3.A

Monitoring of ground water quality and quantity during the mining operation will be conducted at the point shown on the enlarged maps. The location should best reflect changes or problems with water quality or quantity and would better indicate the source of any problems.

Samples will be taken by "grab" type procedures at least quarterly or as required by the Department. Lab tests will be conducted immediately to ensure accurate representation of the ground water characteristics. All sampling procedures and lab analysis will be in accordance with EPA and KPDES requirements.

No adverse effects to ground water are anticipated. However, should it become necessary, additional wells will be drilled to provide further information on water levels, infiltration rates, subsurface flow, and other storage characteristics including quality of the ground water.

Ground water monitoring will include water level, pH, acidity, alkalinity, sulfate, dissolved iron, dissolved manganese, and total dissolved solids. The ground water compliance monitoring results will be submitted to the Department quarterly, within 30 days after the samples are taken.

ATTACHMENT 30.4.A

The ground water monitoring points associated with this application are located within an unnamed tributary of Wolfe Pen Branch. Ground water flows are generally in a northeasterly direction of the mining site directly toward the monitoring point location. Therefore, the point location was chosen to best provide data of ground water flows that would potentially be affected by the mining operation.

The fracture flow described previously is the only unit that would be potentially affected. The monitoring points also extends into this unit and, therefore, will provide results of any affects on this supplier.

30.5 Provide the following information for the surface and ground water monitoring locations

I.D. Number	Pond Number if Applicable	Type Surface/Ground	Latitude	Longitude
S-1	N/A	Surface	36-46-37.8	83-31-2.5
S-2	N/A	Surface	36-46-14.2	83-30-34.9
S-3	N/A	Surface	36-45-56.4	83-30-6.9
G-1	N/A	Surface	36-45-57	83-30-34.3
SS #1	1	Surface	36-46-4.5	83-30-37
SS #2	2	Surface	36-46-30	83-31-11
SS #3	3	Surface	36-45-26	83-31-11
SS #4	4	Surface	36-45-36	83-30-20
SS #5	5	Surface	36-45-45	83-30-16
SS #6	6	Surface	36-45-53.8	83-30-9.6
SS #7	7	Surface	36-46-00	83-30-14
SS #8	8	Surface	37-04-19	83-25-48
SS #9	9	Surface	37-04-17	83-25-24
SS #10	10	Surface	37-04-17	83-25-38
SS #11	11	Surface	37-04-09	83-25-41
SS #15	15	Surface	36-46-25.9	83-30-58
SS #16	16	Surface	36-46-32	83-31-02
SS #17	17	Surface	36-46-35	83-31-13
SS #18	18	Surface	36-45-15	83-30-33
SS #19	19	Surface	36-45-03	83-30-31

30.6 List the name and address of the laboratory which will perform required testing of water samples.

Name Kentucky Resource Lab
Address P.O. Box 350, Manchester, KY 40962

31. Sediment Ponds and Impoundments

31.1 Complete the following table for each proposed sediment pond and impoundment. The numbers preceding the rows refer to the list of titles below the chart.

1	1	2	3	4	5	6	7
2	A	A	A	A	A	A	A
3	170	382.1	400.6	17.3	22.1	10.9	11.8
4	29.9	53.9	24.1	7.1	5.9	4.5	3.2
5	2.25	3.28	1.9	0.89	0.74	0.56	0.40
6	6.56	6.358	7.93	4.953	4.722	2.841	2.463
7	6.56	9.024	7.93	4.953	4.722	2.841	2.463
8	Dugout	17.0	Dugout	Dugout	Dugout	Dugout	Dugout
9	4.6	11.239	17.5	6.141	6.579	3.856	3.859
10	5.4	20.0	7.2	2.5	3.0	2.5	3.5
11	36°46'4.5"	36°46'30"	36°45'26"	36°45'36"	36°45'45"	36°45'53.8"	36°46'00"
12	83°30'37"	83°31'11"	83°31'11"	83°30'20"	83°30'16"	83°30'9.6"	83°30'14"

1.) Facility ID No.
2.) Hazard Classification (A, B, or C)
3.) Total Drainage Area (Acres)
4.) Disturbed Drainage Area (Acres)
5.) Sediment Storage Capacity (Acre-Feet)
6.) Storage Capacity at Principal Spillway (Acre-Feet)
7.) Storage Capacity at Emergency Spillway (Acre-Feet)
8.) Structure Height at Emergency Spillway Measured from Upstream Toe (Feet)
9.) Storage Capacity at Top of Dam (Acre-Feet)
10.) Structure Height at Top of Dam Measured from Downstream Toe (Feet)
11.) Latitude
12.) Longitude

1	8	9	10	11	12*	13*	14*
2	A	A	A	A			
3	10.7	3.6	8.0	8.0			
4	10.7	3.6	8.0	8.0			
5	0.80	0.27	0.60	0.60			
6	1.49	0.55	1.14	1.14			
7	1.49	0.55	1.14	1.14			
8	Dugout	Dugout	Dugout	Dugout			
9	2.55	1.91	1.9	1.9			
10	5	2.9	4	4			
11	37°04'19"	37°04'17"	37°04'17"	37°04'09"			
12	83°25'48"	83°25'24"	83°25'38"	83°25'41"			

1.) Facility ID No.
2.) Hazard Classification (A, B, or C)
3.) Total Drainage Area (Acres)
4.) Disturbed Drainage Area (Acres)
5.) Sediment Storage Capacity (Acre-Feet)
6.) Storage Capacity at Principal Spillway (Acre-Feet)
7.) Storage Capacity at Emergency Spillway (Acre-Feet)
8.) Structure Height at Emergency Spillway Measured from Upstream Toe (Feet)
9.) Storage Capacity at Top of Dam (Acre-Feet)
10.) Structure Height at Top of Dam Measured from Downstream Toe (Feet)
11.) Latitude
12.) Longitude

* These ponds have been removed from the proposed permit.

1	15	16	17	18	19	BP 1 *	BP2 *
2	A	A	A	A	A		
3	35.1	3.1	8.1	29.1	195.28		
4	5.5	2.5	4.0	9.0	17.78		
5	0.42	0.31	0.3	1.13	1.34		
6	1.27	3.037	0.64	6.897	4.09		
7	1.27	3.037	0.64	6.897	4.09		
8	Dugout	Dugout	Dugout	Dugout	Dugout		
9	1.95	3.855	1.0	8.578	8.3		
10	3.6	2.0	2.3	2.5	6.6		
11	36°46'25.9"	36°46'32"	36°46'35"	36°45'15"	36°45'03"		
12	83°30'58"	83°31'02"	83°31'13"	83°30'33"	83°30'31"		

1.) Facility ID No.
2.) Hazard Classification (A, B, or C)
3.) Total Drainage Area (Acres)
4.) Disturbed Drainage Area (Acres)
5.) Sediment Storage Capacity (Acre-Feet)
6.) Storage Capacity at Principal Spillway (Acre-Feet)
7.) Storage Capacity at Emergency Spillway (Acre-Feet)
8.) Structure Height at Emergency Spillway Measured from Upstream Toe (Feet)
9.) Storage Capacity at Top of Dam (Acre-Feet)
10.) Structure Height at Top of Dam Measured from Downstream Toe (Feet)
11.) Latitude
12.) Longitude

* These ponds have been removed from the proposed permit.

1	BP3 *	BP4 *					
2		--					
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

1.) Facility ID No.
2.) Hazard Classification (A, B, or C)
3.) Total Drainage Area (Acres)
4.) Disturbed Drainage Area (Acres)
5.) Sediment Storage Capacity (Acre-Feet)
6.) Storage Capacity at Principal Spillway (Acre-Feet)
7.) Storage Capacity at Emergency Spillway (Acre-Feet)
8.) Structure Height at Emergency Spillway Measured from Upstream Toe (Feet)
9.) Storage Capacity at Top of Dam (Acre-Feet)
10.) Structure Height at Top of Dam Measured from Downstream Toe (Feet)
11.) Latitude
12.) Longitude

* These ponds have been removed from the proposed permit.

31.2 Were any of the structures listed in chart 31.1 constructed prior to January 18, 1983? ☐ YES ☒ NO. If "YES", identify each structure and submit as "Attachment 31.2.A, 31.2.B", etc., the descriptions and compliance plan(s) required by 405 KAR 8:030, Section 25, or 405 KAR 8:040, Section 25, as appropriate.

31.3 For each proposed impoundment submit the applicable design plans and descriptions, including compliance demonstration documents, as required by 405 KAR 8:030 or 8:040, Section 34. Design plans and descriptions shall be submitted as "Attachment 31.3.A, 31.3.B", etc. Compliance demonstration documents shall be appropriately labeled and submitted in a separate document cover entitled "Sediment Ponds – Compliance Demonstration Documents". Put the applicant's name and the application number on the face of the document cover. If other state or federal agencies receive a copy of the permit application, a copy of the compliance demonstration documents shall also be provided to such agencies unless specifically waived.

NOTE: If any proposed sediment ponds are to be retained as permanent impoundments, the applicant shall ensure that such structures have been designated to meet the requirements of 405 KAR 16:100 or 405 KAR 18:100 as appropriate.

See Separate Folder

31.4 Will water be chemically treated at any of the proposed or existing sediment structures? ☐ YES ☒ NO. If "YES", provide the following information:

I.D. Number	Treatment Chemicals	Describe the method of treatment application and any special structures or facilities to be used

If special structures are to be utilized, submit as "Attachment 31.4.A, 31.4.B" etc., supporting engineering designs and calculations.

31.5 Provide a plan for the periodic maintenance of all sediment structures and discuss the proposed sediment clean-out schedule. Provide information as "Attachment 31.5.A".

See Attachment 31.5.A

31.6 Provide a removal plan for all temporary impoundments. Submit as "Attachment 31.6.A".

See Attachment 31.6.A

32. Diversions

32.1 Is authorization to conduct mining and reclamation operations or to construct mining related facilities within 100 feet of an intermittent or perennial stream being requested? ☐ YES ☒ NO. If "YES", provide the following information for all of the following.

(a) A map showing the location(s) where such authorization is requested, and the proposed disturbance(s)/facility(ies) with an indication of the specific distance to the stream(s). Submit as "Attachment 32.1.A".

(b) Cross-sections and a longitudinal profile of the stream's premining and postmining configuration. Submit as "Attachment 32.1.B".

(c) A description, including maps, plans, drawings, etc., of the specific measures to be taken to protect the stream(s) during the mining and reclamation operation. Submit as "Attachment 32.1.C".

32.2 Will the disturbances referenced in item 32.1 result in the temporary or permanent diversion of an intermittent or perennial stream? ☐ YES ☒ NO. If "YES", provide as "Attachment 32.2.A", the design calculations and other pertinent information to demonstrate compliance with 405 KAR 16:080, Section 2, or 405 KAR 18:080, Section 2, as appropriate.

32.3 Complete the following chart for all diversions:

Diversion Number	Length of Diversion	Design Storm	Type of Channel	Design Velocity	Average Slope	Erosion Control Methods
HF #1 N&S Top	1150'	100 yr.	V-bottom	5 fps	1%	Rip-rap
HF #1 N&S Face	350'	100 yr.	V-bottom	16 fps	20%	Rip-rap
HF #2 E&W Top	1600'	100 yr.	V-bottom	6.8 fps	1%	Rip-rap
HF #2 E&W Face	470'	100 yr.	V-bottom	22 fps	20%	Rip-rap
DitchDitches 1-39 Max. Design	650'	25 yr.	V-bottom	3.3 fps	1%	Vegetated Channel

ATTACHMENT 31.5.A

Construction of sediment ponds in accordance with the design plans submitted in this application should greatly reduce the potential for frequent maintenance. Quarterly inspections will be conducted for each facility to ensure that the pond is functioning properly with no stability problems. Any required maintenance will be noted at this inspection and corrected promptly.

Structure clean out is proposed for 100% of sediment capacity as noted on the pond designs submitted in this application. Should this material become necessary to be removed, it will be dipped out using a backhoe or clam shell. Trucks will transport the material to the mine site where it will be mixed with overburden materials and ultimately seeded. The sediment will be tested to determine if it is toxic or not before mixing with overburden material and if test results indicate toxicity, sediment should be de-watered and covered with at least four (4) feet of non-toxic material in the permitted area.

ATTACHMENT 31.6.A

SEDIMENT POND REMOVAL PLAN

The sediment pond removal process will begin by draining the structure either by pumping or by cutting into the structure in a controlled manner with appropriate ditches. The exit channel for pumped or drained water will be checked periodically to insure that erosion does not occur and that velocities are reduced as necessary to provide a controlled discharge. Water quality will also be monitored to insure an acceptable effluent is being released.

Once all water has been removed, the earth dam material will be pushed into the pond. After the pond has been completely filled, the area will be graded to match the surrounding contours and natural area grade. Seeding and mulching will then be accomplished in accordance with the revegetation plan and the post-mining land use plan described in the permit package. The revegetation plan should comply with 405 KAR 16/18:200.

Prior to covering the sediment in the pond, it shall be allowed to dry. Testing will then be conducted to determine toxicity. Lime amounts necessary to neutralize the sediment will then be applied if needed. Following lime applications, the sediment will be covered with soil material from the embankment as described previously.

Since there are no streams either intermittent or perennial associated with the site, only straw or hay bales will be placed around the lower side of the pond removal area to prevent silt from leaving the site. These shall remain until revegetation is well established.

A STREAM RESTORATION PLAN FOR A PROPOSED SURFACE MINE AREA NEAR BLACKSNAKE BRANCH, BELL COUNTY, KENTUCKY (APPLICATION # 807-0339)

Prepared for:
Logos Engineering, Inc.
Manchester, Kentucky
&
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Apogee Project # 05-105.00

June 2006

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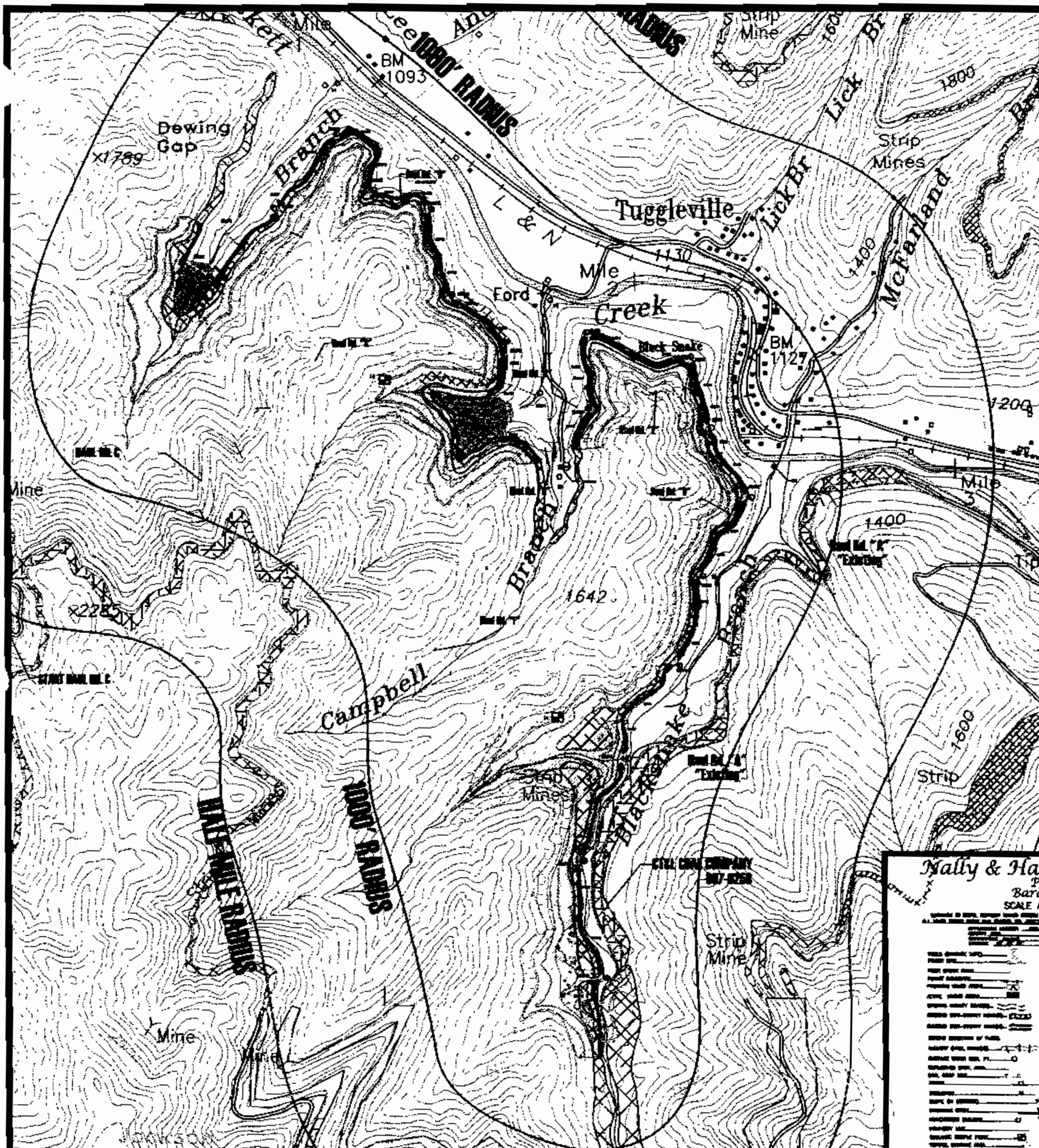
1.0 INTRODUCTION

Apogee Environmental Consultants (Apogee) was contracted by Logos Engineering, Inc. to prepare a post-mining stream restoration plan for four streams in Bell County, Kentucky. The proposed mine by Nally & Hamilton Enterprises, Inc. [Department of Natural Resources (DNR) Permit No. 807-0399] and the associated streams to be disturbed are shown in Figure 1. This plan is hereby submitted to U. S. Army Corps of Engineers (USACE) on behalf of Logos Engineering, Inc. and Nally & Hamilton Enterprises, Inc to fulfill the requirements set forth by USACE concerning Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

2.0 SITE LOCATION AND DESCRIPTION

The project area is located in Bell County, Kentucky, approximately 2 miles south of the community of Black Snake. The proposed permit area, which is located in the Puckett Creek drainage area, covers approximately 383.2 surface acres. There will be two hollowfills and two associated sediment control ponds for the proposed permit, in addition to two areas of stream that will be mined through (Figure 1). All four affected stream areas are small (1st and 2nd order), with above pond drainage areas of 302, 170, 169, and 373 acres for hollowfills 1 and 2 and mine areas 1 and 2 respectively. Table 1 contains acreages that occur above the dam of each pond, above the toe of each hollowfill, and the approximate cubic/yards of fill material to be placed into each hollowfill. The project area is located in the Cumberland River basin.

Features which might create adverse surface water conditions are existing roads, previous logging operations, previous mining operations, and gas well areas. No other conditions are known to exist in these watersheds which may create any adverse surface water conditions. With the exception of the above disturbances, the drainage is completely forested. The proposed project area is located on the Balkan USGS quadrangle.



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NALLY & HAMILTON ENTERPRISES, INC.

Figure 1. Proposed permit area and in stream disturbances, Bell County, Kentucky (Permit No. 807-0342).

SCALE: 1"=1500' 2/13/06

Table 1. Acreages located above sediment structure dam and toe of hollowfill; and amount of fill material to be placed into each hollowfill at four streams in Bell County, Kentucky (Permit No. 807-0399).

Structure	Area Above Pond Dam (Acres)	Area Above Toe of Hollowfill (Acres)	Fill Material (cubic yards/hollowfill)
HF #1 and SS #1	302	265	457,299
HF #2 and SS #2	170	152	1,159,052
Mine Area #1	169	-	-
Mine Area #2	373	-	-

2.1 Direct and Indirect Impacts

Direct impacts to waters of the U.S. will occur at four streams in Bell County, Kentucky. Lengths and types of stream to be impacted are shown in Table 2. There will be no impacts to wetlands during the proposed mine project. Direct impacts are illustrated in Attachments 1-4. No indirect impacts are planned for the project.

Table 2. Length, flow regime, specific conductivity, Ecological Integrity Index (EII), and Ecological Integrity Units (EIUs) at four streams in Bell County, Kentucky (Permit No. 807-0399).

Stream	Flow Regime	Length (ft)	Specific Cond.	EII	EIU
Hollowfill #1	Perennial	1,916	460	.50	958.0
SS#1	Perennial	337	460	.50	168.5
Hollowfill #2	Intermittent	2,616	460	.50	1308.0
Hollowfill #2	Perennial	427	460	.50	213.5
SS#2	Perennial	273	460	.50	136.5
Mine Area #1	Intermittent	1,095	334	.59	646.1
Mine Area #2	Perennial	2,164	550	.45	973.8
Total		**8,828**			**4,404.4**

2.2 Ecoregion Information

The project area is situated in the Cumberland Mountain Thrust Block Ecoregion (Woods et al. 2002). This ecoregion is characterized by steep ridges, hills, coves, narrow valleys, and the Pine Mountain Overthrust Fault. Forest composition is highly variable and is determined by aspect, slope position, historic usage, and degree of topographical shading. Many streams in this ecoregion are cool and high gradient, with a substrate commonly consisting of cobble and boulder (riffles are common). The underlying geology consists of Pennsylvanian shale, siltstone, sandstone, conglomerate, and coal. The presence of coal mining and acidic mine drainage (and also logging) has led to many streams being degraded. Nutrient levels in streams are low, a result of the areas low population, limited farming, and non-carbonate rocks.

2.3 Purpose of Project

A variance is being requested for time and distance to comply with the revised regulations, 405 KAR 16:020 Section 6, Supplemental Assurance. A variance is needed to meet marketing demands for different coal qualities, quantity, and the large amount of equipment and manpower and many different operations that need to be executed at the same time. The different working areas needed are for clearing & grubbing, topsoil removal, drill benching, drill operations, blasting area, overburden removal by dozer, overburden removal by loader trucks, final pit preparation, and coal loading areas. Each operation needs a separate working area so it will not interface with the other ongoing operation and to ensure continuous coal loading operations so that coal contracts can be met. The additional time is needed so that the highwall can be eliminated by progressive mining. We are requesting a distance of nine thousand (9,000) linear feet and a time of 120 days for backfilling and grading to approximate original contour. Supplemental assurance per each additional pit (1,500 feet) will be submitted upon activation as concurrently as possible and in a timely manner in order to minimize the time period in which disturbed areas are exposed prior to reclamation. For each 1500 foot section and spread of equipment backfilling and grading at that location shall be completed within 120 calendar days after removal of the last coal seam at that location and shall follow the advancing cut of the last coal seam by not more than 1500 feet per pit. The maximum number of spreads of equipment that will be utilized at any one time will be (6) six.

2.4 Project Timeline

Mining will begin immediately or very soon after approval is received from the USACE. The life of the mine permit will vary depending on the amount of coal that can be economically mined from each permit. The anticipated termination date cannot be accurately predicted due to uncontrollable conditions of the industry: market conditions, mining conditions, coal geology, weather, labor conditions, and equipment availability. Despite the unknowns, mining operations are expected to last for approximately two years.

3.0 SURVEYS CONDUCTED

Several site visits have been made to determine the existing conditions at the streams that will be impacted during mine operations. This information will guide restoration efforts and will be used to determine if these efforts are a success.

3.1 Aquatic Biological Assessment

Benthic sampling was not conducted at the proposed permit area. Therefore, we did not include the macroinvertebrate component when calculating stream integrity.

3.1.1 Habitat Assessment

The method used to analyze habitat followed Rapid Bioassessment Protocols for use in Wadeable Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish (2nd Edition) (Barbour et al. 1999). Sample sites were visited by Apogee Biologists, with stream conditions and riparian vegetation being recorded at each site. Stream conditions at each site were assessed using the High Gradient Stream Data Sheet (Barbour et al. 1999). The following stream condition parameters were assessed at each site: available cover, embeddedness, velocity/depth regime, sediment deposition, channel flow status, channel alteration, frequency of riffles (or bends), bank stability, vegetative protection, and riparian vegetative zone width. The completed data sheets for each site can be found in Appendix A. Riparian vegetation was analyzed using DSMRE's constructed vegetative stratum rank system (Appendix B). Results of the vegetation survey are shown in Table 3.

Table 3. Vegetation analysis using DSMRE's Constructed Vegetative Stratum Rank System at four streams in Bell County, Kentucky (Permit No. 807-0399).

Common Name	Scientific Name	Site			
		HF 1 and SS 1	HF 2 and SS 2	Mine Area 1	Mine Area 2
Tulip Tree	*Liriodendron tulipifera*		4	9	
Beech	*Fagus grandifolia*	4	6	2	
Yellow Buckeye	*Aescylus flava*	5		1	2
Sweet Birch	*Betula lenta*		3	2	4
Sycamore	*Platanus occidentalis*	5	5	2	3
Witchhazel	*Hamamelis virginiana*	2			
Eastern Hemlock	*Tsuga canadensis*	6			
Basswood	*Tilia americana*	3			
Ironwood	*Carpinus caroliniana*	2	2		
White Ash	*Fraxinus americana*	2			2
Red Maple	*Acer rubrum*	4	4		4
Sugar Maple	*Acer saccharum*	2	6		6
Black Locust	*Robinia pseudoacacia*		2		
Hydrangea	*Hydrangea arborescens*		1		

Common Name	Scientific Name	Site			
		HF 1 and SS 1	HF 1 and SS 1	HF 1 and SS 1	HF 1 and SS 1
Umbrella Magnolia	*Magnolia tripetala*		3		2
Flowering Dogwood	*Cornus florida*		1		
Black Oak	*Quercus velutina*				4
Mockernut Hickory	*Carya tomentosa*				4
American Elm	*Ulmus americana*				3
White Oak	*Quercus alba*				6
Pawpaw	*Asimina triloba*				2

3.1.2 Physiochemical

Measurements for specific conductance were collected by Apogee biologists at the four proposed affected streams. Specific conductance measurements ranged from 334 to 550. Conductivity readings for the proposed affected sites are located in Table 2.

3.2 Physical Characteristics

As a general rule [based upon Rosgren's (1994) classification system], streams affected on this project are considered A3a+. These stream types are characterized by having high entrenchment, low sinuosity, and a substrate consisting mostly of cobble. The areas of stream to be impacted were assessed using the High Gradient Stream Data Sheet. The areas of stream to be impacted were assessed to include the stream pattern, profile and dimensions. The results of these assessments are located in Table 4. The completed data sheets for longitudinal profiles, pebble counts, and cross sections are located in Appendix C. Longitudinal profile and cross section diagrams are located in Appendix D.

Table 4. Stream pattern, profile, and dimension data at four streams in Bell County, Kentucky (Permit No. 807-0399) that will be used to guide restoration efforts.

Characteristic	HF 1	SS 1	HF 2	SS 2	Mine Area 1	Mine Area 2
Pattern						
Sinuosity	1.07	1.12	1.06	1.10	1.12	1.07
Profile						
Slope	5.9	18.8	12.9	7.72	13.5	10.6
Dimension						
Bankful Width (ft)	6.5	10.0	10.8	7.34	10.8	12.42
Mean Bankful Depth (ft)	0.18	0.85	0.38	0.87	0.96	0.54
Maximum Depth (ft)	0.34	1.2	0.62	1.1	1.1	0.87
Width/Depth Ratio	36.11	11.76	28.4	8.43	11.25	23.0
Floodprone Width (ft)	55.9	12.6	13.3	10.2	24.3	26.2
Entrenchment Ratio	8.6	1.26	1.23	1.39	2.25	2.11

4.0 IMPACTS TO STREAM

4.1 Alternatives Analysis

To ensure that as little stream as possible is impacted, a number of changes have been made to the original engineering plans. Two proposed hollowfills were eliminated to reduce potential affects to waters of the U.S. In addition, proposed plans to mine through Campbell Branch were also eliminated. Existing hollowfills were made as small as possible by placing as much material on bench areas and by increasing hollowfill slopes to the maximum so they would hold more material. Also, plans had originally called for the construction of sediment ponds farther downstream from each hollowfill. However, after discussing these plans, the client decided to move the sediment control structures as close as practical to the toe of the hollowfills. Also, sediment structures will be constructed prior to any disturbance in upstream areas, limiting the amount and degree of disturbance to affected streams.

To completely ensure that the client is taking the appropriate action concerning waters of the U.S., other options were also considered. These included the possibility of employing deep mine techniques instead of surface mine techniques, using upland areas for the storage of waste materials, and using fewer hollowfills. Deep mining was not employed due to limited resource recovery and the fact that this type mining would not discourage potential future mining in the same area. Using upland areas or fewer hollowfills was not viable due to the amount of excess material to be disposed of (7,566,253 cubic yards). Due to the large amount of waste material, it is not practical to place this material in upland areas or to use fewer hollowfills. In addition, there are financial issues that must be considered. The use of fewer hollowfills or upland areas would increase the operating price for the mine above what is financially feasible for the client.

4.2 Stream Assessment

The streams were assessed using the Ecological Integrity Index (EII) and Ecological Integrity Units (EIUs) developed by USACE (Table 2). EII is measured as quality per running foot and is scored from 0 – 1 (with 1 being equal to least disturbed conditions in the region). Ecological Integrity Units are calculated by multiplying the EII by length of stream to be impacted (in feet). Based upon calculated scores (Table 2), total EIU's impacted during this proposed mine project will be 4,404.4.

4.3 Cumulative Impacts Analysis

In addition to the proposed direct affects on the streams, the incremental impact of the proposed activities when added to other past, present and reasonably foreseeable future actions were also taken into account. Future land disturbances that could potentially occur in the drainages include logging operations, and powerline corridor developments. It is unlikely that there will be any economic development, agricultural development, or road construction, due to the hollows being so small, steep, and remote.

5.0 STREAM RESTORATION PLAN

Once all mining activities are completed, the streams will be restored as closely as possible to a healthy stream system. The purpose of this restoration plan is to return stability and ecological function to the impacted streams, while also making the streams self-maintaining. The pattern, profile, and dimension data collected at the streams will be used to guide the stream restoration efforts. Restoration measures to be employed include stream shaping and realignment, revetments (riffles, boulder clusters, substrate, cover logs, J-hook vanes, and cross vanes), and bioengineering (revegetation).

The sediment control ponds, the areas between the ponds and the hollowfills, and the mined through areas will be restored to a self-maintaining system, while the hollowfills will have natural channels constructed on the top and down each side. During the removal of the sediment control ponds, silt fences and/or rows of straw will be employed to reduce the amounts of sediment that will impact the downstream areas. All stream restoration efforts will be conducted during low flow situations.

5.1 Stream Habitat

During restoration efforts, in-stream habitat will be re-created as closely as possible to pre-disturbance levels. This will include reproducing as close as possible the pre-disturbance bankfull width, depth, channel sinuosity, riffle-run-pool ratio, and substrate types. The longitudinal profile (riffle/run/pool), cross sections, and pebble count data collected will be used to guide restoration efforts. A diverse in stream habitat will be achieved by using rock/log deflectors, riffles, boulder clusters, substrate (cobble and gravel), cover logs, J-hook vanes (made of large rock, logs, and/or root wads), and cross vanes (rock and log). These structures will help make the streams self-maintaining and also provide a diverse habitat for aquatic organisms. During the construction phase, data sheets detailing current conditions should be referred to to ensure that restoration efforts are being created as closely as possible to pre-disturbance conditions.

In stream restoration structures will be placed in such a way to create a self-maintaining stream. Where bends in the stream are proposed, J-hook vanes will be placed to stabilize the banks and to form a scour pool in the center portion of the channel (Attachment 5). Placing the J-hook vanes in the stream bends will help dissipate energy during high flow situations. The vane arm sections of the J-hook vanes (near the bank) will be interlocked with no spaces in between, thus stabilizing the banks as much as possible. These structures should be built at a 20 to 30 degree angle from the bank. The center sections of the J-hook vanes (that jut out into the middle of the stream) will have gaps located in between the large rocks. These gaps will help transport sediment and improve channel capacity and sediment competence. The vane arm section of the J-hook should be one-third the bankful width of the stream channel and the center section should cover another one-third. Footers for these structures should be three times the protrusion height of the invert rock.

Where sections of the stream are currently straight, cross-vanes will be placed to help provide pool/run habitat. These structures will decrease stream velocity and power near the bank and increase it near the center. Cross vanes will be constructed of either logs or boulders (Attachment 6 and 7). Logs used for these cross vanes will have a 12 to 18 inch diameter and will be at least 18 feet long. To ensure that the logs will not be washed out during high flow situations, log ends will be buried at least two feet within each bank. Cross vanes constructed of boulders will have footers that are three times the protrusion height of the invert rock. The arm vane arm structures should be built at a 20 to 30 degree angle from the bank. Bankfull levels will be approximately six inches above cross vane structures. These structures will be constructed approximately five to seven bankfull widths of each other.

In areas that are currently occupied by step pools, interlocking cross-vanes will be placed to mimic as closely as possible the pre-disturbance conditions (Attachment 8). These structures will also help dissipate energy during high flow situations and will provide small pockets of deep water habitat for aquatic organisms.

In addition to the stream sections below the toes of the hollowfills and in mined through areas, a natural stream section will also be constructed on the top and down each side of the hollowfills. The sides of this drainage will be rip-rapped while the inside sections will have a natural stream channel design. Although there will be drainages down both sides of the hollowfills, the flow of water will be concentrated into only one of these stream sections as to ensure the highest water flow throughout the year. These restored sections will be constructed on solid ground near where the hollowfill comes in contact with the natural terrain. This will help ensure that water does not sink into the fill area but instead flows above ground. In addition, the tree line should come very close to the side of each hollow fill and help to create a more natural setting more quickly. Cross-vanes (made of logs) will be placed in these sections of restored stream to help provide pool/run habitat and to help create a system that is self-maintaining.

In addition to the above listed restoration methods, the restoration will utilize small boulders, cobble, and gravel to mimic as closely as possible the current conditions of the streams. These will help give the stream a natural look and will provide habitat for aquatic organisms. Rock used for the restoration efforts will be a durable sandstone obtained on-site during project operations.

5.2 Riparian Habitat

Once the stream restoration efforts are complete, the riparian vegetation will be re-established. This riparian vegetation will help prevent sedimentation of the streams, keep water temperatures cool (by shading), and provide nutrients for organisms that live within the stream. Mesic-hydric and hydric shrubs will be planted between the normal flow and bankfull areas. This riparian zone will be 60 feet wide on both sides of the streams. During the revegetation process, the site will have hydromulch applied. The hydromulch will aid in the retention of water and help prevent the site from becoming excessively dry. As this mulch decays it will also build additional topsoil.

5.2.1 Grasses

The site will be seeded with temporary groundcover, legumes, and permanent grass. The temporary plants to be seeded will include either foxtail millet (*Setaria italica*), annual rye (*Lolium multiflorum*), or winter cereal rye (*Secale careale*). To insure seeding and to diversify the temporary vegetation, a combination of these species may be used. During seeding a species of legume [white clover (*Trifolium repens*)] will be selected to achieve nitrogen fixation in the soil and to provide quick growing ground cover. In addition to temporary plants and legumes, two species of permanent grasses will be seeded to help build topsoil and to provide quick soil cover. The grasses to be seeded will be a combination of little blue stem (*Schizachyrium scoparium*); redtop (*Agrostis alba*), and little blue stem; or orchard grass, redtop, and little blue stem. See Table 5 for seeding rates for the grasses, legumes, and temporary plants.

Table 5. Seeding rates for grasses, legumes, and temporary plants at four streams in Bell County, Kentucky (Permit No. 807-0399).

Types of Plants and Common Name	**Rate per Acre**
Permanent Grass	
Redtop Grass	3 lbs
Little Blue Stem	3 lbs
Legume	
White clover	3-5 lbs
Temporary Plants	
Foxtail Millet	5-10 lbs
Annual Rye	15-20 lbs
Winter Cereal Rye	15-20 lbs

5.2.2 Trees

Native species of trees that are currently known from the site should be used whenever they are available from the Kentucky Division of Forestry and Nurseries. The exact species of trees to be used will be determined at a later time and will depend on availability. However, at least three species each of trees and shrubs should be used to revegetate the riparian areas. A total of 500 stems per acre will be planted as part of the revegetation plan (350 trees and 150 shrubs). Revegetation will be considered a success if after five years there are 300 stems per acre of live trees and shrubs (200 trees and 100 shrubs). Both trees and shrubs should be planted between three and six feet from each other. This will help ensure that enough vegetation is planted to get the benefits of the riparian habitat, without the vegetation being too densely packed. Trees planted will be bare root stock. In addition to planted species, the site will probably have some native volunteer species invade. Table 6 lists recommended tree species for revegetation of the riparian areas.

Table 6. Recommended tree species for revegetation of riparian areas at four streams in Bell County, Kentucky (Permit No. 807-0399).

Common Name	Scientific Name	Hydrologic Regime
Tree Species		
Silver Maple	*Acer saccharinum*	Mesic
Sugar Maple*	*Acer saccharum*	Intermediate Mesi/Xeric
Yellow Birch	*Betula alleghaniensis*	Mesic
Sweet Birch*	*Betula lenta*	Mesic
Tulip Tree*	*Liriodendron tulipifera*	Mesic
Sweet Gum	*Liquidambar styraciflua*	Hydric
Sycamore*	*Platanus occidentalis*	Mesic-Hydric
Basswood*	*Tilia americana*	Mesic
Northern Red Oak	*Quercus rubra*	Mesic
American Elm*	*Ulmus americana*	Mesic-Hydric
Red Elm	*Ulmus rubra*	Mesic-Hydric
Eastern Hemlock*	*Tsuga canadensis*	Mesic
Shrub Species		
Alder	*Alnus serrulata*	Hydric
Black Willow	*Salix nigra*	Hydric
Elderberry	*Sambucus Canadensis*	Mesic-Hydric
Ironwood*	*Carpinus caroliniana*	Mesic-Hydric
Maple-leaved Vibernum	*Vibernum acerfolia*	Mesic
Witch Hazel*	*Hamamelis virginiana*	Mesic
Hydrangea*	*Hydrangea arborescens*	Mesic-Hydric
Spicebush	*Lindera benzoin*	Mesic

* = Tree and shrub species that are currently growing on the permit area.

6.0 MITIGATION

Under existing law the USACE requires compensatory mitigation to replace aquatic resource functions unavoidably lost or adversely affected by authorized activities. The objective of this mitigation plan is to compensate for adverse conditions associated with the loss of 8,828 feet of stream. To compensate the client will restore the proposed affected streams and also pay an in-lieu-fee.

6.1 Mitigation Work Plan

Mitigation for the sediment structures, the areas between the ponds and the hollowfills, and the mined through areas will be conducted within the degraded streambeds, while mitigation for the the hollowfills will be conducted by constructing natural stream drainages on the sides and tops. Linear feet restored for the ponds, the areas between the ponds and the hollowfills, and the mined through areas will be equal to pre-disturbance levels. There will be one drainage at the top of each hollowfill and one drainage down each side. The top drainage of each hollowfill will be sloped toward the side to be used for mitigation to ensure that as much water as possible gets to the drainage used for mitigation. For each hollowfill, the top drainage will be constructed at a 5 to 7 percent grade (on solid ground) and thus will function as a natural stream. Stream restoration in this section will follow profile and cross section plans that were collected at a stream of similar slope (Appendix E).

Table 7 illustrates the overall losses and gains of the proposed mitigation for this project. The Stream Compensation Ratio Calculator forms that were used to calculate mitigation amounts are located in Appendix F. Mitigation in these streams will follow restoration plans outlined in Section 5.0. Pictures of the streams are included with the pre-disturbance EII Calculation Spreadsheets in Appendix G. EII Calculation Spreadsheets for five and 30 years after restoration are located in Appendices H and I respectively and are reviewed in Table 8.

Based upon losses and gains at the project site, the client will need to offset the net loss of 1,780 feet (Table 9). To accomplish this, the client has agreed to pay an in-lieu-fee. Based upon the loss of 1,780 feet of stream, the client will need to pay an in-lieu-fee of $747,666.90. This money will go to satisfy compensatory mitigation requirements and help meet the USACE's goal of no overall net loss of waters of the U.S. In-lieu-fee calculations are summarized in Table 9.

Table 7. Stream compensation ratio calculator for proposed mitigation efforts at four streams in Bell County, Kentucky (Permit No. 807-0399).

Impact Reach Name	**Flow Regime**	**Impacted Site**			**Mitigation Site**								
					Mitigation Timing and Risk			**EII**			**Mitigation (feet)**		
		Length	**Pre EII**	**Post EII**	Start	Mature	Risk (%)	**Pre-work**	Immediately After	At Maturity	Length Required	Length Offered	Balance
Hollowfill #1	Perennial	1,916	.50	0.0	2009	2039	50	0.0	.32	.40	2,798	1,987	555
SS#1	Perennial	337	.50	0.1	2009	2039	50	0.1	.32	.40	394	337	49
Hollowfill #2	Intermittent	2,616	.50	0.0	2009	2039	50	0.0	32	.40	3,820	2,710	760
Hollowfill #2	Perennial	427	.50	0.0	2009	2039	50	0.0	.32	.40	624	624	0
SS#2	Perennial	273	.50	0.1	2009	2039	50	0.1	.32	.40	319	273	39
Mine Area #1	Perennial	1,095	.59	0.1	2009	2039	50	0.1	.32	.40	1,567	1,095	330
Mine Area #2	Perennial	2,164	.45	0.1	2009	2039	50	0.1	.32	.40	2,212	2,164	47
Total		**8,828**									**11,734**	**9,190**	**1,780**

Table 8. Individual habitat assessment parameters for pre-disturbance, five years after restoration, and 30 years after restoration at four streams in Bell County, Kentucky (Permit No. 807-0399).

Site	Time Period	Parameter										Total
		Epifaunal Substrate	Embeddedness	Velocity/Depth Regime	Sediment Deposition	Channel Flow Status	Channel Alteration	Frequency of Riffles	Bank Stability	Vegetative Protection	Riparian Width	
HF #1 and SS#1	Pre-disturbance	14	15	10	15	18	18	20	16	18	15	159
	5 Years	13	17	10	17	6	15	20	18	12	14	142
	30 Years	17	17	10	17	6	15	20	18	14	18	152
HF #2 and SS#2	Pre-disturbance	13	14	10	14	18	18	20	16	18	18	159
	5 Years	13	17	10	17	6	15	20	18	12	14	142
	30 Years	17	17	10	17	6	15	20	18	14	18	152
Mine Area #1	Pre-disturbance	13	15	10	17	20	15	20	16	15	11	152
	5 Years	13	17	10	17	6	15	20	18	12	14	142
	30 Years	17	17	10	17	6	15	20	18	14	18	152
Mine Area #2	Pre-disturbance	13	13	10	13	18	18	20	16	18	19	158
	5 Years	13	17	10	17	6	15	20	18	12	14	142
	30 Years	17	17	10	17	6	15	20	18	14	18	152

Table 9. In-lieu fee summary at four streams in Bell County, Kentucky (Permit No. 807-0399).

Impact Reach Name	Flow Regime	Stream Length Balance	EII	Compensatory Mitigation Ratio	In-Lieu Fee
Hollowfill #1	Perennial	555	.50	2.25	203,040.00
SS#1	Perennial	49	.50	2.25	31,050.00
Hollowfill #2	Intermittent	760	.50	1.5	118,980.00
Hollowfill #2	Perennial	0	.50	2.25	84,780.00
SS#2	Perennial	39	.50	2.25	25,110.00
Mine Area #1	Intermittent	330	.59	1.59	146,534.40
Mine Area #2	Perennial	47	.45	2.16	138,172.50
Total		**1,780**			**$747,666.90**

Restoration efforts will proceed as soon as mining operations have concluded. After restoration, certain habitat features will recover quickly while others will take time to mature. Both vegetative protection and riparian width will take considerable time to come back, while the other eight parameters should come back more quickly.

6.2 Site Protection

No site protection is proposed for the restored stream areas. To account for this, the risk factor used in the stream compensation ratio calculator, which is set at 20 percent for most projects, was set at 50.

7.0 MONITORING

7.1 Monitoring and Long-term Management

Following the implementation of the restoration plan, a professional engineer will certify to the USACE that construction meets or exceeds planned goals. Following successful restoration, the restored areas will be monitored for five years. This monitoring plan will evaluate the success of the mitigation work and will allow for any necessary adjustments to assure the success of the restoration site. Annual monitoring reports will be submitted to the appropriate USACE office no later than 31 December of the year following completion of the restoration efforts. The annual monitoring reports will include an inspectors report and photographs with locations shown on project maps. If during the time that the restored areas are monitored, there are significant failures in the design of the restored streams, a revised mitigation plan will be submitted to fix any shortcomings in the original mitigation plan. If at the end of the five years the restoration efforts are deemed a success, the applicant shall be released from all permit obligations.

Monitoring will consist of grading the restored area yearly using the High Gradient Stream Restoration Sheets (Barbour et al. 1999). The following parameters will be monitored; pH, specific conductance, dissolved oxygen, epifaunal substrate, embeddedness, velocity/depth regime, sediment deposition, channel flow status, channel alteration, frequency of riffles, bank stability, vegetative protection, and riparian zone. Table 10 illustrates success standards and method of determination for each of these parameters.

Table 10. Factors to be considered when determining successful stream restoration at four streams in Bell County, Kentucky (Permit No. 807-0399).

Parameter/Observation	Success Standards	Method of Determination
Field pH	Report Only	Field Meter
Specific Conductance	Report Only	Field Meter
Dissolved Oxygen	Report Only	Field Meter
Epifaunal Substrate	Minimum 70% favorable substrate	Pebble count; Estimate of available
Embeddedness	Maximum 20% embeddedness	Pebble count; measure embeddedness
Velocity/Depth Regime	Maintain step-pool or riffle-pool sequences similar to approved plans	Longitudinal profile
Sediment Deposition	Little or no enlargement of Islands or point bars and <5% of the bottom affected by sediment deposition	Pebble counts in pools
Channel Flow Status	Maintain width/depth ratio similar to accordance with plans	Determine from X-sections
Channel Alternation	Maintain minimal channelization similar to approved plans	Longitudinal profiles; X-sections
Frequency of Riffles	Maintain step-pool or riffle-pool sequences similar to approved plans	Longitudinal profile
Bank Stability	Banks stable	Bank Erosion Index; Observe density & depth of plant roots, near bank shear stress
Vegetative Protection	Approved width of riparian zone planted with minimum 300 stems/acre surviving	Measure replanted width; estimated stem count
Riparian Zone	Riparian zone with a variety of species alive and healthy	Measure replanted width; estimated stem count

8.0 RESPONSIBLE PARTIES

8.1 Applicant

Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, KY 40004

8.2 Preparer of Restoration Plan

Apogee Environmental Consultants, Inc. (Joel Beverly)
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9.0 LITERATURE CITED

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Appendix A

Completed High Gradient Stream Data Sheets

High Gradient Stream Data Sheet

STREAM NAME: Bull Branch	LOCATION: HF-1
STATION #: MILE:	BASIN/WATERSHED: Cumberland River
LAT.: LONG.:	COUNTY: Bell USGS 7.5 TOPO:
DATE: 23 June 07 TIME: 12:15 ☐AM ☒PM	INVESTIGATORS: Joel Beverly

TYPE SAMPLE: θ P-CHEM θ Macroinvertebrate θ FISH θ BACT.

WEATHER: Now / Past 24 hours
- θ / θ Heavy rain
- θ / θ Steady rain
- θ / θ Intermittent showers
- X / X Clear/sunny

Has there been a heavy rain in the last 7 days? X Yes θ No
Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in.
_____ % Cloud Cover

P-Chem: Temp(°C)________ D.O. (mg/l)________ %Saturation________ pH(S.U.)________ Cond. 460 θ Grab

INSTREAM WATERSHED FEATURES:
- Stream Width ________ ft
- Range of Depth ________ ft
- Average Velocity ________ ft/s
- Discharge ________ cfs
- Est. Reach Length ________

LOCAL WATERSHED FEATUREES:
Predominant Surrounding Land Use: logging

X Surface Mining	θ Construction	X Forest
θ Deep Mining	θ Commercial	θ Pasture/Grazing
θ Oil Wells	θ Industrial	θ Silviculture
θ Land Disposal	θ Row Crops	θ Urban Runoff/Storm Sewers

Hydraulic Structures:
θ Dams θ Bridge Abutments
θ Island θ Waterfalls
θ Other ________

Stream Flow:
θ Dry θ Pooled θ Low X Normal
θ High θ Very Rapid or Torrential

Stream Type:
θ Perennial θ Intermittent
θ Ephemeral θ Seep

Riparian Vegetation: Dom. Tree/Shrub Taxa
Dominate Type:
X Trees X Shrubs
θ Grasses X Herbaceous
Number of strata ____

Canopy Cover:
θ Fully Exposed (0-25%)
θ Partially Exposed (25-50%)
θ Partially Shaded (50-75%)
X Fully Shaded (75-100%)

Channel Alterations:
θ Dredging
θ Channelization
(θFull θPartial)

Substrate θEst. θP.C.	Riffle _____ %	Run _____ %	Pool _____ %
Silt/Clay (<0.06 mm)	See Pebble Count		
Sand (0.06 – 2 mm)			
Gravel (2-64 mm)			
Cobble (64 – 256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	Condition Category			
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HF 1

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score **NOTES/COMMENTS:**

155

High Gradient Stream Data Sheet

STREAM NAME: Unnamed Trib to Campbell Br.	LOCATION: HF #2
STATION #: MILE:	BASIN/WATERSHED: Cumberland
LAT.: LONG.:	COUNTY: Bell USGS 7.5 TOPO:
DATE: 23 June 06 TIME: 11:30 ☒AM ☐PM	INVESTIGATORS: Joel Beverly

TYPE SAMPLE: θ P-CHEM θ Macroinvertebrate θ FISH θ BACT.

WEATHER: Now / Past 24 hours
- θ / θ Heavy rain
- θ / θ Steady rain
- θ / θ Intermittent showers
- X / X Clear/sunny

Has there been a heavy rain in the last 7 days? X Yes θ No
Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in.
_____ % Cloud Cover

P-Chem: Temp(°C)_________ D.O (mg/l)_________ %Saturation_________ pH(S.U.)_________ Cond. 460 θ Grab

INSTREAM WATERSHED FEATURES:
- Stream Width _______ ft
- Range of Depth _______ ft
- Average Velocity _______ ft/s
- Discharge _______ cfs
- Est. Reach Length _______

LOCAL WATERSHED FEATUREES:
Predominant Surrounding Land Use:
X Surface Mining, θ Deep Mining, θ Oil Wells, θ Land Disposal, θ Construction, θ Commercial, θ Industrial, θ Row Crops, X Forest, θ Pasture/Grazing, θ Silviculture, θ Urban Runoff/Storm Sewers

Hydraulic Structures:
θ Dams θ Bridge Abutments
θ Island θ Waterfalls
θ Other

Stream Flow:
θ Dry θ Pooled θ Low X Normal
θ High θ Very Rapid or Torrential

Stream Type:
θ Perennial θ Intermittent
θ Ephemeral θ Seep

Riparian Vegetation: Dom. Tree/Shrub Taxa
Dominate Type:
X Trees X Shrubs
θ Grasses X Herbaceous
Number of strata ____

Canopy Cover:
θ Fully Exposed (0-25%)
θ Partially Exposed (25-50%)
θ Partially Shaded (50-75%)
X Fully Shaded (75-100%)

Channel Alterations:
θ Dredging
θ Channelization
(θFull θPartial)

Substrate θEst. θP.C.	Riffle ______%	Run ______%	Pool ______%
Silt/Clay (<0.06 mm)			
Sand (0.06 – 2 mm)	See		
Gravel (2-64 mm)	Pebble		
Cobble (64 – 256 mm)			
Boulders (>256 mm)		Count	
Bedrock			

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HF2

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score **NOTES/COMMENTS:**

High Gradient Stream Data Sheet

STREAM NAME: Unnamed trib to Blacksnake	LOCATION: Mine Area #1
STATION #: MILE:	BASIN/WATERSHED: Cumberland River
LAT.: LONG.:	COUNTY: Bell USGS 7.5 TOPO:
DATE. TIME. ☐AM ☐PM	INVESTIGATORS: Joel Beverly

TYPE SAMPLE: θ P-CHEM θ Macroinvertebrate θ FISH θ BACT.

WEATHER: Now / Past 24 hours
θ θ Heavy rain
θ θ Steady rain
θ θ Intermittent showers
θ θ Clear/sunny

Has there been a heavy rain in the last 7 days?
θ Yes θ No
Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in
_____ % Cloud Cover

P-Chem: Temp(°C) 10.5 D.O. (mg/l)________ %Saturation________ pH(S.U.) 4.61 Cond. 334 θ Grab

INSTREAM WATERSHED FEATURES:
Stream Width ________ ft
Range of Depth ________ ft
Average Velocity ________ ft/s
Discharge ________ cfs
Est. Reach Length ________

LOCAL WATERSHED FEATUREES:
Predominant Surrounding Land Use:
● Surface Mining θ Construction X Forest
θ Deep Mining θ Commercial θ Pasture/Grazing
θ Oil Wells θ Industrial θ Silviculture
θ Land Disposal θ Row Crops θ Urban Runoff/Storm Sewers

Hydraulic Structures:
θ Dams θ Bridge Abutments
θ Island θ Waterfalls
θ Other

Stream Flow:
θ Dry θ Pooled θ Low ● Normal
θ High θ Very Rapid or Torrential

Stream Type:
θ Perennial ● Intermittent
θ Ephemeral θ Seep

Riparian Vegetation: Dom. Tree/Shrub Taxa
Dominate Type:
● Trees ● Shrubs
θ Grasses ● Herbaceous
Number of strata ____

Canopy Cover:
θ Fully Exposed (0-25%)
θ Partially Exposed (25-50%)
θ Partially Shaded (50-75%)
● Fully Shaded (75-100%)

Channel Alterations:
θ Dredging
θ Channelization
(θFull θPartial)

Substrate θEst. θP.C.	Riffle ______ %	Run ______ %	Pool ______ %
Silt/Clay (<0.06 mm)	See		
Sand (0.06 – 2 mm)			
Gravel (2-64 mm)	Pebble		
Cobble (64 – 256 mm)			
Boulders (>256 mm)		Count	
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Mike Area #1

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8.Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score **NOTES/COMMENTS:**

15

High Gradient Stream Data Sheet

STREAM NAME: Unnamed Trib to Blacksnake B.	LOCATION: Mine Area #2
STATION #: MILE:	BASIN/WATERSHED: Cumberland River
LAT.: LONG.:	COUNTY: Bell USGS 7.5 TOPO:
DATE: 23 June 06 TIME: 11:00 ☒AM ☐PM	INVESTIGATORS: Joel Beverly

TYPE SAMPLE: θ P-CHEM θ Macroinvertebrate θ FISH θ BACT.

WEATHER: Now / Past 24 hours
- θ / θ Heavy rain
- θ / θ Steady rain
- θ / θ Intermittent showers
- X / X Clear/sunny

Has there been a heavy rain in the last 7 days? X Yes θ No
Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in.
_____ % Cloud Cover

P-Chem: Temp(°C)________ D.O. (mg/l)________ %Saturation________ pH(S.U.)________ Cond. 550 θ Grab

INSTREAM WATERSHED FEATURES:
- Stream Width ________ ft
- Range of Depth ________ ft
- Average Velocity ________ ft/s
- Discharge ________ cfs
- Est. Reach Length ________

LOCAL WATERSHED FEATUREES:
Predominant Surrounding Land Use:
- X Surface Mining
- θ Deep Mining
- θ Oil Wells gas wells
- θ Land Disposal
- θ Construction
- θ Commercial
- θ Industrial
- θ Row Crops
- X Forest logging
- θ Pasture/Grazing
- θ Silviculture
- θ Urban Runoff/Storm Sewers

Hydraulic Structures:
θ Dams θ Bridge Abutments
θ Island θ Waterfalls
θ Other

Stream Flow:
θ Dry θ Pooled θ Low X Normal
θ High θ Very Rapid or Torrential

Stream Type:
θ Perennial θ Intermittent
θ Ephemeral θ Seep

Riparian Vegetation: Dominate Type: Dom. Tree/Shrub Taxa
X Trees X Shrubs
θ Grasses X Herbaceous
Number of strata ____

Canopy Cover:
θ Fully Exposed (0-25%)
θ Partially Exposed (25-50%)
θ Partially Shaded (50-75%)
X Fully Shaded (75-100%)

Channel Alterations:
θ Dredging
θ Channelization
(θFull θPartial)

Substrate θEst. θP.C.	Riffle ____ %	Run ____ %	Pool ____ %
Silt/Clay (<0.06 mm)			
Sand (0.06 – 2 mm)	See		
Gravel (2-64 mm)			
Cobble (64 – 256 mm)	Pebble		
Boulders (>256 mm)			
Bedrock		Count	

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
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3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Sow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Mine Area #2

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
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SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8.Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 158

NOTES/COMMENTS:

Appendix B

Stratum Rank Key

Stratum Rank Key

Class	Description
SR-9	A sole dominant species; no other species exceed SR-2.
SR-8	A species so outstanding as to be called the sole dominant; no other species exceeds SR-6. (Given to only one species)
SR-7	A species sharing dominance. Given to one, but rarely two species (for example, oak – hickory).
SR-6	A species sharing dominance with another, but markedly less important than the main dominant, or a species sharing dominance more or less equally with a number of species.
SR-5	Given to the third or forth subdominant where there are two clear dominants, usually given only if all remaining species have low SRs.
SR-4	A subordinate species, not a dominant or subdominant, but contributing significantly to both numbers and cover.
SR-3	A species with three to several individuals furnishing substantial cover.
SR-2	A species with two to several individuals, but infrequent in number and inconsequential in cover.
SR-1	A species for which only a single individual is observed.

Appendix C

Completed Longitudinal Profile, Cross Section, and Pebble Count Data Sheets

Stream Channel Classification (Level II)

Stream NAME: BULL BRANCH
Basin NAME: POND 1 Drainage AREA: 356.8 acre ______ mi^2
Location: BELL CO
Twp: ______ Rge: ______ Sec: ______ Qtr: ______ Lat: ______ Long: ______
Observers: ______ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) 10.0 Feet
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.

Mean DEPTH (d_{bkf}) 0.85 Feet
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)

Bankfull Cross Section Area (A_{bkf}) 8.33 $Feet^2$
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) 11.76 Ft/Ft
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) 1.2 Feet
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.

WIDTH of Flood-Prone Area (W_{fpa}) 12.6 Feet
Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.

Entrenchment Ratio (ER) 1.26 Ft/Ft
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH (W_{fpa}/W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 ______ mm
The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) 1.88 Ft/Ft
Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) 1.12
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type ______

For Reference, see page 5-5, 6-6: Rosgen, 1996. Applied River Morphology.

Stream Channel Classification (Level II) ...

Stream NAME: BULL BRANCH

Basin NAME: HOLLOW FILL 1 Drainage AREA: 34.4 / acre ____ mi^2

Location: BELL CO.

Twp: ____ Rge: ____ Sec: ____ Qtr: ____ Lat: ____ Long: ____

Observers: ____ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.	6.56	Feet
Mean DEPTH (d_{bkf}) Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)	0.19	Feet
Bankfull Cross Section Area (A_{bkf}) AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	1.24	Feet^2
WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.	35.11	Ft/Ft
Maximum DEPTH (d_{mbkf}) Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.	~~0.008~~ 0.34	Feet
WIDTH of Flood-Prone Area (W_{fpa}) Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.	55.9	Feet
Entrenchment Ratio (ER) The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa}/W_{bkf}) (riffle section)	8.6	Ft/Ft
Channel Materials (Particle Size Index) D50 The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.		mm
Water Surface SLOPE (S) Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.	5.9	~~Ft/Ft~~ %
Channel SINUOSITY (K) Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/ S).	1.07	

Stream Type ____

For Reference, see page 5-5, 5-6: Rosgen, 1996. Applied River Morphology.

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Stream Channel Classification (Level II) –

Stream NAME: UNNAMED TRIB CAMPBELL BRANCH

Basin NAME: POND 2 Drainage AREA: 173.8 acre ______ mi^2

Location: BELL CO.

Twp: ______ Rge: ______ Sec: ______ Qtr: ______ Lat: ______ Long: ______

Observers: ______ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) 7.34 Feet
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.

Mean DEPTH (d_{bkf}) 0.87 Feet
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)

Bankfull Cross Section Area (A_{bkf}) 5.52 $Feet^2$
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) 8.43 Ft/Ft
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) 1.1 Feet
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.

WIDTH of Flood-Prone Area (W_{fpa}) 10.2 Feet
Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.

Entrenchment Ratio (ER) 1.39 Ft/Ft
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa}/W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 ______ mm
The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) 7.72 Ft/Ft
Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) 1.10
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type ______ *For Reference, see page 5-5, 5-6: Rosgen, 1996. Applied River Morphology.*

Stream Channel Classification (Level II)

Stream NAME: UNNAMED TRIB CAMPBELL BRANCH
Basin NAME: HOLLOW FILL 2 Drainage AREA: 168.8 acre ______ mi^2
Location: BELL CR
Twp: ______ Rge: ______ Sec: ______ Qtr: ______ Lat: ______ Long: ______
Observers: ______ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) 10.8 Feet
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.

Mean DEPTH (d_{bkf}) 0.38 Feet
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)

Bankfull Cross Section Area (A_{bkf}) 4.33 $Feet^2$
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) 28.4 Ft/Ft
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) 0.62 Feet
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.

WIDTH of Flood-Prone Area (W_{fpa}) 13.3 Feet
Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.

Entrenchment Ratio (ER) 1.23 Ft/Ft
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa}/W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 ______ mm
The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) 12.9 Ft/Ft
Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) 1.06
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/ S).

Stream Type ______ *For Reference, see page 5-5, 5-6: Rosgen, 1996. Applied River Morphology.*

Stream Channel Classification (Level II)

Stream NAME: ~~[illegible]~~ ~~[illegible]~~ Unnamed trip to BlackKnokle

Basin NAME: MINE AREA 2 Drainage AREA: 1922 acre ______ mi²

Location: [illegible] Co

Twp: ______ Rge: ______ Sec: ______ Qtr: ______ Lat: ______ Long: ______

Observers: ______ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) 10.8 Feet
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.

Mean DEPTH (d_{bkf}) 0.96 Feet
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)

Bankfull Cross Section Area (A_{bkf}) 9.85 Feet²
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) 11.25 Ft/Ft
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) 1.1 Feet
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.

WIDTH of Flood-Prone Area (W_{fpa}) 24.3 Feet
Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.

Entrenchment Ratio (ER) 2.25 Ft/Ft
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa}/W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 ______ mm
The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) 13.5 Ft/Ft
Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) 1.12
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).

Stream Type ______ *For Reference, see page 5-5, 6-6: Rosgen, 1996. Applied River Morphology.*

Stream Channel Classification (Level II)

Stream NAME: LEFT FORK BLACK SNAKE BRANCH

Basin NAME: MINE AREA 2 Drainage AREA: 726.2 acre _______ mi^2

Location: Bell C.

Twp: _______ Rge: _______ Sec: _______ Qtr: _______ Lat: _______ Long: _______

Observers: _______ Date: 2-13-06

Bankfull WIDTH (W_{bkf}) WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.	12.42 Feet
Mean DEPTH (d_{bkf}) Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf}=A_{bkf}/W_{bkf}$)	0.54 Feet
Bankfull Cross Section Area (A_{bkf}) AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	3.22 $Feet^2$
WIDTH / DEPTH RATIO (W_{bkf}/d_{bkf}) Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.	23.0 Ft/Ft
Maximum DEPTH (d_{mbkf}) Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.	0.87 Feet
WIDTH of Flood-Prone Area (W_{fpa}) Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.	26.2 Feet
Entrenchment Ratio (ER) The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa}/W_{bkf}) (riffle section)	2.11 Ft/Ft
Channel Materials (Particle Size Index) D50 The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.	_______ mm
Water Surface SLOPE (S) Channel slope = "rise over run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.	10.6 Ft/Ft %
Channel SINUOSITY (K) Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/VL); or estimated from a ratio of valley slope divided by channel slope (VS/S).	1.07

Stream Type _______

For Reference, see page 5-5, 6-4: Rosgen, 1996. Applied River Morphology.

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Pebble Count Data Sheet

Project # ____________ Project Name LOWER BLACK SNAKE

Stream/Drainage BULL BRANCH Date 2-13-06

GPS: N 36° 46' 29.4" W 83° 31' 11.94

County BELL State KY Quad BALKAN

Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)
0	69	26	SILT	52		78	
1	546	27	SILT	53		79	
2	1024	28	35	54		80	
3	894	29	48	55		81	
4	52	30	110	56		82	
5	755	31	220	57		83	
6	120	32	54	58		84	
7	1756	33	302	59		85	
8	905	34	750	60		86	
9	10	35	5	61		87	
10	197	36	3	62		88	
11	48	37	15	63		89	
12	206	38	32	64		90	
13	1152	39	25	65		91	
14	1571	40	19	66		92	
15	226	41	53	67		93	
16	31	42	2	68		94	
17	98	43	SILT	69		95	
18	425	44	45	70		96	
19	1926	45	20	71		97	
20	1010	46	66	72		98	
21	80	47	8	73		99	
22	93	48	12	74		100	
23	225	49	69	75			
24	1005	50	112	76			
25	SILT	51	83	77			

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Longitudinal Profile Data Sheet -POND 1

Project # ____________ Project Name LOWER BLACK SNAKE

Stream/Drainage BULL BRANCH Date 2-13-06

GPS: N 36°46'31.7" W 83°31'09.47

County BELL State KY Quad BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	67.6	RIFFLE	3	
2	1.5	68.9	RIFFLE	4	
3	21.6	68.6	POOL	16	
4	28.1	71.6	RIFFLE	2	
5	45.3	73.2	RIFFLE	4	
6	64.9	74.7	POOL	8	
7	72.7	75.1	POOL	12	
8	80.9	77.9	RIFFLE	4	
9	99.2	86.7	RIFFLE	3	
10	117.0	87.7	RIFFLE	5	
11	122.4	87.1	POOL	13	
12	131.3	90.6	RIFFLE	3	
13	138.2	90.1	POOL	11	
14	146.5	92.3	RIFFLE	4	
15	154.4	92.4	RIFFLE	2	
16	173.0	93.7	RIFFLE	2	
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Longitudinal Profile Data Sheet – HOLLOW FILL I

Project # ______ Project Name LOWER BLACK SNAKE

Stream/Drainage BULL BRANCH Date 2-13-06

GPS: N 36°46' 29.4" W 83°37' 11.9"

County BELL State KY Quad BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	93.7	RUN	5	
2	10.8	93.4	RUN	2	
3	39.0	94.0	RUN	2	
4	65.1	94.2	POOL	18	
5	84.2	93.1	RUN	3	
6	98.6	94.3	POOL	14	
7	109.1	93.7	RUN	5	
8	111.4	95.1	RIFFLE	4	
9	124.2	95.6	RIFFLE	2	
10	145.9	96.5	POOL	12	
11	150.6	95.5	RIFFLE	2	
12	155.5	96.7	POOL	15	
13	198.4	96.1	RIFFLE	3	
14	209.4	97.6	RIFFLE	2	
15	220.2	97.9	RIFFLE	2	
16	237.6	98.0	RIFFLE	2	
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Cross Section Data Sheet -Pond 7

Project # ________ Project Name LOWER BLACK SNAKE

Stream/Drainage BULL BRANCH Date 2-13-06

GPS: N 36° 46' 31.7" W 83° 31' 09.4"

County BELL State KY Quad BALKAN

Feature Surveyed [X] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	79.0	HILL
2	5.6	75.4	CHANNEL
3	9.0	75.0	WATER
4	11.7	74.5	THALWEG
5	14.5	74.6	CHANNEL
6	15.1	75.7	BANKFUL
7	15.7	76.9	TOP OF BANK
8	23.4	80.9	HILL
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Cross Section Data Sheet - HOLLOW FILL 1

Project # ____________ Project Name LOWER BLACK SNAKE

Stream/Drainage BULL BRANCH Date 2-13-06

GPS: N 36° 46' 22.4" W 83° 3' 11.9"

County BELL State KY Quad BALKAN

Feature Surveyed [x] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	97.9	HILL
2	5.6	96.6	CHANNEL
3	8.3	96.4	THALWEG
4	11.5	96.7	CHANNEL
5	56.7	96.3	BOTTOM OF BANK
6	75.6	101.7	HILL
7			
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Pebble Count Data Sheet

Project # ____________ Project Name LOWER BLACK SNAKE

Stream/Drainage UNNAMED TRIB CAMPBELL BR, Date 2-13-06

GPS: N 36°46' 04.7' W 83°36' 37.3"

County BELL State KY Quad BALKAN

Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)
0	201	26	76	52		78	
1	210	27	SILT	53		79	
2	12	28	783	54		80	
3	250	29	590	55		81	
4	56	30	95	56		82	
5	83	31	238	57		83	
6	175	32	631	58		84	
7	189	33	184	59		85	
8	76	34	SILT	60		86	
9	137	35	192	61		87	
10	311	36	189	62		88	
11	520	37	45	63		89	
12	10	38	1150	64		90	
13	345	39	882	65		91	
14	23	40	37	66		92	
15	1024	41	5	67		93	
16	235	42	200	68		94	
17	58	43	423	69		95	
18	326	44	85	70		96	
19	18	45	3	71		97	
20	93	46	165	72		98	
21	5	47	459	73		99	
22	391	48	135	74		100	
23	157	49	245	75			
24	84	50	93	76			
25	67	51	1195	77			

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Longitudinal Profile Data Sheet -POND2

Project # ____________ **Project Name** LOWER BLACK SNAKE

Stream/Drainage UNNAMED TRIB. CAMPBELL BR **Date** 2-13-06

GPS: N 36° 46' 6.7" **W** [illegible]

County BELL **State** KY **Quad** BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	87.4	RIFFLE	3	
2	4.5	87.0	POOL	5	
3	17.2	88.1	RIFFLE	3	
4	32.0	88.6	POOL	8	
5	35.6	89.3	RIFFLE	4	
6	50.1	90.3	RIFFLE	4	
7	56.1	89.8	POOL	10	
8	62.3	90.7	RIFFLE	3	
9	80.3	92.2	RIFFLE	2	
10	98.6	92.2	POOL	8	
11	103.1	93.9	RIFFLE	4	
12	127.8	94.7	POOL	5	
13	131.1	95.6	RIFFLE	3	
14	140.0	97.2	RIFFLE	3	
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Longitudinal Profile Data Sheet - Hollow Fill 2

Project # ______ **Project Name** LOWER BLACKSNAKE

Stream/Drainage UNNAMED TRIB CAMPBELL BR **Date** 2-13-06

GPS: N 36°46'03.4" **W** 83°[illegible]'39.5"

County BELL **State** KY **Quad** BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	97.2	RIFFLE	3	
2	41.8	98.8	RIFFLE	4	
3	53.8	100.7	RIFFLE	3	
4	60.6	100.0	POOL	14	
5	70.6	101.1	RIFFLE	3	
6	75.4	102.8	RIFFLE	1	
7	93.2	102.8	POOL	12	
8	99.1	104.3	RIFFLE	2	
9	110.4	104.6	POOL	5	
10	115.0	105.9	RIFFLE	2	
11	133.5	105.7	POOL	5	
12	137.0	106.6	RIFFLE	4	
13	146.0	107.6	RIFFLE	4	
14	171.0	109.2	RIFFLE	3	
15	191.8	110.5	RIFFLE	3	
16	215.1	112.5	RIFFLE	3	
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Cross Section Data Sheet - POND 2

Project # ______ **Project Name** LOWER BLACK SNAKE

Stream/Drainage UNNAMED TRIB LANDBELLAR **Date** 2-13-06

GPS: N [illegible] **W** [illegible]

County BELL **State** KY **Quad** [illegible]

Feature Surveyed [x] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	101.9	HILL
2	7.5	98.2	TOP OF BANK
3	9.4	97.1	BANKFULL
4	10.2	96.8	CHANNEL
5	14.7	96.5	THALWEG
6	19.8	96.8	CHANNEL
7	21.1	97.5	TOP OF BANK
8	28.0	101.2	HILL
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Cross Section Data Sheet - HOLLOW FILL 2

Project # ______ **Project Name** LOWER BLACKSNAKE

Stream/Drainage UNNAMED TRIB CAMPBELL BR **Date** 2-13-06

GPS: N ______ **W** [illegible]

County BELL **State** KY **Quad** BALKAN

Feature Surveyed [X] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	107.7	HILL
2	5.6	107.2	TOP OF BANK
3	8.1	105.7	BANKFULL
4	9.7	105.0	CHANNEL
5	12.2	104.6	THALWEG
6	14.7	104.8	CHANNEL
7	16.6	106.9	TOP OF BANK
8	27.7	110.0	HILL
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Pebble Count Data Sheet

Project # ______ **Project Name** LOWER BLACK SNAKE

Stream/Drainage Blacksnake BRANCH **Date** 2-13-06

GPS: N 36°45'46.1" **W** [illegible]

County BELL **State** KY **Quad** BALKAN

Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)
0	610	26	127	52		78	
1	23	27	22	53		79	
2	54	28	40	54		80	
3	5	29	93	55		81	
4	83	30	3	56		82	
5	26	31	85	57		83	
6	35	32	SILT	58		84	
7	8	33	3	59		85	
8	482	34	19	60		86	
9	15	35	55	61		87	
10	96	36	186	62		88	
11	123	37	42	63		89	
12	5	38	16	64		90	
13	315	39	29	65		91	
14	45	40	28	66		92	
15	63	41	230	67		93	
16	8	42	29	68		94	
17	SILT	43	170	69		95	
18	15	44	120	70		96	
19	12	45	15	71		97	
20	24	46	3	72		98	
21	3	47	62	73		99	
22	86	48	85	74		100	
23	49	49	47	75			
24	23	50	57	76			
25	18	51	5	77			

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Longitudinal Profile Data Sheet - MINE AREA 1

Project # ____________ Project Name LOWER BLACK SNAKE

Stream/Drainage ~~[illegible]~~ Blacksnake BRANCH Date 2-13-06

GPS: N 36° 45' 46.1" W 83° 50' 37.9"

County BELL State KY Quad BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	90.1	RUN	4	
2	9.2	90.5	RUN	3	
3	24.4	91.5	R	2	
4	37.9	92.0	POOL	4	
5	48.3	92.1	POOL	6	
6	55.3	93.2	R	3	
7	69.3	93.7	POOL	5	
8	73.8	94.0	POOL	5	
9	81.9	95.2	R	2	
10	84.9	94.8	POOL	8	
11	94.8	96.1	R	2	
12	114.0	97.3	R	3	
13	124.1	96.9	POOL	6	
14	128.2	98.3	R	2	
15	138.9	99.3	R	2	
16	152.4	99.9	R	3	
17	157.3	99.5	POOL	6	
18	162.4	101.0	R	1	
19	186.9	102.3	R	1	
20	191.8	102.0	POOL	6	
21	198.3	103.1	R	3	
22	204.7	102.5	POOL	10	
23	211.8	104.3	R	1	
24	214.9	105.2	R	0.5	
25	218.2	104.6	POOL	6	
26	249.2	106.7	R	3	
27					
28					
29					
30					

APOGEE ENVIRONMENTAL CONSULTANTS, LLC

Cross Section Data Sheet - MINE AREA I

Project # ______ **Project Name** LOWER BLACK SNAKE

Stream/Drainage ~~[illegible]~~ Blacksnake BRANCH **Date** 2-13-06

GPS: N 36°45'46.1" **W** 83°30'37.9"

County BELL **State** KY **Quad** BALKAN

Feature Surveyed [X] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	99.3	HILL
2	15.2	97.7	BANKFULL/TOP OF BANK
3	16.6	96.7	CHANNEL
4	17.6	96.6	THALWEG
5	19.0	96.7	CHANNEL
6	20.5	97.6	TOP OF BANK
7	38.8	99.2	HILL
8			
9			
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11			
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25			

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Pebble Count Data Sheet

Project # ____________ **Project Name** LOWER BLACK SNAKE

Stream/Drainage LEFT FORK BLACK SNAKE **Date** 2-13-06

GPS: N 36° 45' 26.6" **W** 83° 3' 39.5'

County BELL **State** KY **Quad** BALKAN

Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)	Point (m)	Pebble size (mm)
0	56	26	66	52		78	
1	22	27	125	53		79	
2	14	28	320	54		80	
3	175	29	545	55		81	
4	12	30	625	56		82	
5	326	31	35	57		83	
6	42	32	112	58		84	
7	360	33	375	59		85	
8	498	34	420	60		86	
9	75	35	596	61		87	
10	166	36	SILT	62		88	
11	112	37	240	63		89	
12	132	38	195	64		90	
13	320	39	85	65		91	
14	5	40	SILT	66		92	
15	225	41	5	67		93	
16	352	42	SILT	68		94	
17	560	43	3	69		95	
18	85	44	27	70		96	
19	227	45	157	71		97	
20	SILT	46	45	72		98	
21	423	47	39	73		99	
22	120	48	87	74		100	
23	173	49	23	75			
24	89	50	63	76			
25	250	51	277	77			

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Longitudinal Profile Data Sheet - MINE AREA 2

Project # ______ **Project Name** LOWER BLACK SNAKE

Stream/Drainage LEFT FORK BLACKSNAKE **Date** 2-13-06

GPS: N 36°45'28.6" **W** 83°30' 34.5"

County BELL **State** KY **Quad** BALKAN

Point	Distance from Beg(ft)	Elevation (ft)	Stream Characteristic	Water depth (Tenths)	Bankfull (Tenths)
1	0.0	83.4	RIFFLE	6	
2	16.6	84.3	RIFFLE	3	
3	24.8	84.2	RIFFLE	4	
4	27.0	83.9	POOL	12	
5	42.7	88.1	RIFFLE	4	
6	48.5	87.6	POOL	14	
7	53.9	88.4	RIFFLE	2	
8	72.7	90.5	RIFFLE	4	
9	83.9	91.9	RIFFLE	2	
10	90.9	92.5	RIFFLE	4	
11	94.5	94.4	RIFFLE	2	
12	102.4	94.3	POOL	8	
13	113.3	95.9	RIFFLE	2	
14	116.2	95.1	POOL	11	
15	120.9	96.1	RIFFLE	5	
16	129.9	97.0	RIFFLE	5	
17	152.1	100.0	RIFFLE	1	
18	157.3	99.5	POOL	10	
19	169.9	100.9	RIFFLE	4	
20	183.4	102.2	RIFFLE	4	
21	190.9	102.0	POOL	10	
22	202.8	102.9	RIFFLE	3	
23	215.5	103.2	POOL	10	
24	219.6	104.1	RIFFLE	5	
25	228.0	105.3	RIFFLE	3	
26	233.8	106.5	RIFFLE	4	
27					
28					
29					
30					

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Cross Section Data Sheet - MINE AREA 2

Project # ____________ **Project Name** LOWER BLACKSNAKE

Stream/Drainage LEFT FORK BLACKSNAKE BR **Date** 2-13-06

GPS: N 36° 45' 26.6 **W** 83° 40' 37.5"

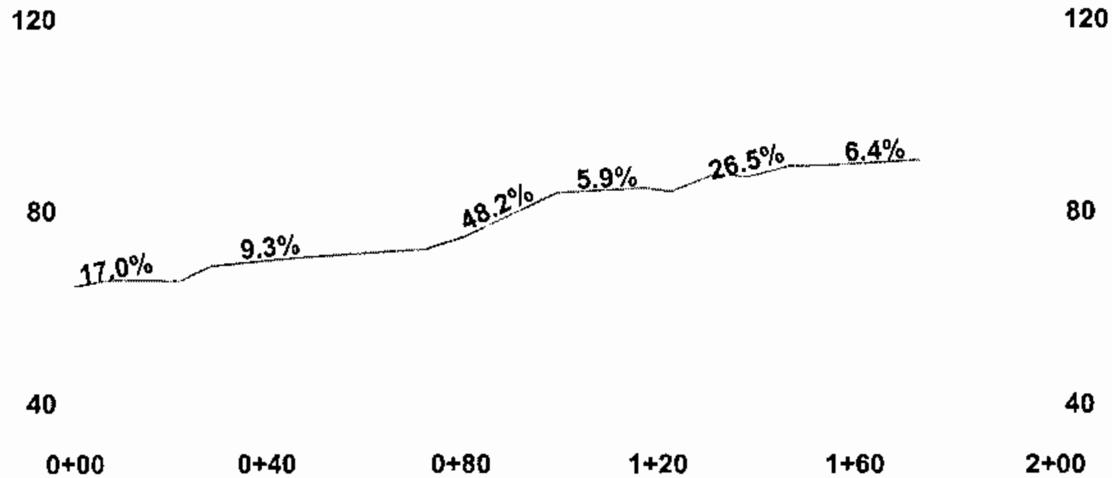
County BELL **State** KY **Quad** BALKAN

Feature Surveyed [x] riffle [ ] pool

Point	Distance from LB (ft)	Elevation (ft)	Description
1	0.0	94.2	HILL
2	8.5	89.0	BOTTOM OF BANK
3	32.5	90.2	TOP OF BANK
4	34.5	89.4	BANKFULL
5	36.1	88.9	CHANNEL
6	38.2	88.5	THALWEG
7	41.1	89.0	CHANNEL
8	46.4	90.2	TOPO
9	53.2	89.4	TOP OF BANK
10	53.5	87.8	CHANNEL
11	57.3	88.0	CHANNEL
12	59.2	90.8	TOP OF BANK
13	68.7	93.1	HILL
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

Appendix D

Longitudinal Profile and Cross Section Diagrams



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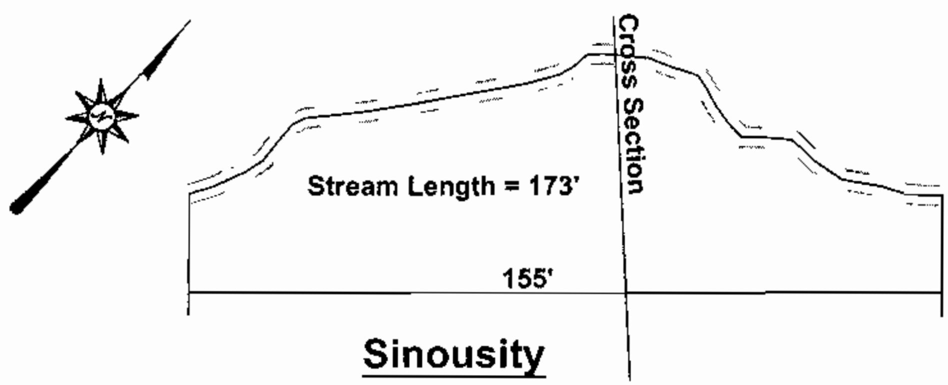

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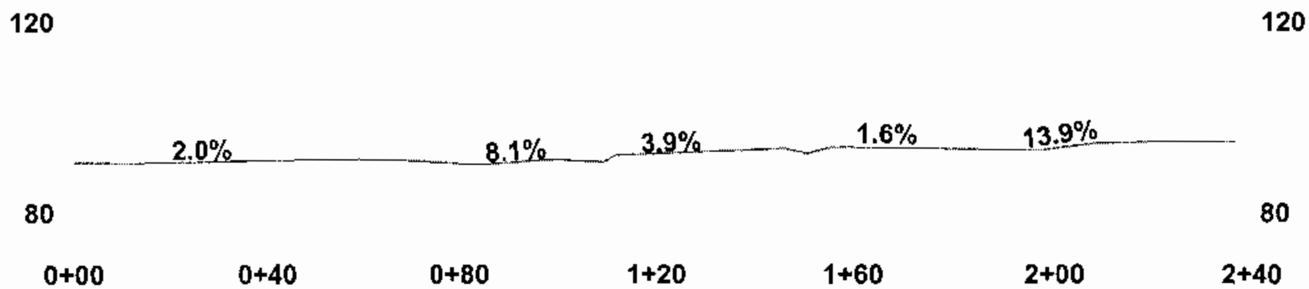
Appendix D. Longitudinal Profile of Sediment Structure 1, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



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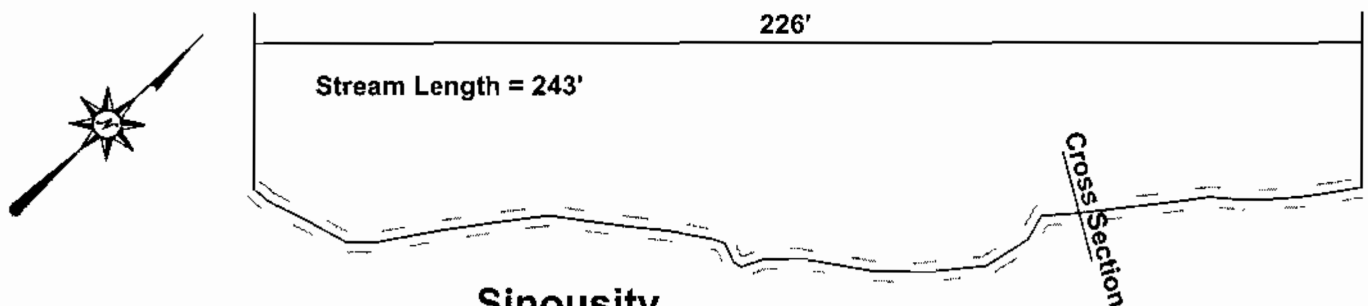

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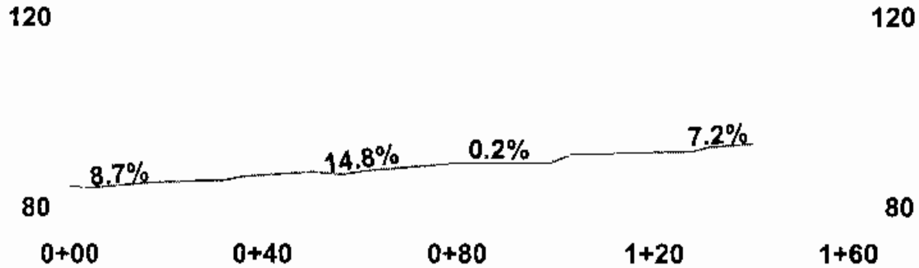
Appendix D. Longitudinal Profile of Hollowfill 1, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



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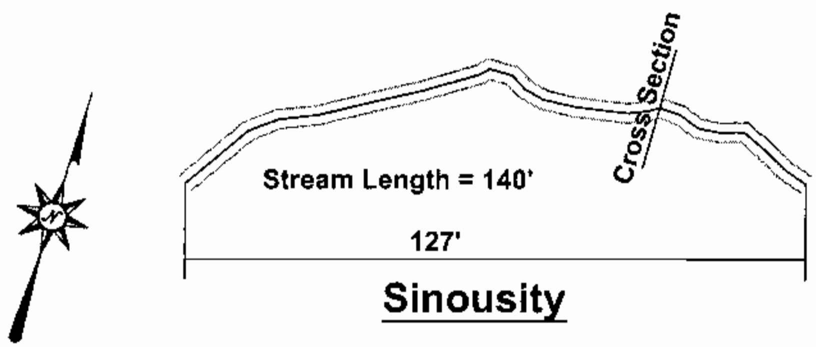

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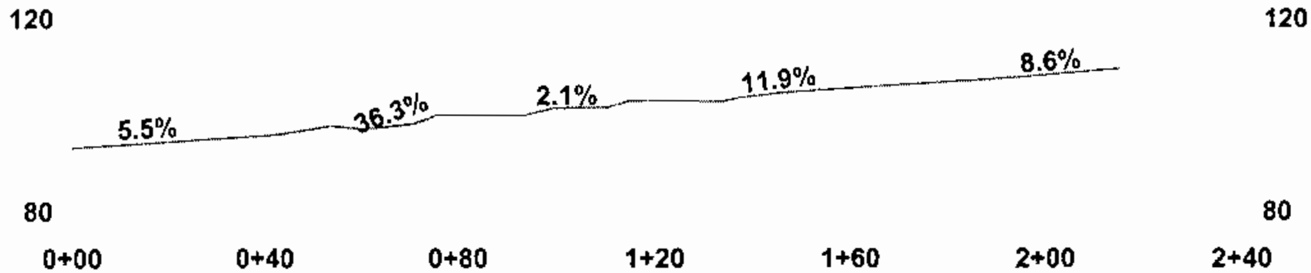
Appendix D. Longitudinal Profile of Sediment Structure 2, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



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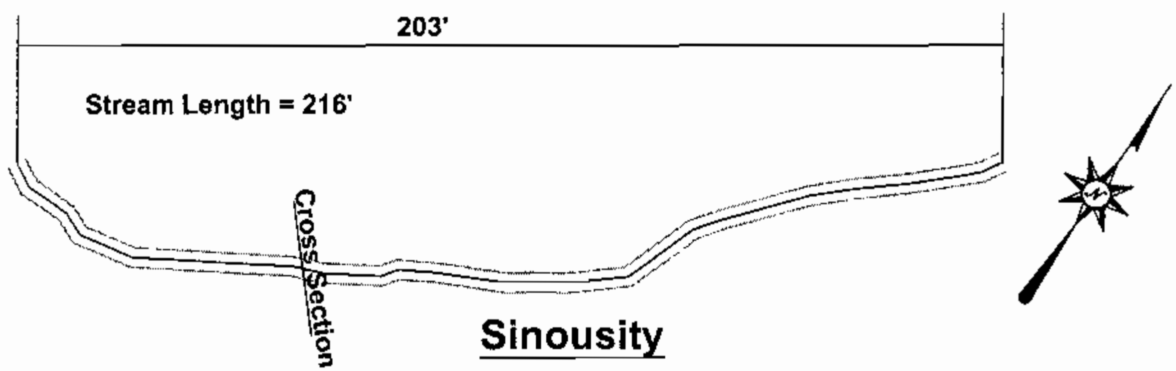

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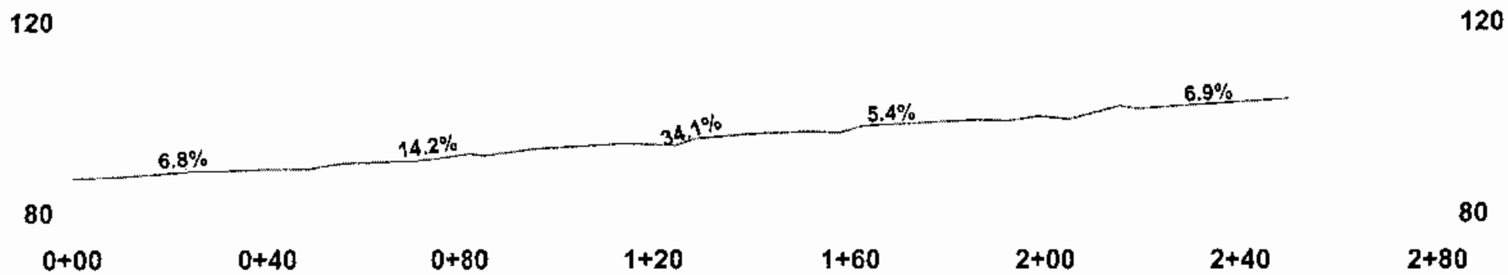
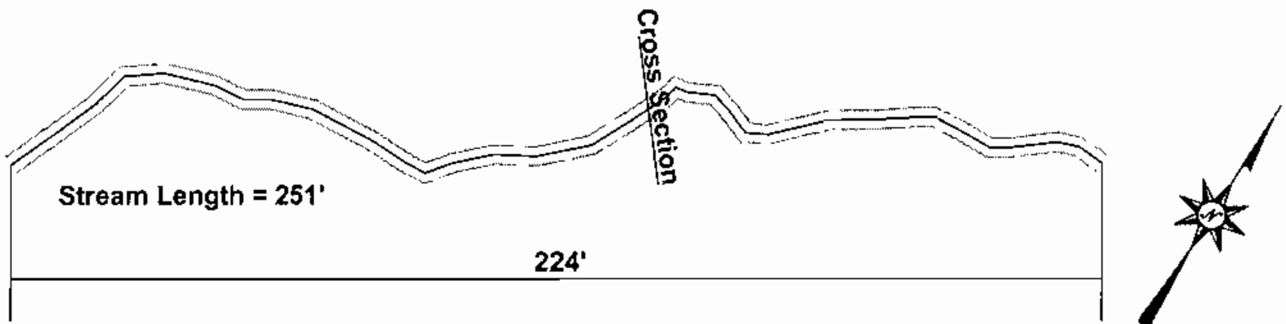
Appendix D. Longitudinal Profile of Hollowfill 2, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



Profile



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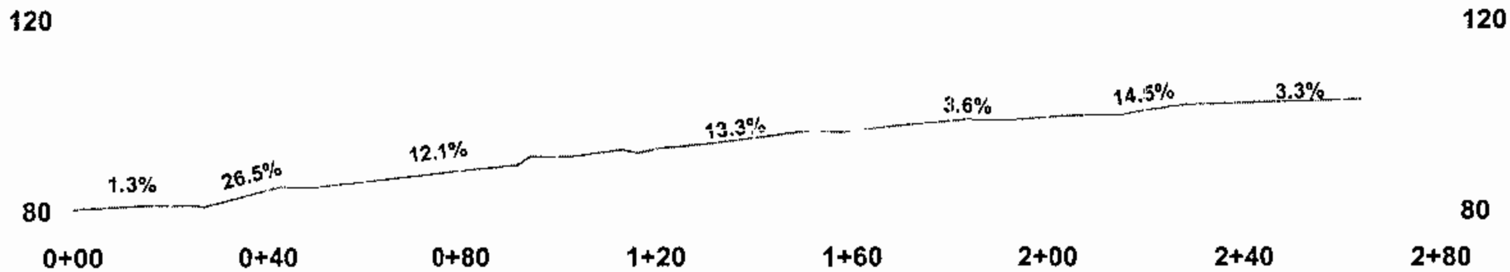
Appendix D. Longitudinal Profile of Mine Area 1, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



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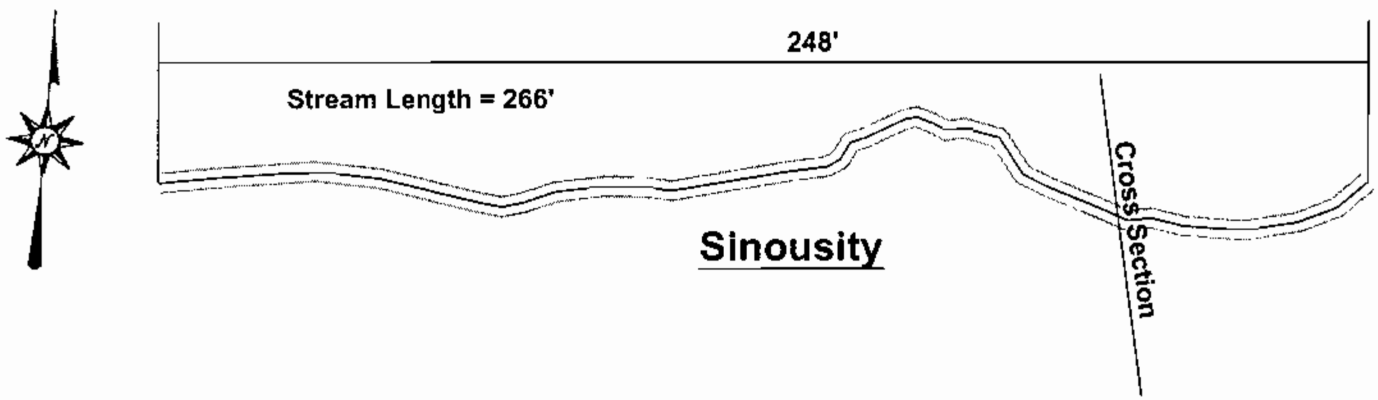

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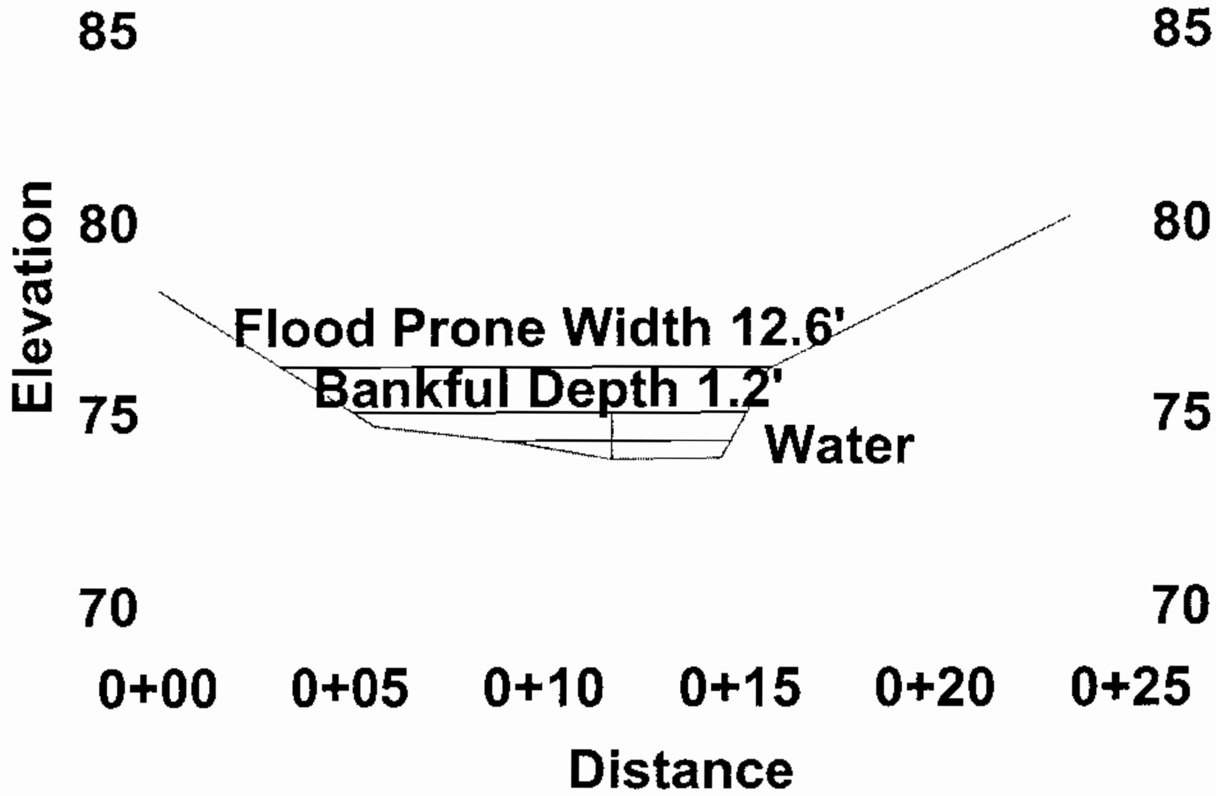
Appendix D. Longitudinal Profile of Mine Area 2, Bell County, Kentucky.

SCALE:	1"=40'	2/13/06



Typical Riffle Section

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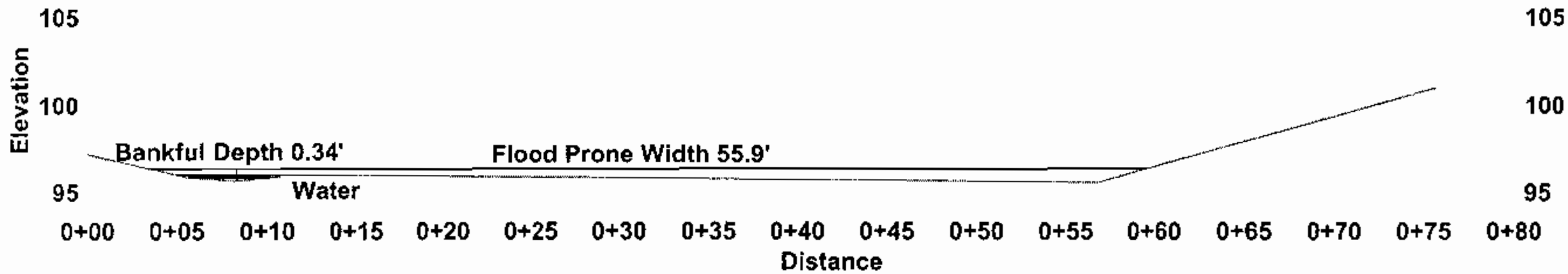
Cross Section

Appendix D.

SCALE:	1"=5'	2/13/06



Typical Riffle Section

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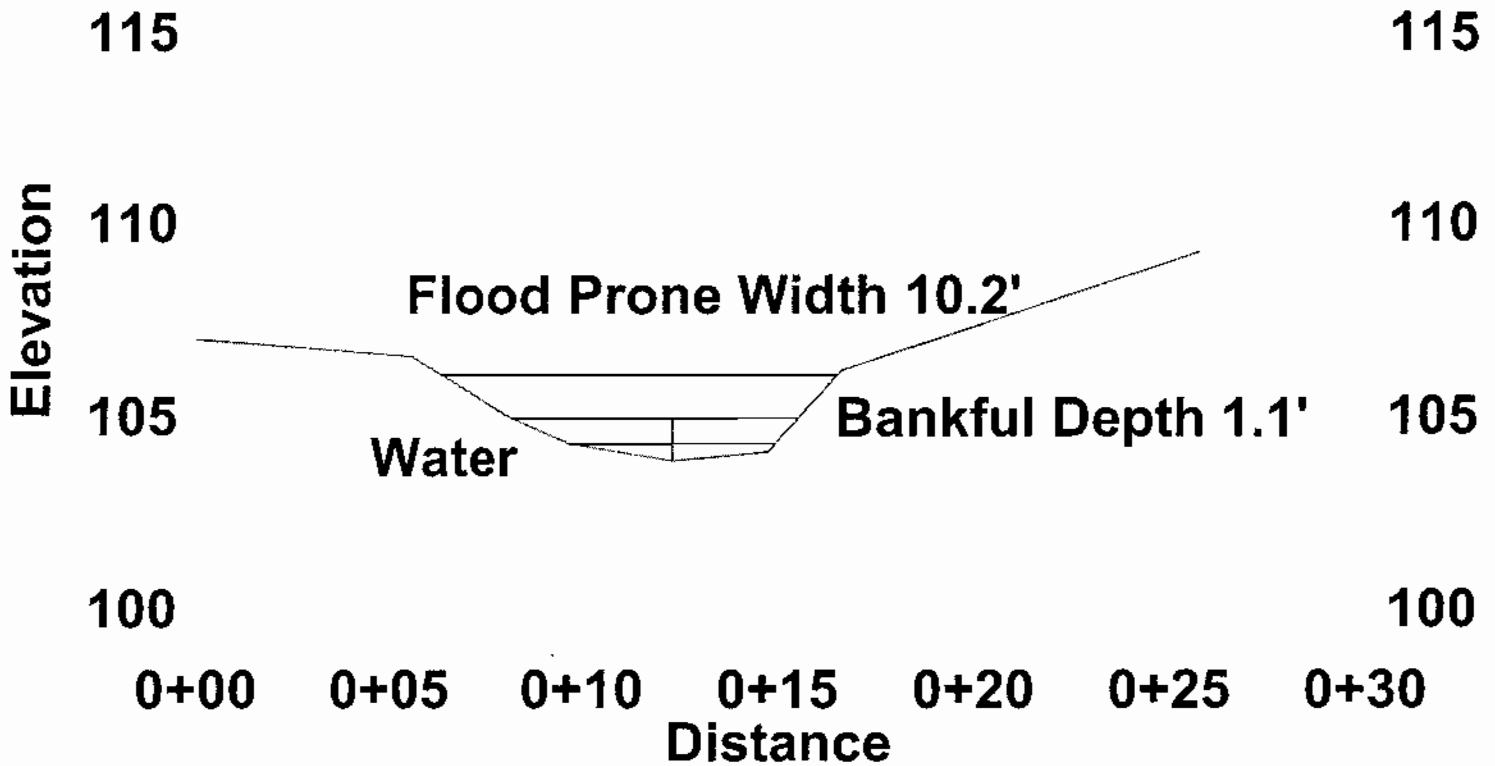
Cross Section

Appendix D.

SCALE:	1"=10'	2/13/06



Typical Riffle Section

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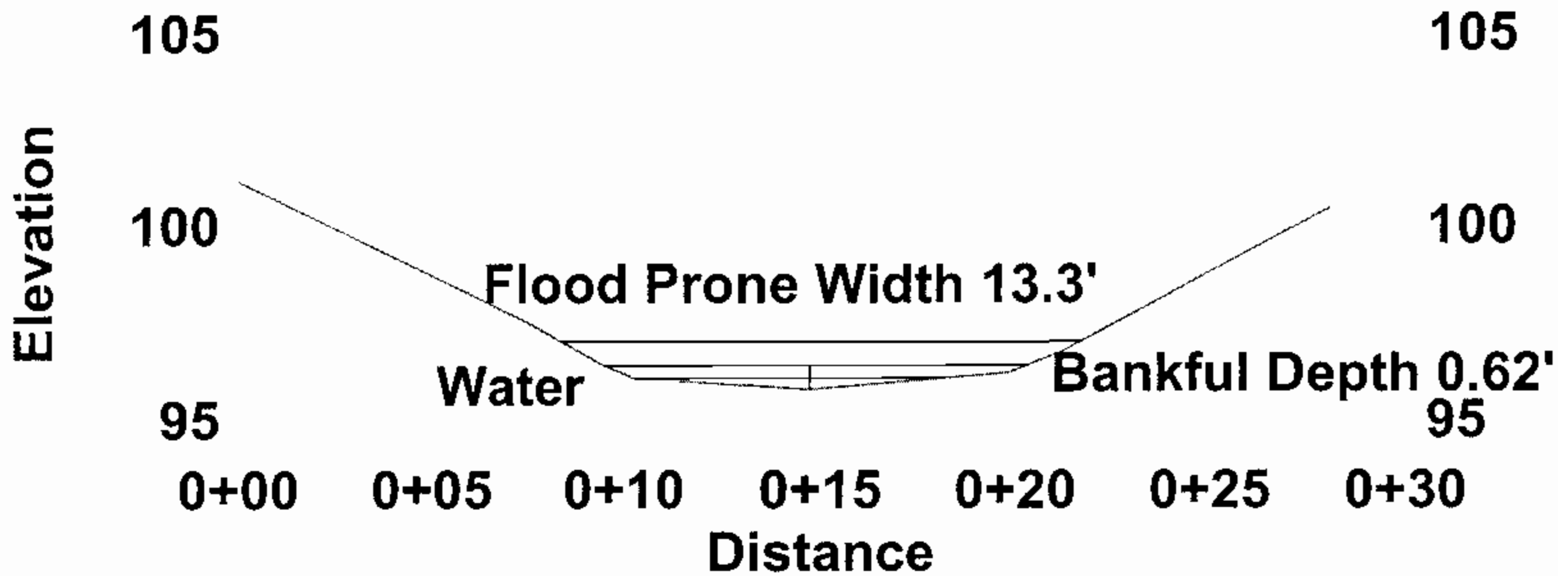
Cross Section

Appendix D.

SCALE:	1"=5'	2/13/06



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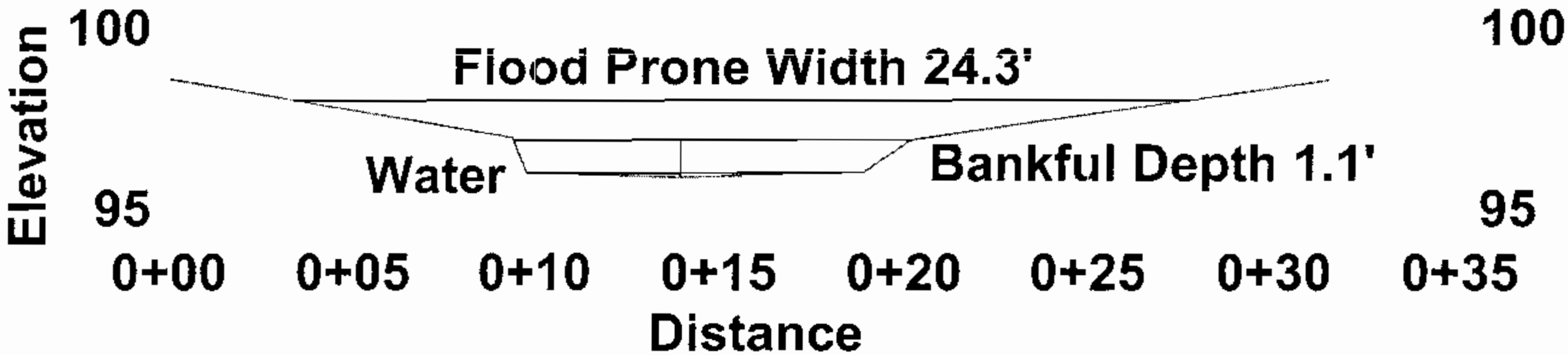
Cross Section

Appendix D.

SCALE:	1"=5'	2/13/06



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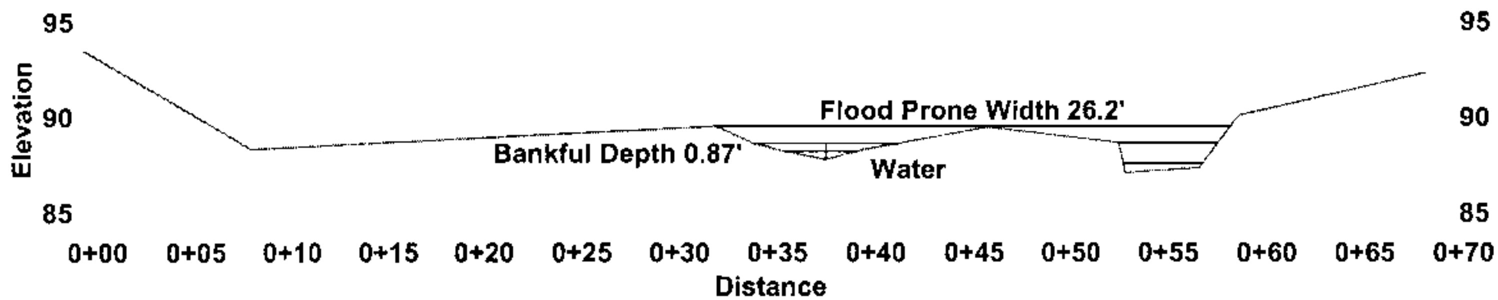
Cross Section

Appendix D.

SCALE:	1"=5'	2/13/06



Typical Riffle Section

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NALLY & HAMILTON ENTERPRISES, INC.

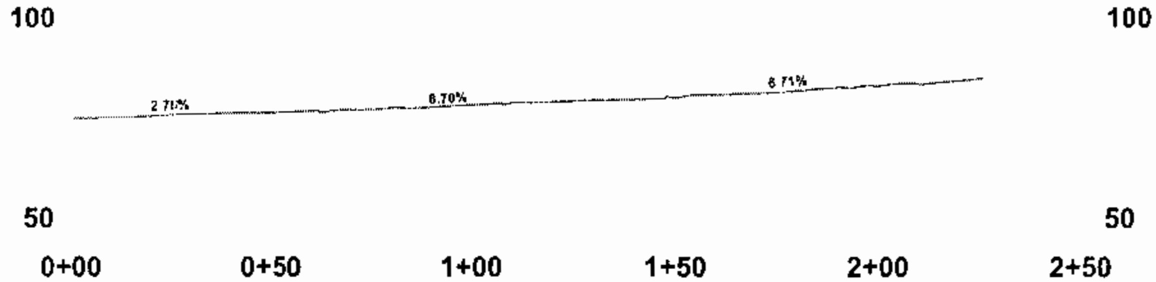
Cross Section

Appendix D.

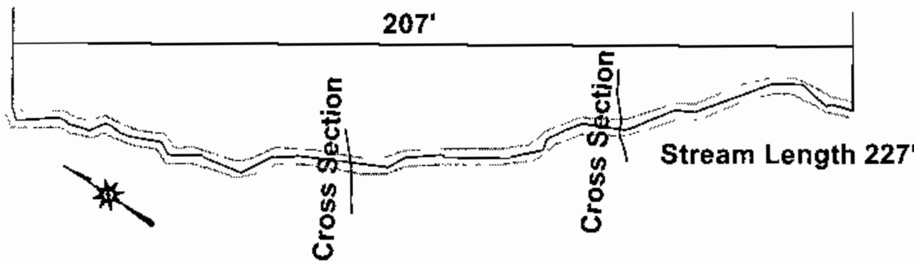
SCALE:	1"=10'	2/13/06

Appendix E

Longitudinal Profile, Cross Sections, and Pebble Counts for Five to Seven Percent Grade Stream



Profile



Sinuosity

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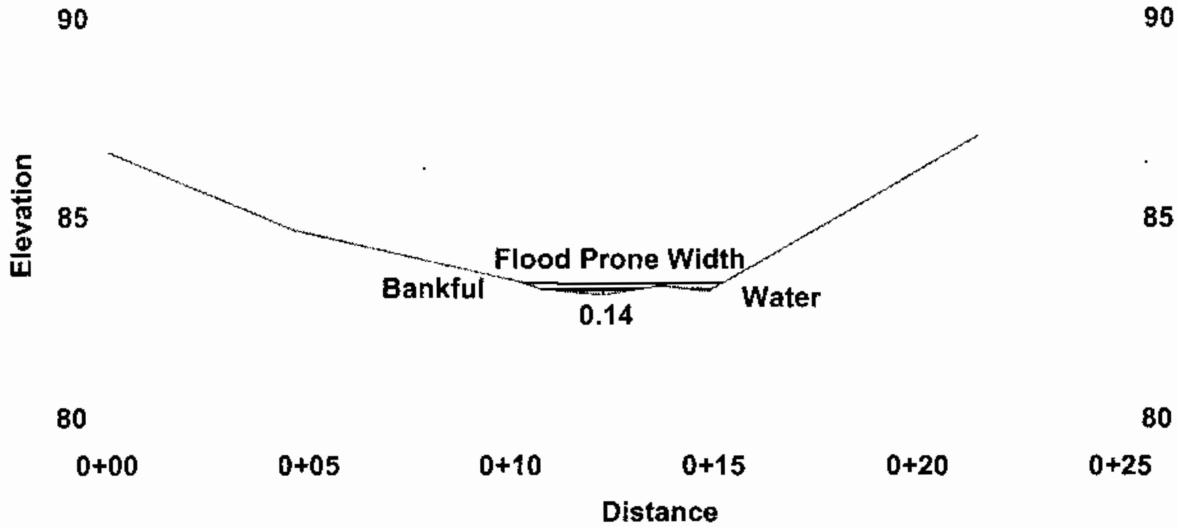
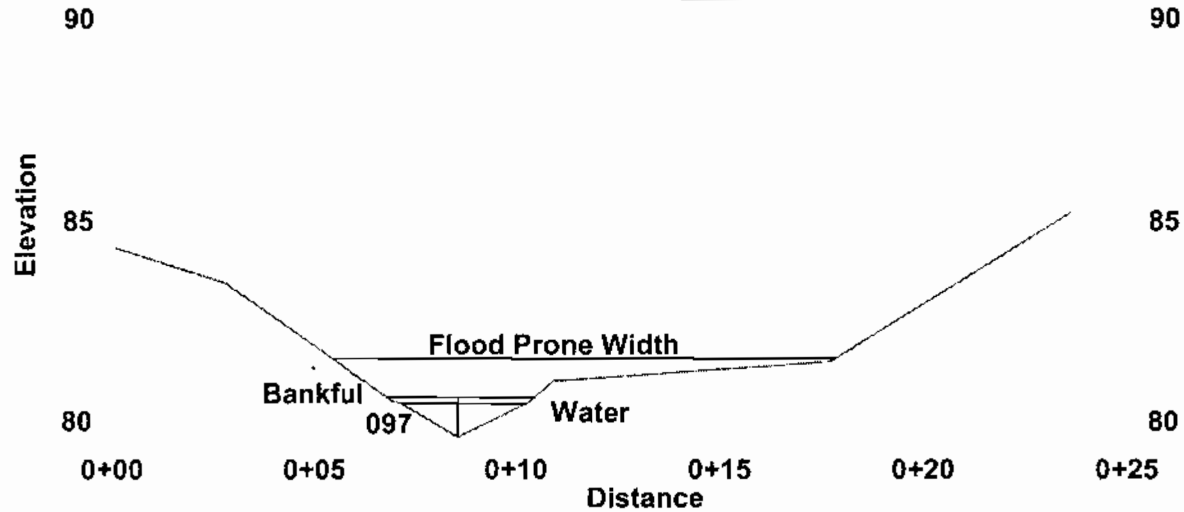
NALLY & HAMILTON ENTERPRISES, INC.

Typical longitudinal profile
of five to seven percent sloped stream.

SCALE:	1"=50'	10/14/05



Riffle Section



Pool Section

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NALLY & HAMILTON ENTERPRISES, INC.

Typical cross section
for five to seven percent grade stream.

SCALE:	1"=5'	4/14/06

APOGEE ENVIRONMENTAL CONSULTANTS, LLC

Pebble Count Data Sheet

Project # ______ **Project Name** Lick Branch

Stream/Drainage Lick Fork / Middle Fork KY **Date** ______

GPS: N ______ **W** ______

County Leslie **State** KY **Quad** Hoskinston

Point (m)	Pebble size (mm)		Point (m)	Pebble size (mm)		Point (m)	Pebble size (mm)		Point (m)	Pebble size (mm)	
0	silt	R	30	Sand	R	60	345	P	90	27	R
1	silt	R	31	28	R	61	87	R	91	25	R
2	silt	R	32	sand	R	62	133	P	92	Sand	R
3	18	P	33	16	R	63	sand	P	93	300	R
4	20	R	34	68	R	64	35	R	94	80	P
5	6	P	35	16	R	65	9	R	95	37	R
6	Sand	P	36	5	P	66	50	R	96	20	R
7	12	P	37	75	P	67	100	P	97	69	R
8	510	P	38	20	R	68	120	R	98	40	R
9	118	P	39	107	R	69	15	R	99	27	R
10	14	R	40	115	R	70	32	R	100	26	R
11	10	R	41	24	R	71	95	R	101		
12	Sand	R	42	4	P	72	890	R	102		
13	40	R	43	45	R	73	120	R	103		
14	Sand	R	44	27	R	74	32	R	104		
15	Sand	R	45	23	R	75	90	R	105		
16	25	R	46	25	R	76	92	R	106		
17	7	P	47	70	R	77	50	R	107		
18	Sand	P	48	Sand	R	78	28	R	108		
19	Sand	P	49	300	R	79	Sand	P	109		
20	28	R	50	15	R	80	1200	R	110		
21	5	R	51	18	P	81	75	R	111		
22	44	R	52	82	P	82	72	R	112		
23	23	R	53	85	R	83	30	P	113		
24	18	R	54	120	R	84	120	R	114		
25	25	R	55	130	R	85	140	R	115		
26	26	R	56	20	R	86	sand	R	116		
27	35	R	57	65	P	87	38	R	117		
28	Sand	R	58	18	R	88	25	R	118		
29	[illegible]	R	59	7	P	89	77	R	119		

Appendix F

Stream Compensation Ratio Calculator Forms

Stre... ...mpensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75	Impacted Site			
		Impact Year: 2008			
Project ID # :	Permit No. 807-0399	Ecological Integrity Index		Length	Balance
Project Name.	Lower Blacksnake				
Impact Reach (IR):		Pre-Impact	Post-Impact	(ft)	(ft)
HF 1		0.50	0.00	1916	
Reach Continued		0.50	0.00		555
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
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#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!

Mitigation Site

Mitigation Reach (MR) Name	Mitigation Work Timing & Risk: Year Started	Year Matured	Failure Risk	Ecological Integrity Index: Pre-Work	Immediately After Work	At Maturity	Mitigation (Length Required)	Mitigation (Length Offered)
HF 1	2008	2038	60 %	0.00	0.32	0.40	2798	1987
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	

Outputs	Ecological Integrity Compensation Ratios			Ratio
Impact Reach vs Mitigation Reach			(mitigation site feet per impact site foot)	
IR vs MR1			>=	[illegible]
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) Describe the project impacts:

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) Describe the proposed mitigation used to offset proposed impacts:

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Stream Compensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75	Impacted Site				Mitigation Site								
Project ID # :	Permit No. 807-0399	Impact Year: 2008												
Project Name:	Lower Blacksnake	Ecological Integrity Index		Length	Balance	Mitigation Work Timing & Risk				Ecological Integrity Index			Mitigation	Mitigation
Impact Reach (IR):		Pre-Impact	Post-Impact	(ft)	(ft)	Mitigation Reach (MR) Name	Year Started	Year Matured	Failure Risk	Pre-Work	Immediately After Work	At Maturity	(Length Required)	(Length Offered)
SS 1		0.50	0.10	337		SS 1	2008	2038	50	0.00	0.32	0.40	394	337
Reach Continued		0.50	0.10		49								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	

Outputs

Impact Reach vs Mitigation Reach	Ecological Integrity Compensation Ratios		(mitigation site feet per impact site foot)	Ratio
IR vs MR1			>>	1.17
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) Describe the project impacts:

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) Describe the proposed mitigation used to offset proposed impacts:

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Stream Compensation Ratio Calculator Version 3.4

Inputs

Time Horizon:	75
Project ID #:	Permit No. 807-0399
Project Name:	Lower Blacksnake

Impacted Site

Impact Year: 2006

Impact Reach (IR):	Ecological Integrity Index Pre-Impact	Post-Impact	Length (ft)	Balance (ft)
HF 2 - Intermittent	0.50	0.00	2616	
Reach Continued	0.50	0.00		760
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!

Mitigation Site

Mitigation Reach (MR) Name	Mitigation Work Timing & Risk: Year Started	Year Matured	Failure Risk	Ecological Integrity Index: Pre-Work	Immediately After Work	At Maturity	Mitigation (Length Required)	Mitigation (Length Offered)
HF 2 - Intermittent	2008	2038	50 %	0.00	0.32	0.40	3820	2710
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	

Outputs

Ecological Integrity Compensation Ratios

Impact Reach vs Mitigation Reach				Ratio (mitigation site feet per impact site foot)
IR vs MR1			>=	[illegible]
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) **Describe the project Impacts:**

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) **Describe the proposed mitigation used to offset proposed impacts:**

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Stream Compensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75
Project ID #.	Permit No. 607-0399
Project Name:	Lower Blacksnake

Impacted Site — Impact Year: 2006

Mitigation Site

Impact Reach (IR):	Ecological Integrity Index Pre-Impact	Ecological Integrity Index Post-Impact	Length (ft)	Balance (ft)	Mitigation Reach (MR) Name	Mitigation Work Timing & Risk: Year Started	Year Matured	Failure Risk	Ecological Integrity Index: Pre-Work	Immediately After Work	At Maturity	Mitigation (Length Required)	Mitigation (Length Offered)
HF 2 - perennial	0.50	0.00	427		HF 2 - perennial	2008	2038	60%	0.00	0.32	0.40	624	624
				0								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	
#VALUE!	#######	#######		#VALUE!								#VALUE!	

Outputs

Impact Reach vs Mitigation Reach	Ecological Integrity Compensation Ratios			Ratio (mitigation site feet per impact site foot)
IR vs MR1			>=	[illegible]
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!
#VALUE!	#VALUE!	#######	#VALUE!	#VALUE!

Instructions

1) Describe the project impacts:

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) Describe the proposed mitigation used to offset proposed impacts:

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Stream Compensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75
Project ID #:	Permit No. 507-0399
Project Name:	Lower Blacksnake

Impacted Site

Impact Year: 2008

Mitigation Site

Impact Reach (IR):	Ecological Integrity Index: Pre-Impact	Ecological Integrity Index: Post-Impact	Length (ft)	Balance (ft)	Mitigation Reach (MR) Name	Mitigation Work Timing & Risk: Year Started	Year Matured	Failure Risk	Ecological Integrity Index: Pre-Work	Immediately After Work	At Maturity	Mitigation (Length Required)	Mitigation (Length Offered)
SS 2	0.50	0.10	273		SS 2	2008	2038	50 %	0.00	0.32	0.40	319	273
Reach Continued	0.50	0.10		39								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	

Outputs

Impact Reach vs Mitigation Reach	Ecological Integrity Compensation Ratios			Ratio (mitigation site feet per impact site foot)
IR vs MR1			>=	1.17
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) **Describe the project impacts:**

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) **Describe the proposed mitigation used to offset proposed impacts:**

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

St... ...mpensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75
Project ID #:	Permit No. 807-0399
Project Name:	Lower Blacksnake

Impacted Site

Impact Year: 2006

Impact Reach (IR):	Ecological Integrity Index Pre-Impact	Ecological Integrity Index Post-Impact	Length (ft)	Balance (ft)
Mine Area 1	0.59	0.10	1095	
Reach Continued	0.59	0.10		330
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!

Mitigation Site

Mitigation Reach (MR) Name	Mitigation Work Timing & Risk: Year Started	Year Matured	Failure Risk	Ecological Integrity Index: Pre-Work	Immediately After Work	At Maturity	Mitigation (Length Required)	Mitigation (Length Offered)
Mine Area 1	2008	2038	60 %	0.00	0.32	0.40	1567	1095
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	
							#DIV/0!	

Outputs

Ecological Integrity Compensation Ratios

Impact Reach vs Mitigation Reach				Ratio (mitigation site feet per impact site foot)
IR vs MR1			>=	#DIV/0!
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) **Describe the project impacts:**

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) **Describe the proposed mitigation used to offset proposed impacts:**

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Strean Compensation Ratio Calculator Version 3.4

Inputs	Time Horizon: 75	Impacted Site				Mitigation Site								
		Impact Year: 2006												
Project ID #:	Permit No. 807-0399	Ecological Integrity Index				Mitigation Work Timing & Risk				Ecological Integrity Index				
Project Name:	Lower Blacksnake			Length	Balance								Mitigation	Mitigation
Impact Reach (IR):		Pre-Impact	Post-Impact	(ft)	(ft)	Mitigation Reach (MR) Name	Year Started	Year Matured	Failure Risk	Pre-Work	Immediately After Work	At Maturity	(Length Required)	(Length Offered)
Mine Area 2		0.45	0.10	2164		Mine Area 2	2006	2038	50 %	0.00	0.32	0.40	2212	2164
Reach Continued		0.45	0.10		47								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	
#DIV/0!		#DIV/0!	#DIV/0!		#DIV/0!								#DIV/0!	

Outputs	Ecological Integrity Compensation Ratios			Ratio
Impact Reach vs Mitigation Reach			(mitigation site feet per impact site foot)	
IR vs MR1			>>	1.02
IR vs MR2			(see note 15)	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions

1) **Describe the project impacts:**

a) Indicate when the impact(s) will take place (i.e., Impact Year)

b) Estimate the Ecological Integrity (EII) prior to project impacts (i.e., Pre-Impact)

c) Predict Ecological Integrity (EII) after the proposed impacts occur (i.e., Post-Impact)

d) Prescribe the length of stream reach represented by this proposed impact

2) **Describe the proposed mitigation used to offset proposed impacts:**

a) Indicate when the proposed mitigation will take place (i.e., Year Started)

b) Predict when the mitigation project will reach maturity (i.e., Year Matured)

c) Estimate the Risk of Failure for the specific proposed mitigation site and plan

d) Estimate the Ecological Integrity of the proposed mitigation site before any work is done (i.e., Pre-Work), Immediately After Work, and At Maturity

e) Indicate the linear distance of the proposed mitigation offered to offset proposed impacts

f) If necessary, (indicated by a balance > 0 in Column P), continue with additional mitigation sites

User Notes:

1) User only needs to fill out the gray shaded boxes

2) Use a separate spreadsheet for each homogeneous impact reach to be mitigated

Appendix G

EII Calculation Spreadsheets for Pre-disturbance

(Family Level Taxonomy - Riffle Only Sample)

Project ID: HF #1 and SS#1

Stream/Reach: Bull Branch

Assessment Objectives:

EII		Model	
NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.50	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
RBP Habitat Parameters			
1. Epifaunal Substrate	14	no units (0-20)	
2. Embeddedness	15	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	15	no units (0-20)	
5. Channel Flow Status	18	no units (0-20)	
6. Channel Alteration	18	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	16	no units (0-20)	
9. Veg. Protection (both combined)	18	no units (0-20)	
10. Riparian Width (both combined)	15	no units (0-20)	
Total Habitat Score	[redacted]	no units	Subindex

[redacted]

Macroinvertebrate Data - Family Level (Riffle Only)

11. Family Taxa Richness	0	# of taxa sampled	[redacted]
12. Family EPT Richness	0	# of EPT species sampled	[redacted]
13. % Ephemeroptera	0	% Mayflies (0-100)	[redacted]
14. % Chironomidae & Oligochaeta	0	% Midges & Worms (0-100)	[redacted]
16. mFBI	0	no units	[redacted]

[redacted]

[redacted]	460	[redacted]

APOGEE
ENVIRONMENTAL CONSULTANTS LLC

(Family Level Taxonomy - Riffle Only Sample)

Project ID: HF 2 and SS 2

Stream/Reach: Unnamed Trib to Campbell Branch

Assessment Objectives:

EII		Model	
NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.50	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units
RBP Habitat Parameters		
1. Epifaunal Substrate	13	no units (0-20)
2. Embeddedness	14	no units (0-20)
3. Velocity/Depth Regime	10	no units (0-20)
4. Sediment Deposition	14	no units (0-20)
5. Channel Flow Status	18	no units (0-20)
6. Channel Alteration	18	no units (0-20)
7. Freq. Of Riffles (bends)	20	no units (0-20)
8. Bank stability (both combined)	16	no units (0-20)
9. Veg. Protection (both combined)	18	no units (0-20)
10. Riparian Width (both combined)	18	no units (0-20)

Total Habitat Score	[redacted]	no units	Subindex

[redacted]

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Macroinvertebrate Data - Family Level (Riffle Only)

11. Family Taxa Richness	0	# of taxa sampled	[redacted]
12. Family EPT Richness	0	# of EPT species sampled	
13. % Ephemeroptera	0	% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta	0	% Midges & Worms (0-100)	
16. mFBI	0	no units	

[redacted]

[redacted]	**460**	[redacted]	

(Family Level Taxonomy - Riffle Only Sample)

Project ID: Mine Area No. 1

Stream/Reach: Unnamed Trib to Blacksnake Branch

Assessment Objectives:

EII		Model	
NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.59	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units
RBP Habitat Parameters		
1. Epifaunal Substrate	13	no units (0-20)
2. Embeddedness	15	no units (0-20)
3. Velocity/Depth Regime	10	no units (0-20)
4. Sediment Deposition	17	no units (0-20)
5. Channel Flow Status	20	no units (0-20)
6. Channel Alteration	15	no units (0-20)
7. Freq. Of Riffles (bends)	20	no units (0-20)
8. Bank stability (both combined)	16	no units (0-20)
9. Veg. Protection (both combined)	15	no units (0-20)
10. Riparian Width (both combined)	11	no units (0-20)
Total Habitat Score	[redacted]	no units

Subindex

[redacted]

APOGEE ENVIRONMENTAL CONSULTANTS LLC

__Macroinvertebrate Data - Family Level (Riffle Only)__

11. Family Taxa Richness	0	# of taxa sampled	[redacted]
12. Family EPT Richness	0	# of EPT species sampled	
13. % Ephemeroptera	0	% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta	0	% Midges & Worms (0-100)	
16. mFBI	0	no units	

[redacted]

[redacted]	334	[redacted]

APOGEE ENVIRONMENTAL CONSULTANTS LLC

(Family Level Taxonomy - Riffle Only Sample)

Project ID: Mined through area at Mine Area No. 2

Stream/Reach: Unnamed Trib to Blacksnake Branch

Assessment Objectives:

EII		Model	
NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
.45	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	13	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	13	no units (0-20)	
5. Channel Flow Status	18	no units (0-20)	
6. Channel Alteration	18	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	16	no units (0-20)	
9. Veg. Protection (both combined)	18	no units (0-20)	
10. Riparian Width (both combined)	19	no units (0-20)	
Total Habitat Score	[redacted]	no units	Subindex

[redacted]

APOGEE ENVIRONMENTAL CONSULTANTS LLC

Macroinvertebrate Data - Family Level (Riffle Only)

11. Family Taxa Richness	0	# of taxa sampled	[redacted]
12. Family EPT Richness	0	# of EPT species sampled	
13. % Ephemeroptera	0	% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta	0	% Midges & Worms (0-100)	
16. mFBI	0	no units	
[redacted]			
[redacted]	550	[redacted]	

Appendix H

EII Calculation Five Years after Restoration

Project ID:
Stream/Reach: Unnamed Trib to Campbell Branch — HF 1 and SS 1 — **RESTORED (5 years)**
Assessment Objectives: 5 years after restored

NA	**Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)**		
0.32	**Ecological Integrity Index (Habitat Integrity + Conductivity)**		

Variables	Measure	Units	Subindex
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	**142**	no units	**Subindex**
Habitat Integrity			**0.53**
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	NA	no units	NA
Conductivity	500	microMHOs	0.10

APOGEE ENVIRONMENTAL CONSULTANTS LLC

Project ID:

Stream/Reach: Bull Branch HF 2 and SS 2

Assessment Objectives: 5 years after restored

NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.32	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	142	no units	Subindex
Habitat Integrity			0.53
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	NA	no units	NA
Conductivity	500	microMHOs	0.10

Project ID:
Stream/Reach: Unnamed Trib to Blacksnake Branch — Mine Area 1
Assessment Objectives: 5 years after restored

NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.32	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	142	no units	Subindex
Habitat Integrity			0.53
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	NA	no units	NA
Conductivity	500	microMHOs	0.10

Project ID:
Stream/Reach: Unnamed Trib to Blacksnake Branch — Mine Area 2
Assessment Objectives: 5 years after restored

NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.32	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	142	no units	Subindex
Habitat Integrity			0.53
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	NA	no units	NA
Conductivity	500	microMHOs	0.10

Appendix I

EII Calculation for 30 Years after Disturbance

Project ID:
Stream/Reach: Unnamed Trib to Campbell Branch — HF 1 and SS 1 — **RESTORED (5 years)**
Assessment Objectives: 5 years after restored

NA	**Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)**		
0.40	**Ecological Integrity Index (Habitat Integrity + Conductivity)**		

Variables	**Measure**	**Units**	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	17	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	14	no units (0-20)	
10. Riparian Width (both combined)	18	no units (0-20)	
Total Habitat Score	**152**	no units	**Subindex**
Habitat Integrity			**0.70**
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	**NA**	no units	**NA**

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Conductivity	500	microMHOs	0.10

Project ID:

Stream/Reach: Bull Branch HF 2 and SS 2

Assessment Objectives: 5 years after restored

NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.32	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	142	no units	Subindex
Habitat Integrity			0.53
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI	0	no units	
Macroinvertebrate Bioassessment	NA	no units	NA

Conductivity	500	microMHOs	0.10

Project ID:
Stream/Reach: Unnamed Trib to Blacksnake Branch — Mine Area 1
Assessment Objectives: 5 years after restored

NA	Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)		
0.32	Ecological Integrity Index (Habitat Integrity + Conductivity)		

Variables	Measure	Units	

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

RBP Habitat Parameters

1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	142	no units	Subindex
Habitat Integrity			0.53

Macroinvertebrate Data - *Genus/species Level*

11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	NA	no units	NA
Conductivity	500	microMHOs	0.10

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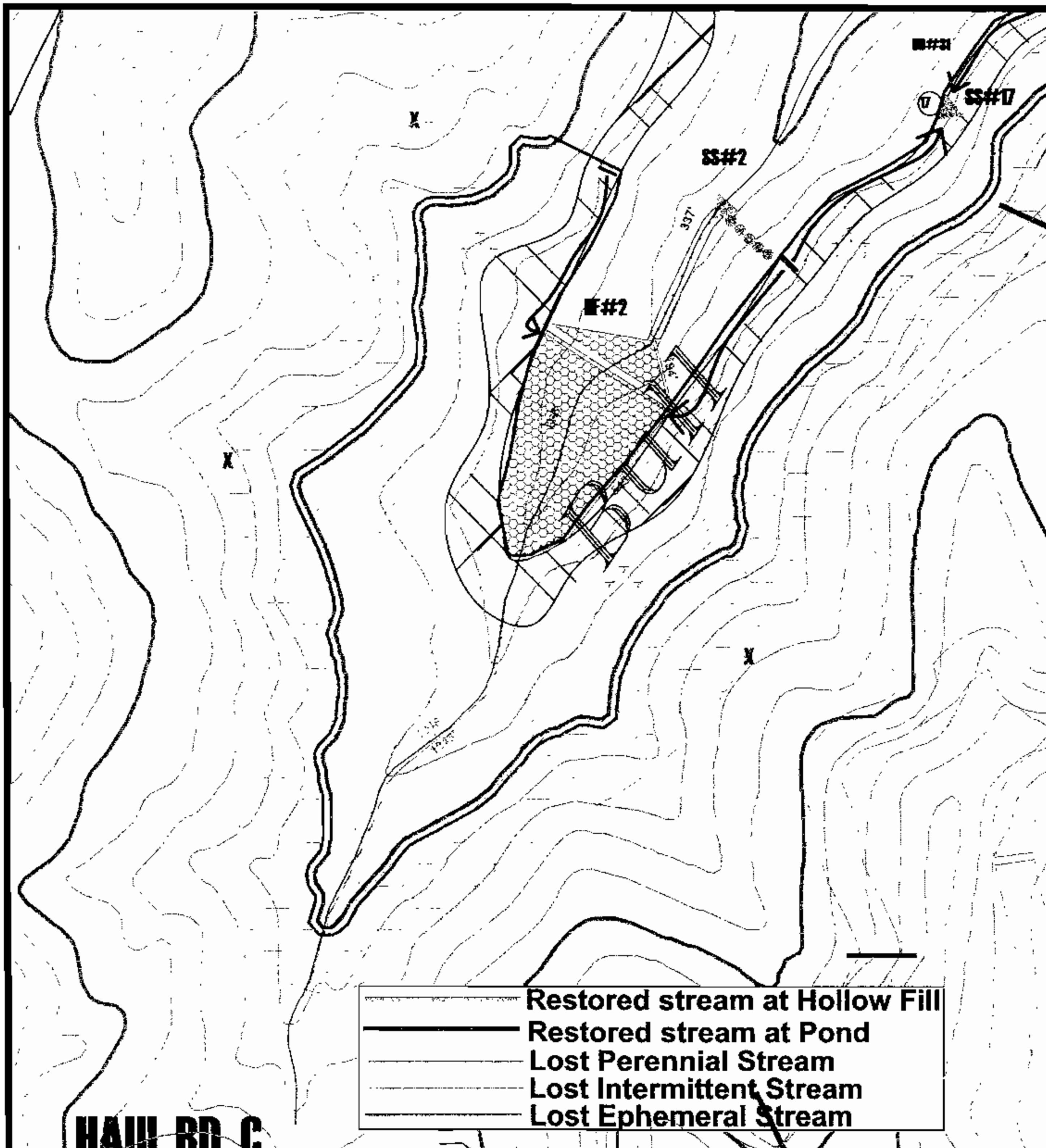
Project ID:
Stream/Reach: Unnamed Trib to Blacksnake Branch

Mine Area 2

Assessment Objectives: 5 years after restored

NA	**Ecological Integrity Index (MBI + Habitat Integrity + Conductivity)**		
0.32	**Ecological Integrity Index (Habitat Integrity + Conductivity)**		

Variables	**Measure**	**Units**	
Enter quantitative or categorical measure from Field Data Sheet in shaded cells			
RBP Habitat Parameters			
1. Epifaunal Substrate	13	no units (0-20)	
2. Embeddedness	17	no units (0-20)	
3. Velocity/Depth Regime	10	no units (0-20)	
4. Sediment Deposition	17	no units (0-20)	
5. Channel Flow Status	6	no units (0-20)	
6. Channel Alteration	15	no units (0-20)	
7. Freq. Of Riffles (bends)	20	no units (0-20)	
8. Bank stability (both combined)	18	no units (0-20)	
9. Veg. Protection (both combined)	12	no units (0-20)	
10. Riparian Width (both combined)	14	no units (0-20)	
Total Habitat Score	**142**	no units	**Subindex**
Habitat Integrity			**0.53**
Macroinvertebrate Data - *Genus/species Level*			
11. Genus/species Taxa Richness		# of taxa sampled	
12. Genus/species EPT Richness		# of EPT species sampled	
13. % Ephemeroptera		% Mayflies (0-100)	
14. % Chironomidae & Oligochaeta		% Midges & Worms (0-100)	
15. % Clingers		% Clingers (0-100)	
16. mHBI		no units	
Macroinvertebrate Bioassessment	**NA**	no units	**NA**
Conductivity	**500**	microMHOs	**0.10**



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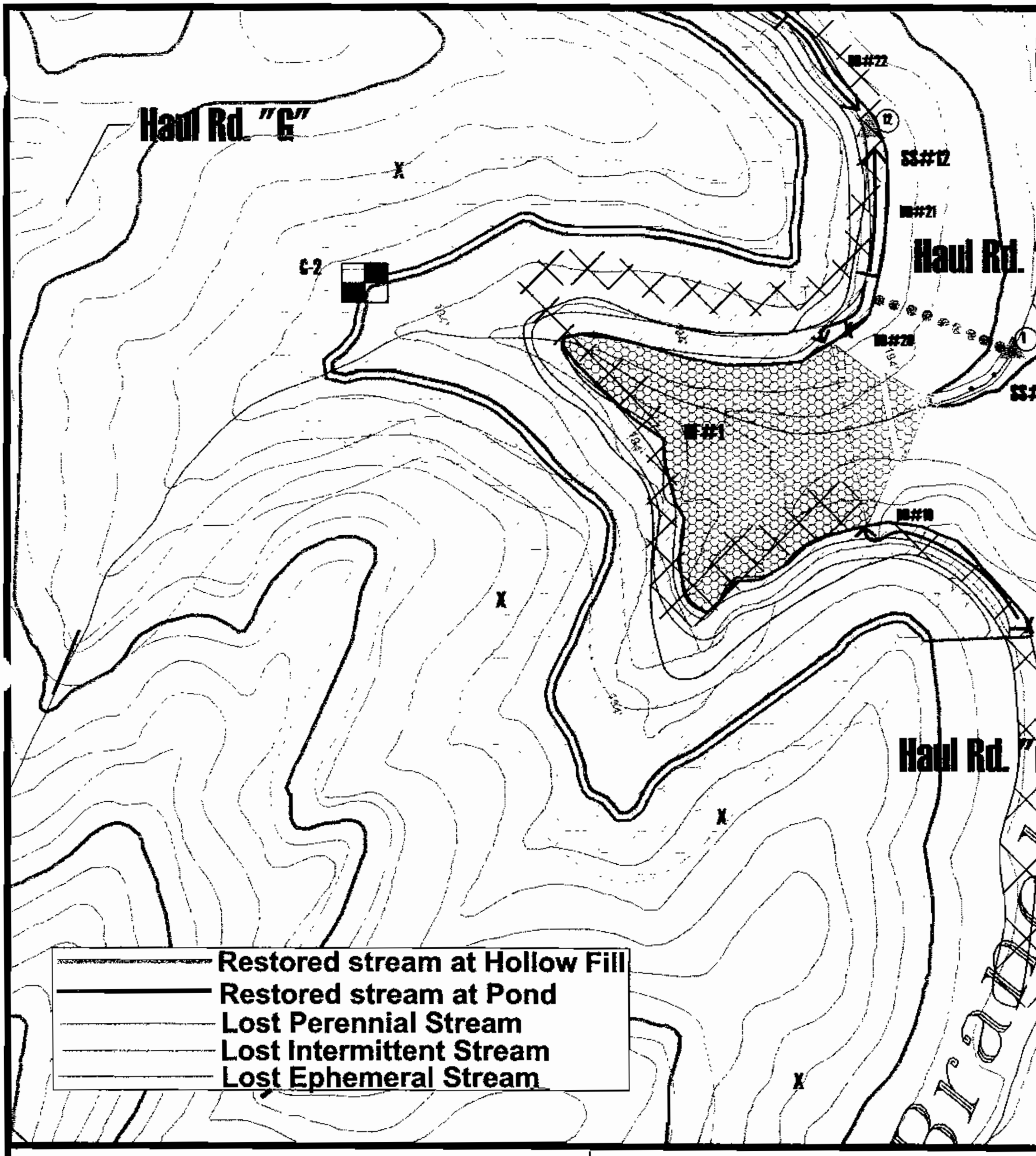
NALLY & HAMILTON ENTERPRISES, INC.

Attachment 1. Restored stream areas for mitigation at Hollowfill 1 and Pond 1, Bell County, Kentucky.

SCALE: 1"=350' 2/13/06



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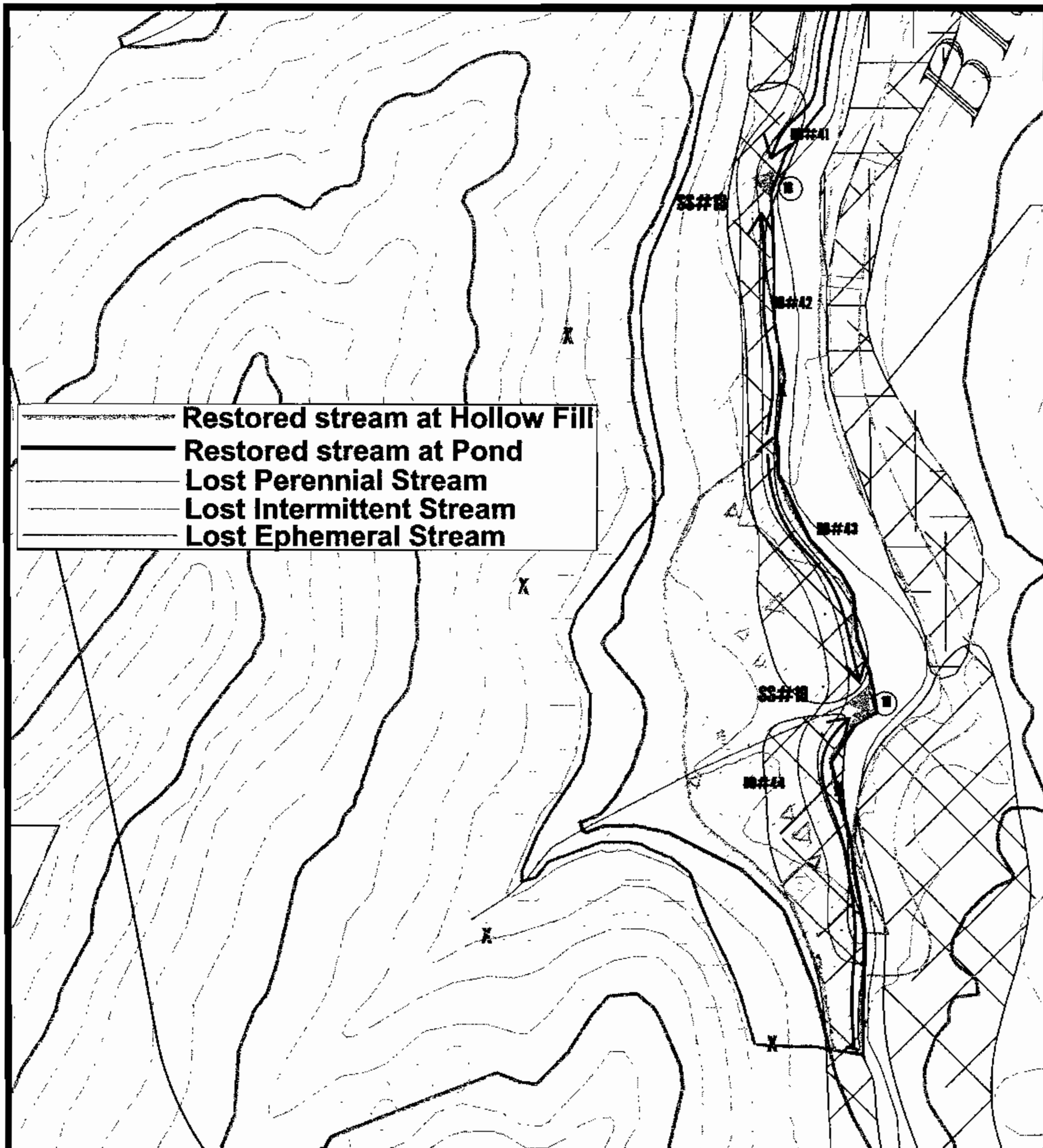
Attachment 2. Restored stream areas for mitigation at Hollowfill 2 and Pond 2, Bell County, Kentucky.

SCALE:	**1"=300'**	**3/10/05**



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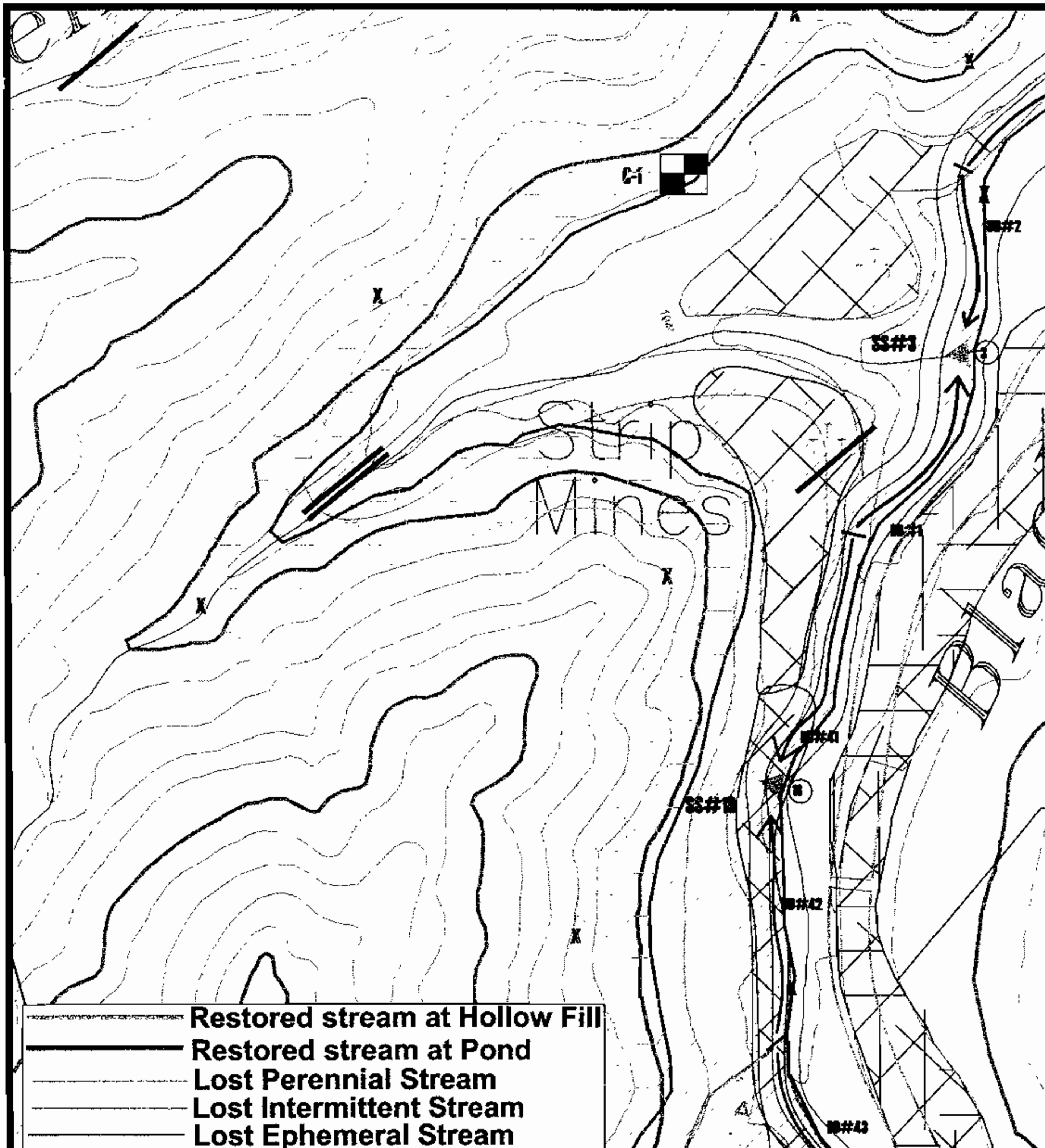
NALLY & HAMILTON ENTERPRISES, INC.

Attachment 3. Restored stream areas for mitigation at Mine Area 1, Bell County, Kentucky.

SCALE:	1"=300'	3/10/05



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Attachment 4. Restored stream areas for mitigation at Mine Area 2, Bell County, Kentucky.

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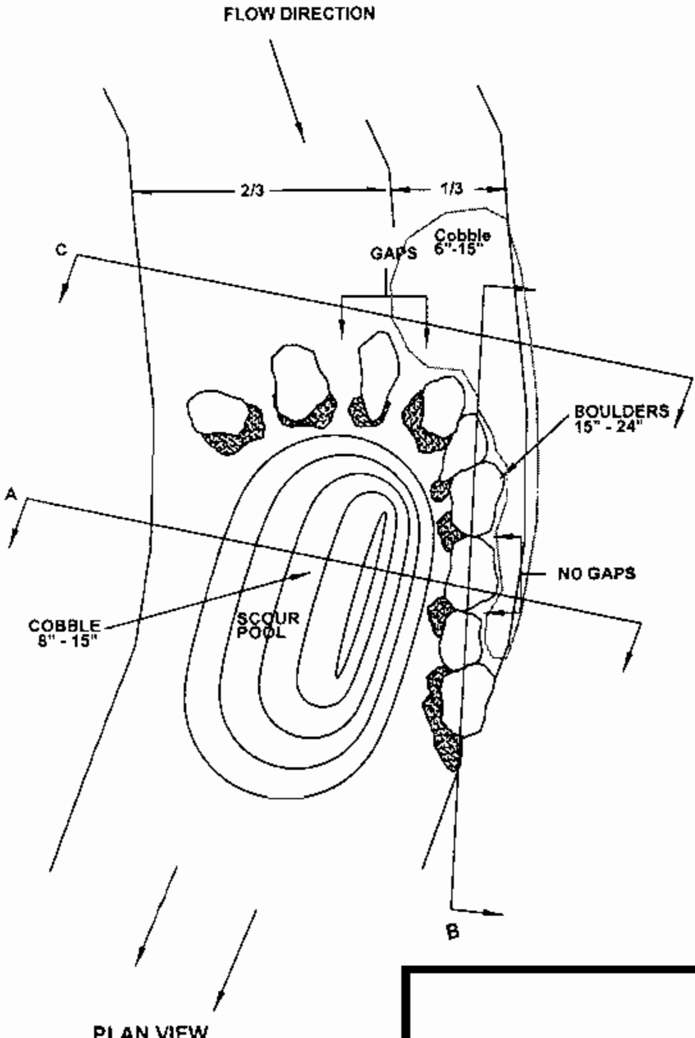
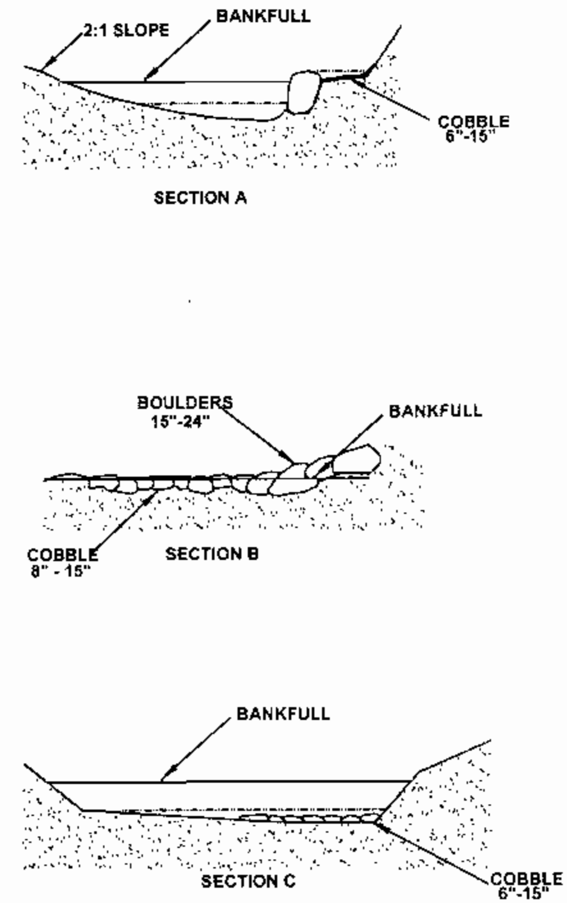
SCALE:	1"=350'	3/10/05





J-Hook

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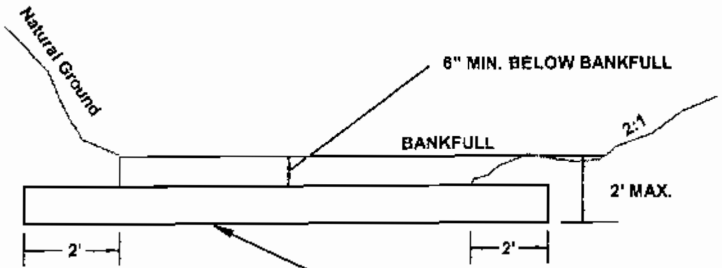
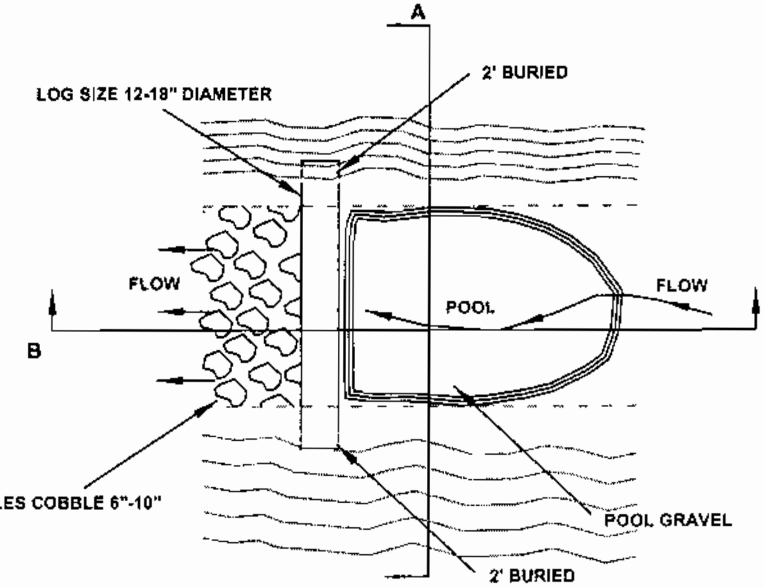
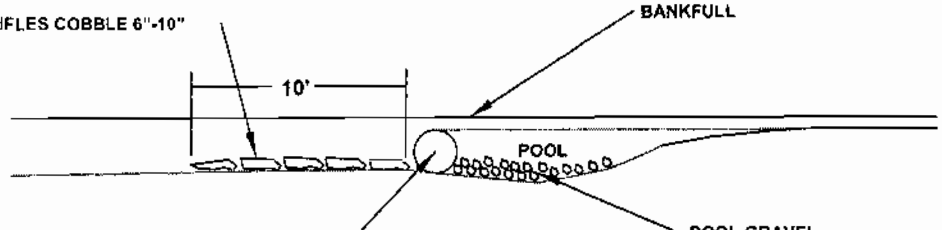
ATTACHMENT 5.
J-HOOK DIAGRAM

SCALE:	-NTS-	2/13/06



SECTION A





SECTION B

Log Vane

APOGEE ENVIRONMENTAL CONSULTANTS, INC.

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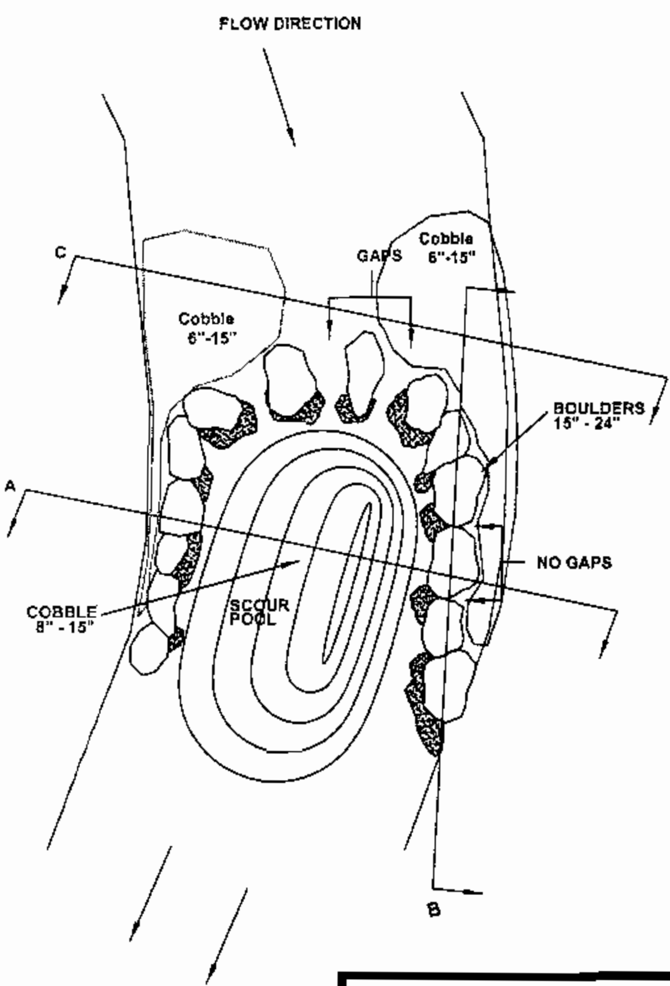
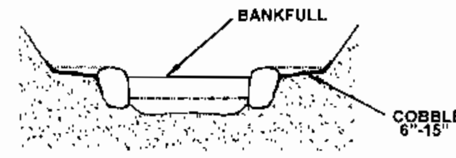
NALLY & HAMILTON ENTERPRISES, INC.

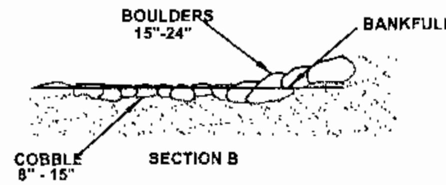
ATTACHMENT 6. LOG VANE DIAGRAM

SCALE:	-NTS	2/13/06





SECTION A



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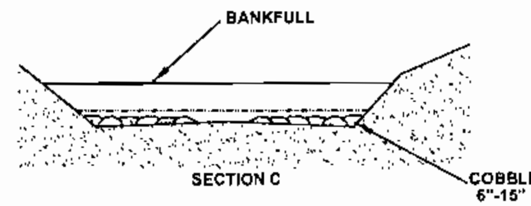

SECTION C

Rock Vane

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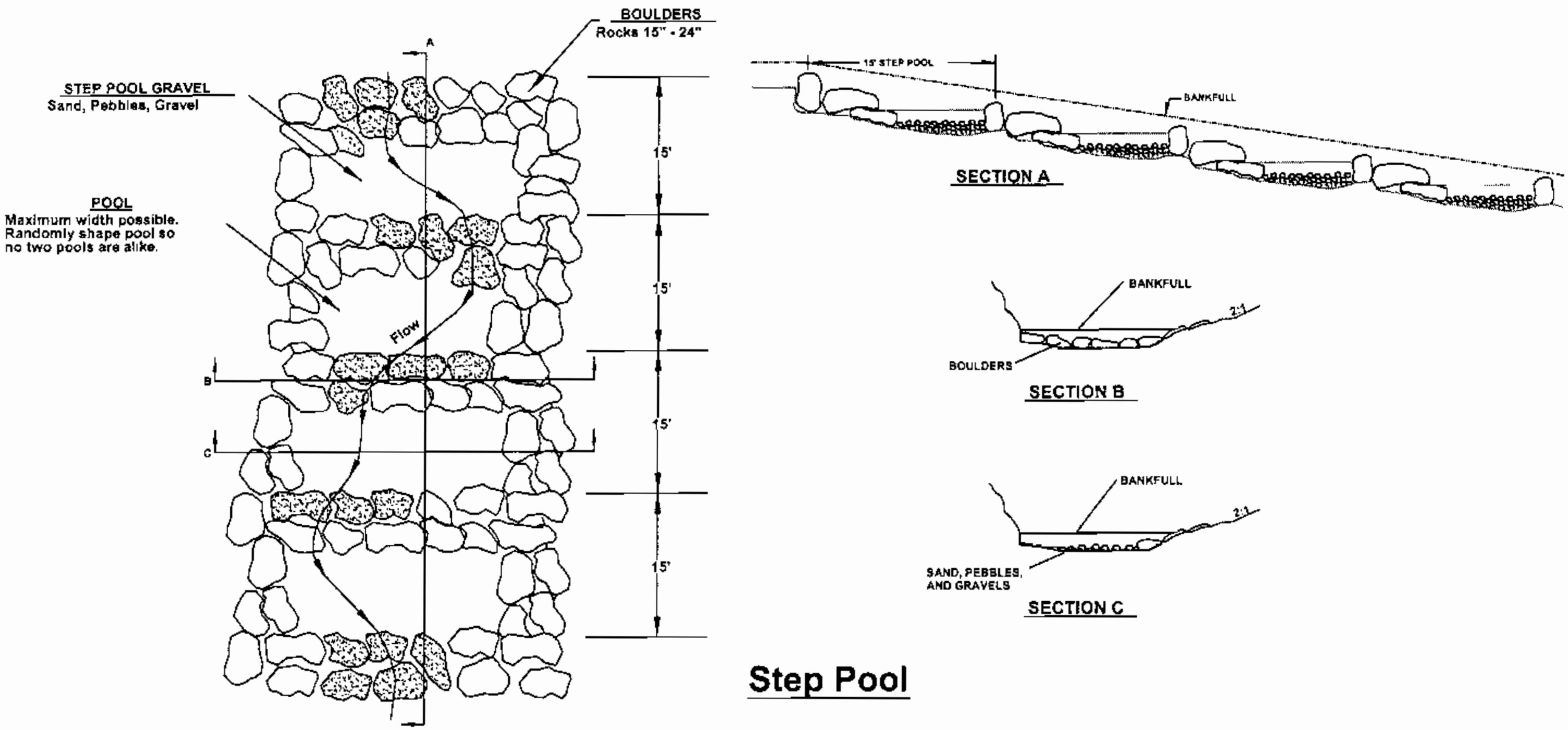
NALLY & HAMILTON ENTERPRISES, INC.

ATTACHMENT 7. ROCK VANE DIAGRAM

SCALE:	-NTS-	2/13/06



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ATTACHMENT 8.
STEP POOL DIAGRAM

SCALE:	-NTS-	2/13/06

32.4 Are any of the proposed diversions to be retained as permanent facilities? ☐ YES ☒ NO. If "YES", List the identification numbers of those diversions. ______________________________.
Additionally, provide as "Attachment 32.4.A", detailed designs cross-sections, calculations, and drawings for each proposed diversion ditch to demonstrate compliance with 405 KAR 16:080 or 18:080, Section 1, as appropriate.

See Attachment 32.4.A - 32.4.F

33. Transportation Facilities Plan

33.1 Describe the transportation plan for the proposed permit area. The plan shall include a discussion of road maintenance, appropriate maps, cross-sections, and specifications for each road width, gradient, surface, cut, fill embankment, culvert, bridge, drainage ditch, and drainage structure. Submit the description as "Attachment 33.1.A".

See Attachment 33.1.A - 33.1.H

33.2 Are roads for which construction began prior to January 18, 1983, proposed for use within the permit area? ☐ YES ☒ NO. If "YES", clearly identify the extent of such roads on the MRP Map and submit the information required to demonstrate compliance with 405 KAR 8:030, Section 25, or 405 KAR 8:040, Section 25 as appropriate. Submit the information as "Attachment 33.2.A".

33.3 Will conveyors and/or rail systems be located within the proposed permit area? ☐ YES ☒ NO. If "YES" submit a description as "Attachment 33.3.A" and show on the MRP Map.

33.4 Does the applicant propose to use alternate specifications for any road or portions of road within the permit area? ☐ YES ☒ NO. If "YES", describe the specification to be modified and provide required justification. Submit as "Attachment 33.4.A".

33.5 Describe the measures to be used to ensure that interests of the public are protected if a waiver to conduct surface disturbances within 100' from the right-of-way of any public road or to relocate a public road is being requested. Submit this description as "Attachment 33.5.A".
N/A

34. Air Pollution Control Plan

34.1 For proposed permit area, describe the fugitive dust control plan to be employed during site preparation, mining, and reclamation. When required, provide an air quality monitoring program and locate monitoring station(s) on the MRP Map. Submit this information as "Attachment 34.1.A".

See Attachment 34.1.A

DIVERSION DITCH DESIGN

HF# 1 N&S Top Ditches Maximum Design

$Q_{100} = C\ I\ A$

A = 23.9 Acres

(30 %) C = 0.50 (Table 2.27, "Applied Hydrology And Sedimentology For Disturbed Areas")

(70 %) C = 0.15 (Chart 1003, KY D.O.T. Drainage Manual)

Weighted Value C = 0.26

$$T_c = 0.0078 \left[\frac{L^{3/2}}{H^{1/2}} \right]^{0.770}$$

L = 2000 Feet

H = 320 Feet

T_c = 5.5 Minutes

I = 8.7 In./Hr. (Chart 1005.6)

Q_{100} = (0.26) (8.7) (23.9)

= 54.06 cfs

Using Chart 1033.3-2

Slope 1 %

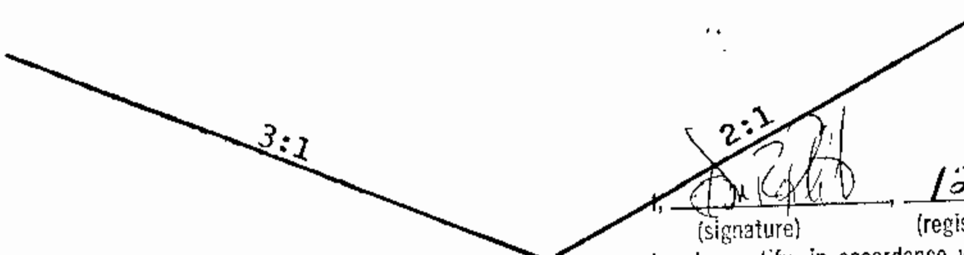
Bottom 2 ft.

Velocity 5 fps.

Depth 1.9 ft.

+0.3 ft. freeboard

2.2 ft.



[signature], 12575, 12/13/05
(signature) (registration no.) (date)

I hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS ... and 405 KAR Title 405. (Affix engineer's seal)

DIVERSION DITCH DESIGN

HF#1 N&S Face Ditches Maximum Design

Q_{100} = C I A

A = 26.5 Acres

(30 %) C = 0.50 (Table 2.27, "Applied Hydrology And Sedimentology For Disturbed Areas")

(70 %) C = 0.15 (Chart 1003, KY D.O.T. Drainage Manual)

Weighted Value C = 0.26

$$T_c = 0.0078 \left[\frac{L^{3/2}}{H^{1/2}} \right]^{0.770}$$

L = 2350 Feet

H = 420 Feet

T_c = 5.97 Minutes

I = 8.6 In./Hr. (Chart 1005.6)

Q_{100} = (0.26) (8.6) (26.5)

= 59.25 cfs

Using Chart 1033.3-2

Slope 20 %

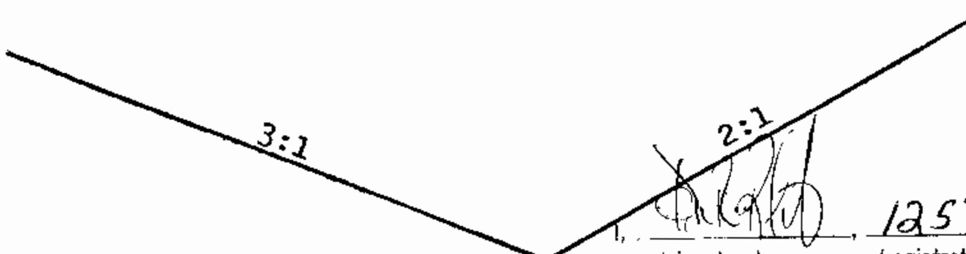
Bottom 2 ft.

Velocity 16 fps.

Depth 1.0 ft.

+0.3 ft. freeboard

1.3 ft.



I, [signature], 12575, 12/13/05

(signature) (registration no.) (date)

[illegible] certify, in accordance with 405 KAR 7:040E, Section 10, that [illegible] document is correct as determined by accepted engineering [illegible] and [illegible] of it by [illegible]

DIVERSION DITCH DESIGN

HF#2 E&W Top Ditches Maximum Design

Q_{100} = C I A

A = 110 Acres

(12 %) C = 0.50 (Table 2.27, "Applied Hydrology And Sedimentology For Disturbed Areas")

(88 %) C = 0.15 (Chart 1003, KY D.O.T. Drainage Manual)

Weighted Value C = 0.19

$$T_c = 0.0078 \left[\frac{L^{3/2}}{H^{1/2}} \right]^{0.770}$$

L = 1400 Feet

H = 360 Feet

T_c = 3.48 Minutes

I = 8.88 In./Hr. (Chart 1005.6)

Q_{100} = (0.19) (8.88) (110)

= 185.6 cfs

Using Chart 1033.3-2

Slope 1 %

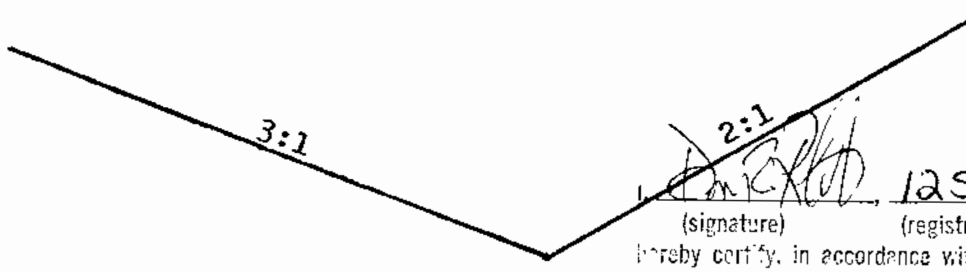
Bottom 2 ft.

Velocity 6.8 fps.

Depth 3.2 ft.

+ 0.3 ft. freeboard

3.5 ft.



I [signature], 12575, 12/13/05

(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10 that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS ... 350 and KAR Title 405. (Affix engineer's seal)

DIVERSION DITCH DESIGN

HF#2 E&W Face Ditches Maximum Design

Q_{100} = C I A

A = 115.5 Acres

(12 %) C = 0.50 (Table 2.27, "Applied Hydrology And Sedimentology For Disturbed Areas")

(88 %) C = 0.15 (Chart 1003, KY D.O.T. Drainage Manual)

Weighted Value C = 0.19

$$T_c = 0.0078 \left[\frac{L^{3/2}}{H^{1/2}} \right]^{0.770}$$

L = 1900 Feet

H = 500 Feet

T_c = 4.36 Minutes

I = 8.88 In./Hr. (Chart 1005.6)

Q_{100} = (0.19) (8.88) (115.5)

= 194.9 cfs

Using Chart 1033.3-2

Slope 20 %

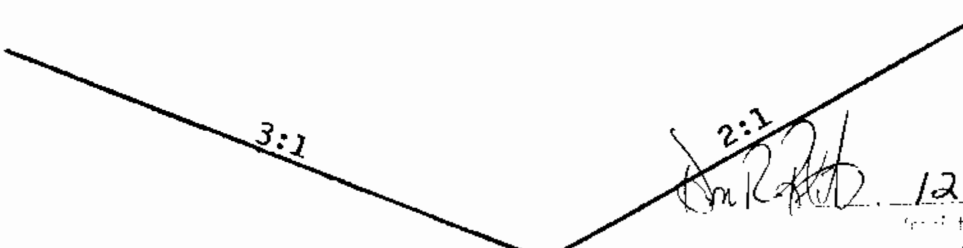
Bottom 2 ft.

Velocity 22 fps.

Depth 1.7 ft.

+0.3 ft. freeboard

2.0 ft.



12575 12/13/05

(registration no.) (date)

... in accordance with 405 KAR 7:040E, Section 10 that ... determined by accepted engineering ... includes all the information required of it by KRS ... Title 405. (Affix engineer's seal)

ATTACHMENT 32.4.E

DIVERSION DITCH DESIGN

Q25 = C I A

		A=	18.00	
40.00	%	C=	0.50	TABLE 2.27, "APPLIED HYDROLOGY AND SEDIMENTOLOGY FOR DISTURBED AREAS"
60.00	%	C=	0.15	CHART 1003, KY D.O.T. DRAINAGE MANUAL
WEIGHTED VALUE		C=	0.29	

Tc = 0.0078 (L^1.5/H^0.5) 0.770

L= 2107.00
H= 640.00

Tc= 4.47

I= 7.55 IN./HR (CHART 1005.6)

Q25	=	0.29	7.55	18.00
		C	I	A

Q25 = 39.41 CFS

USING CHART 1033. 3-2	
SLOPE	1 %
BOTTOM	0 FT. (V-BOTTOM)
VELOCITY	3.3 FPS.
DEPTH	2.1 FT.
+	0.3 FT. FREEBOARD
TOTAL DEPTH	2.4 FT.

MAXIMUM DESIGN FOR ALL DIVERSION DITCHES
SEE ATTATCHMENT FOR DRAWING

I, [signature], 12575, 12/13/05,
(signature) (registration no.) (date)
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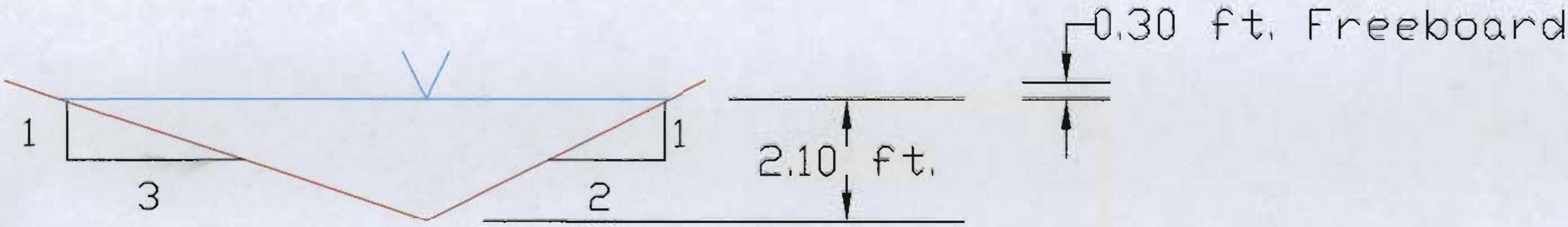

Triangular Channel
DIVERSION DITCH DESIGN

I, [signature], 12575, 12/13/05
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ATTACHMENT 33.1.A

Transportation Facilities Plan

Haul Road C,E,F,G are to be constructed. Haul Road A & D are existing with appropriate documentation attached. The existing haul road will need some upgrading and repair though road location will not change. The haul road which will be constructed, including equipment roads on the permit area, is to be placed on original ground material. This will ensure stability since excavation will be to solid rock in most cases. No potential slide areas are present in the area of this application or its haul roads.

Culverts are to be placed along the roadway periodically to remove runoff from ditches and allow proper drainage of the haulroad itself. These culverts are to be placed in natural drainways to prevent alteration of natural drainage flows and at other locations shown on the maps and designs enclosed. Inlet ends of each culvert will be protected by a non-clogging screen. Fencing or wire mesh with large openings is to be placed upstream of the inlet of each pipe to trap debris. Debris removal and proper cleaning will be employed to ensure proper operation of the screen filter.

During the operation, the haul roads will be properly maintained to ensure safe, passable conditions. The surface will be covered with well compacted durable rock to minimize rutting. Ditches will be kept open and free of debris. All ditches and embankments that are redisturbed will be seeded to prevent erosion. The surface and the shoulders will be repaired as required to maximize safety. A water truck will be utilized to minimize dust when necessary and provide safe sight distances along the access road.

Existing condition is fair for all existing roads. Surface of existing roads is poor. Newly constructed roads and upgrade of existing roads will utilize gravel to surface depth of 6" average.

CERTIFICATION OF DESIGN

STATE OF KENTUCKY
JOHN
ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, [signature], (Signature) , (Engineer's Seal) 12575 (Registration No.) , 12/20/05 (Date Certified) ,

hereby certify, in accordance with 405 KAR 7:040, Section 10, that the design of each of the following facilities, whose design is included in this application, Application # 807-0339 :

a) is in accordance with accepted engineering practices and recognized professional standards;
b) complies with the design requirements of KRS Chapter 350 and KAR Title 405; and
c) provided that the facility is properly constructed, operated and maintained, is adequate for the facility to meet the applicable performance standards of KRS Chapter 350 and KAR Title 405 insofar as such performance can reasonably be predicted by accepted engineering practices.

FACILITY TYPE: Roads
(One facility type only)

FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN	FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN
Haul Road "A"	----	12/20/05			
Pond Road SS #1	----	12/20/05			
Pond Road SS #2	----	12/20/05			

TYPES OF FACILITIES:

- -- sedimentation pond
- -- excess spoil disposal fill
- -- temporary water impoundment
- -- permanent water impoundment
- -- coal processing waste impoundment
- -- coal processing waste dam
- -- coal processing waste bank
- -- road
- -- postmining land use plan
- -- permanent ditches

* Show hazard class, if applicable.

ATTACHMENT 33.1.B (1) 807-0339

CERTIFICATION OF DESIGN

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

I, ______________________ , (Signature) — (Engineer's Seal) — 12575 (Registration No.) , 01/24/08 (Date Certified) ,

hereby certify, in accordance with 405 KAR 7:040, Section 10, that the design of each of the following facilities, whose design is included in this application, Application # 807-0339 :

a) is in accordance with accepted engineering practices and recognized professional standards;
b) complies with the design requirements of KRS Chapter 350 and KAR Title 405; and
c) provided that the facility is properly constructed, operated and maintained, is adequate for the facility to meet the applicable performance standards of KRS Chapter 350 and KAR Title 405 insofar as such performance can reasonably be predicted by accepted engineering practices.

FACILITY TYPE: roads
(One facility type only)

FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN	FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN
Haul Rd. C	----	01/24/08			
Haul Rd. E	----	01/24/08			
Haul Rd. F	----	01/24/08			

TYPES OF FACILITIES:

-- sedimentation pond
-- excess spoil disposal fill
-- temporary water impoundment
-- permanent water impoundment
-- coal processing waste impoundment
-- coal processing waste dam
-- coal processing waste bank
-- road
-- postmining land use plan
-- permanent ditches

* Show hazard class, if applicable.

Kentucky Department for Surface Mining Reclamation and Enforcement
SMP-31-A (9/96)

CERTIFICATION OF DESIGN

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ______________________, (Signature) (Engineer's Seal) 12575 (Registration No.), 08/01/06 (Date Certified),

hereby certify, in accordance with 405 KAR 7:040, Section 10, that the design of each of the following facilities, whose design is included in this application, Application # 807-0339 :

a) is in accordance with accepted engineering practices and recognized professional standards;
b) complies with the design requirements of KRS Chapter 350 and KAR Title 405; and
c) provided that the facility is properly constructed, operated and maintained, is adequate for the facility to meet the applicable performance standards of KRS Chapter 350 and KAR Title 405 insofar as such performance can reasonably be predicted by accepted engineering practices.

FACILITY TYPE: Sedimentation ponds (temporary)
(One facility type only)

FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN	FACILITY ID #	HAZARD CLASS*	DATE OF DESIGN
Haul Rd. D	----	08/01/06			
Haul Rd. G	----	08/01/06			

TYPES OF FACILITIES:

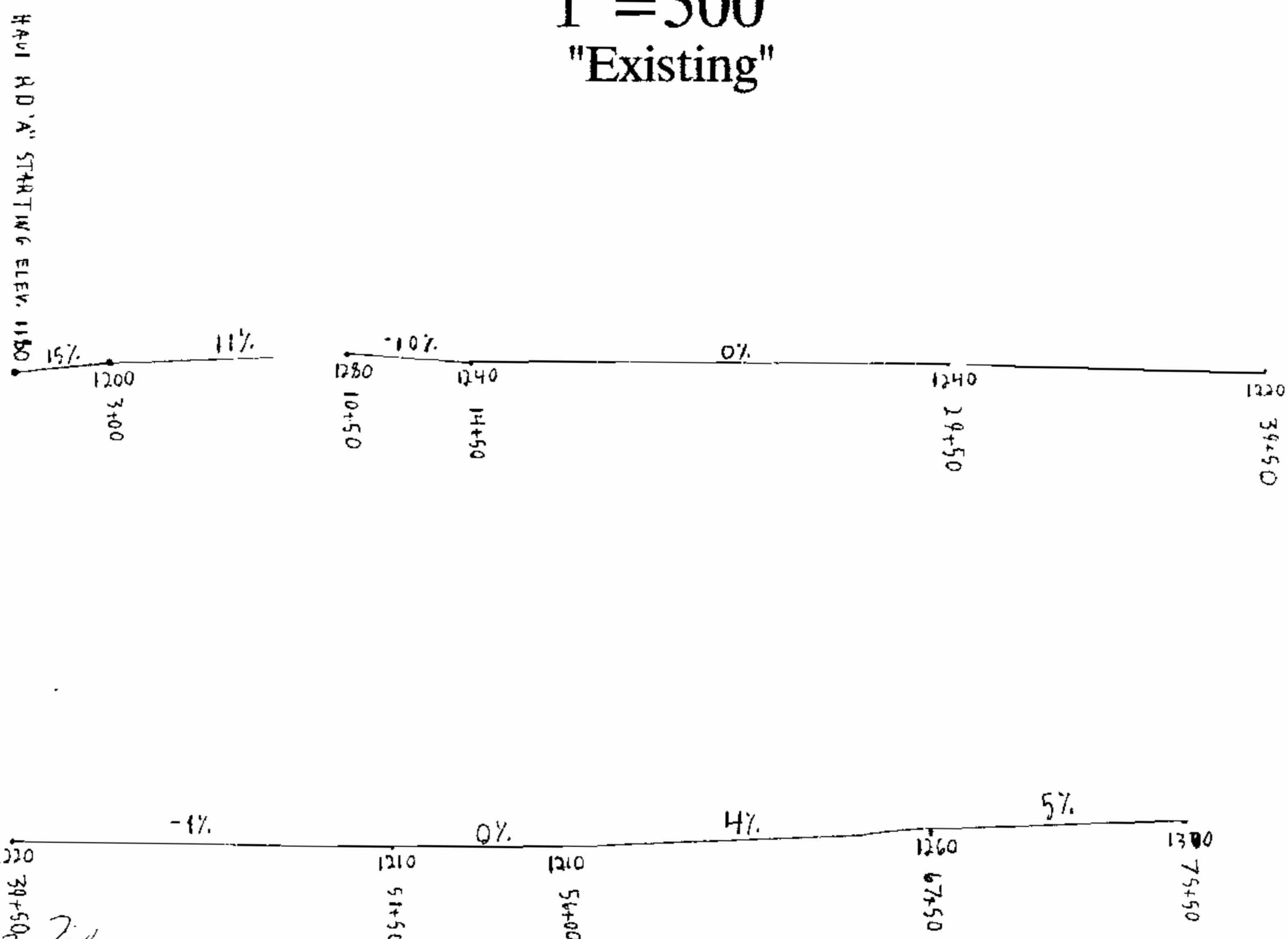
- -- sedimentation pond
- -- excess spoil disposal fill
- -- temporary water impoundment
- -- permanent water impoundment
- -- coal processing waste impoundment
- -- coal processing waste dam
- -- coal processing waste bank
- -- road
- -- postmining land use plan
- -- permanent ditches

* Show hazard class, if applicable.

HAUL RD "A"

1"=500'

"Existing"



I, ______ (signature) 12575 (registration no.) 12/20/05 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS

PAGE 1

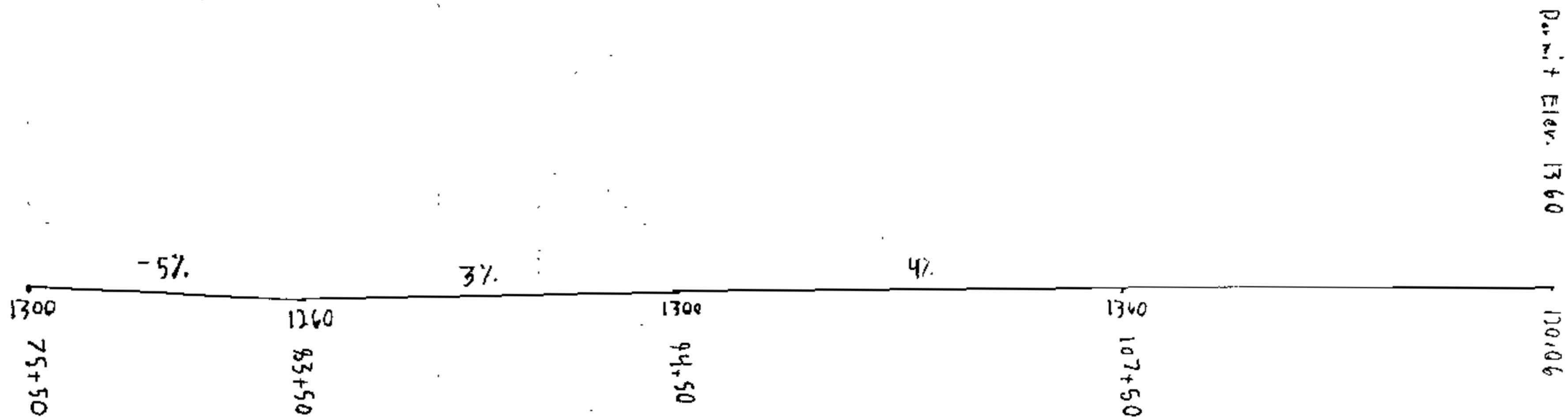
ATTACHMENT 33.1.C

807-0339

HAUL RD "A"

1"=500'

"Existing"



ATTACHMENT 33.1.D

807-0339

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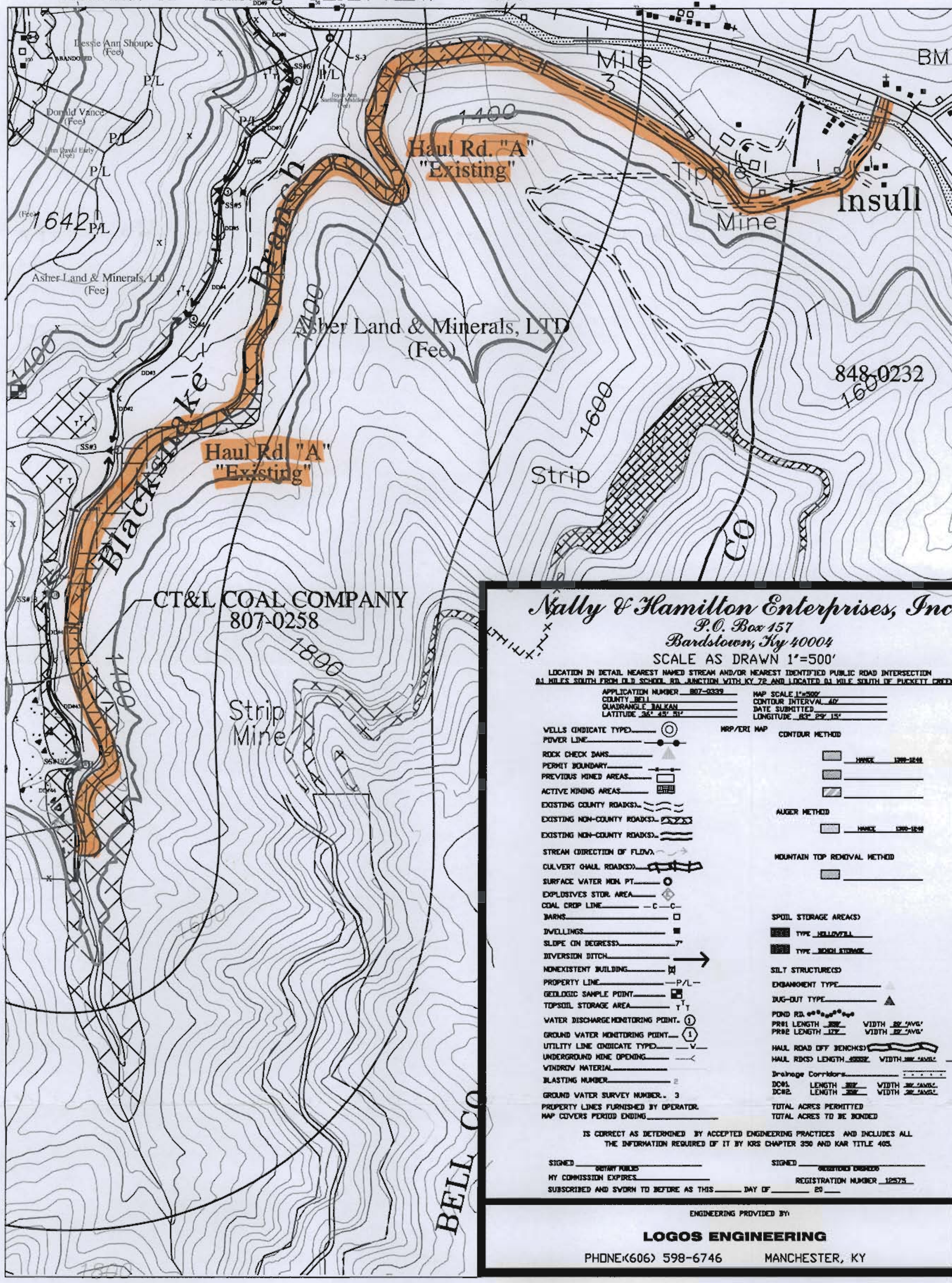
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Haul Rd. "A" "Existing" PLAN VIEW 1"=800'



I, [signature] 12575 01-29-08
(signature) (registration no.) (date)
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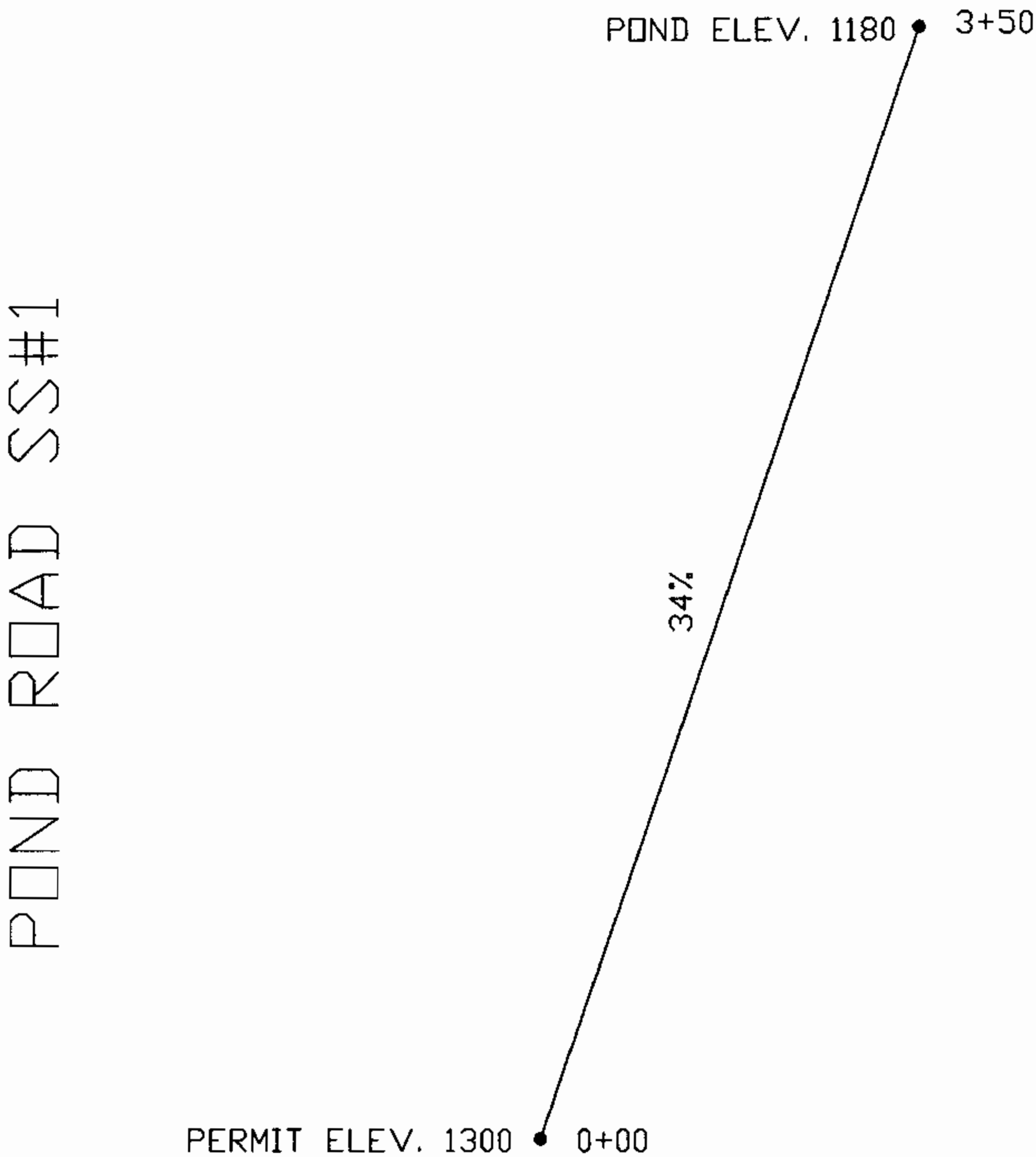
STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

ATTACHMENT 33.1.D (1)

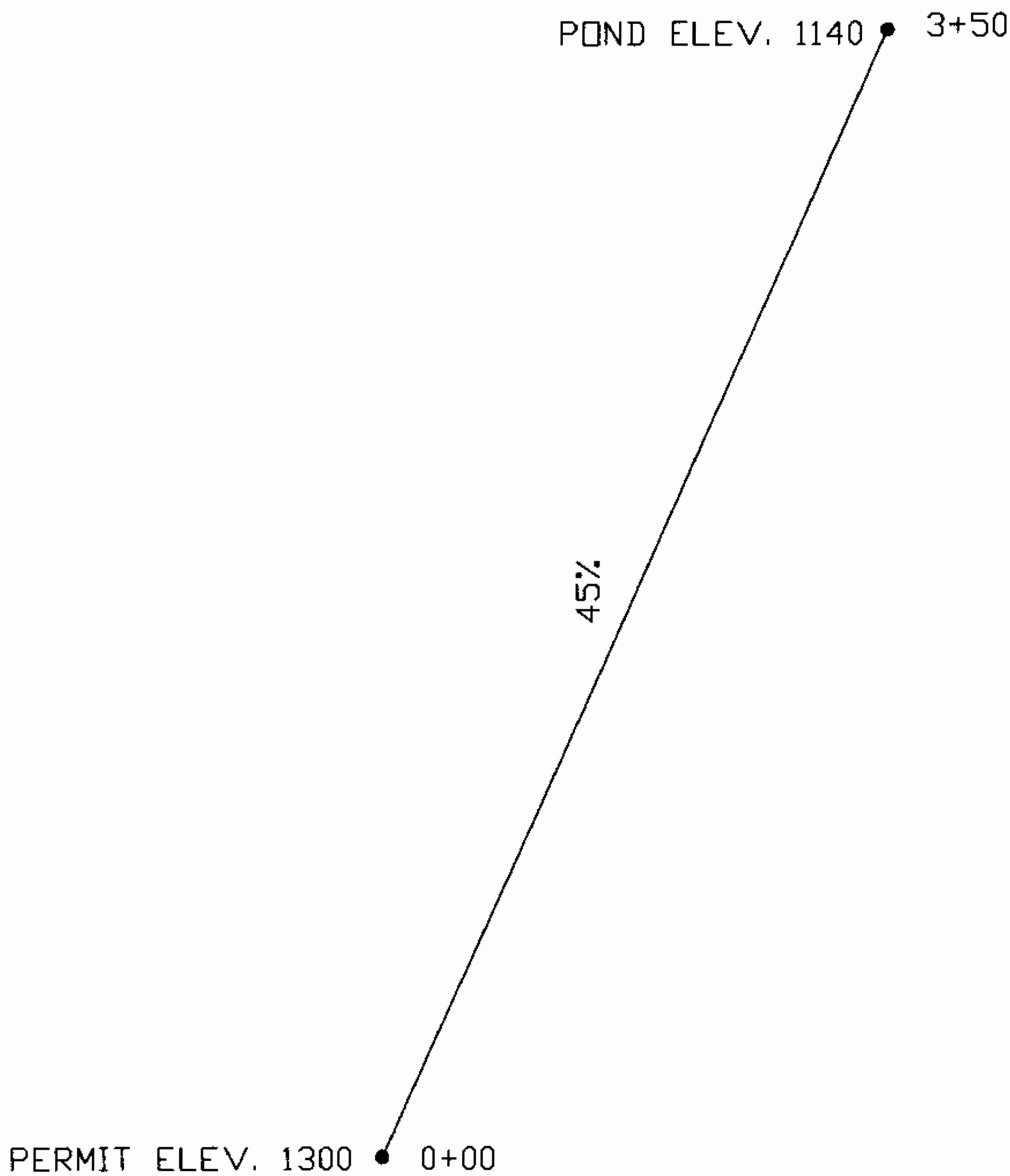
807-0339



I, ____, 12575, 12/20/05,
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

POND ROAD SS#2

1" = 50'



I, [signature] , 12575 , 12/20/05 ,
(signature) (registration no.) (date)

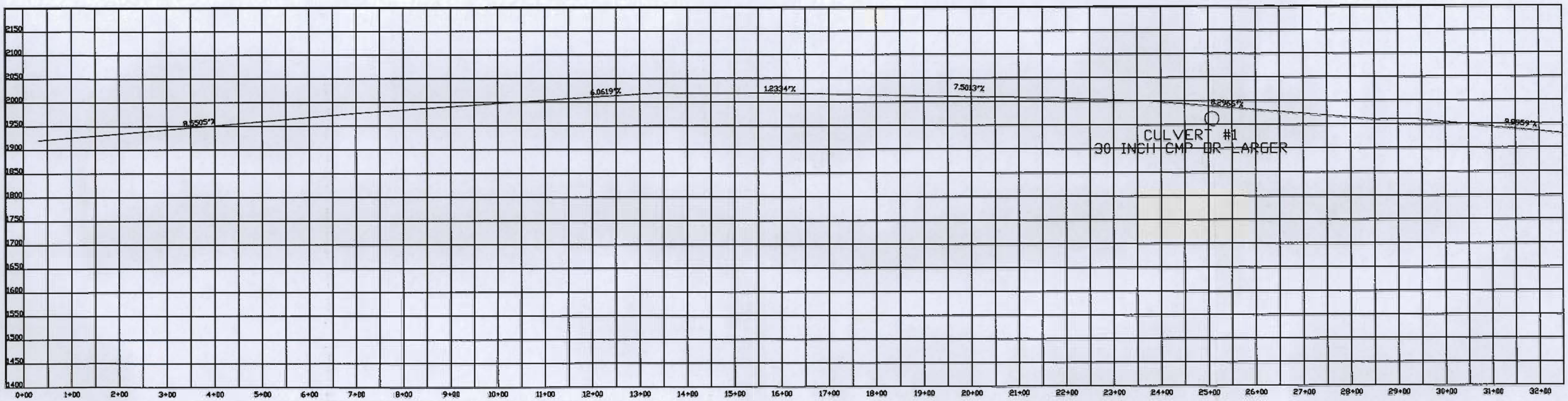
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

807-0339

ATTACHMENT 33.1. G

HAUL RD "C"

1' = 200'



STATE OF KENTUCKY
DON R. ROBERTS
12,575
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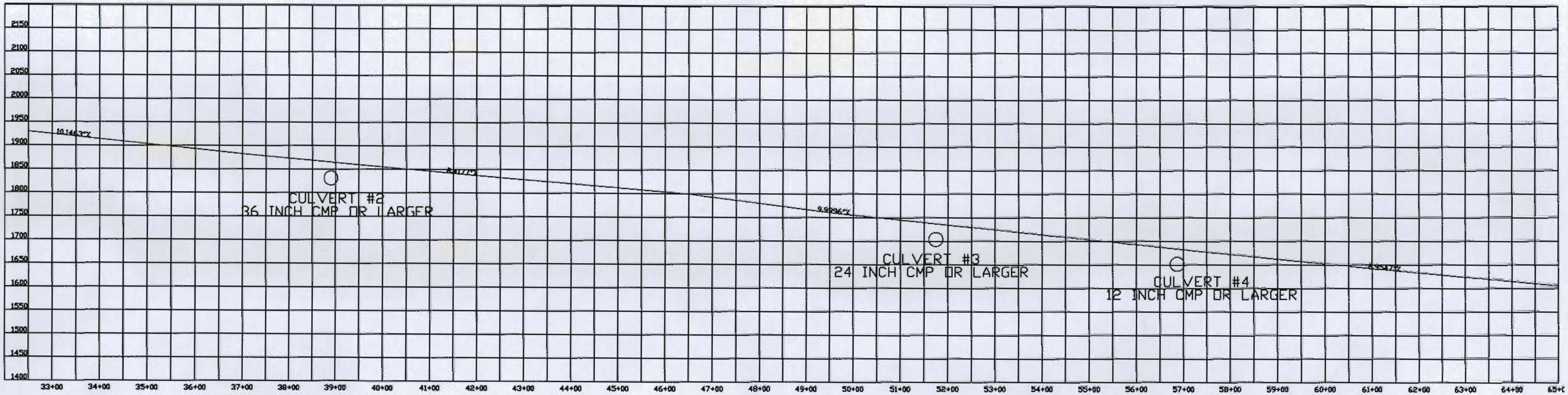
HAUL RD "C"

1'=200'



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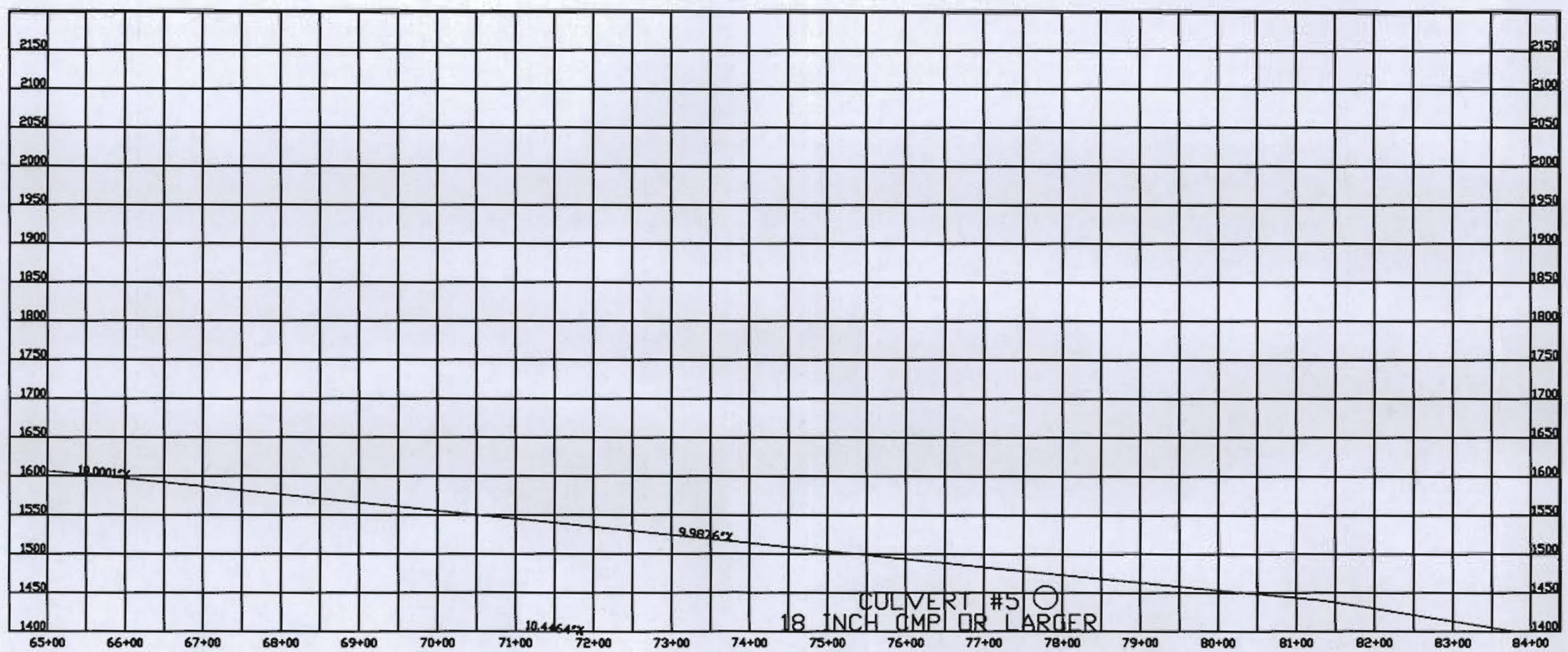
HAUL RD "C"

1'=200'



STATE OF KENTUCKY
DON R. ROBERTS
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I, [signature], 12575, 01-24-08
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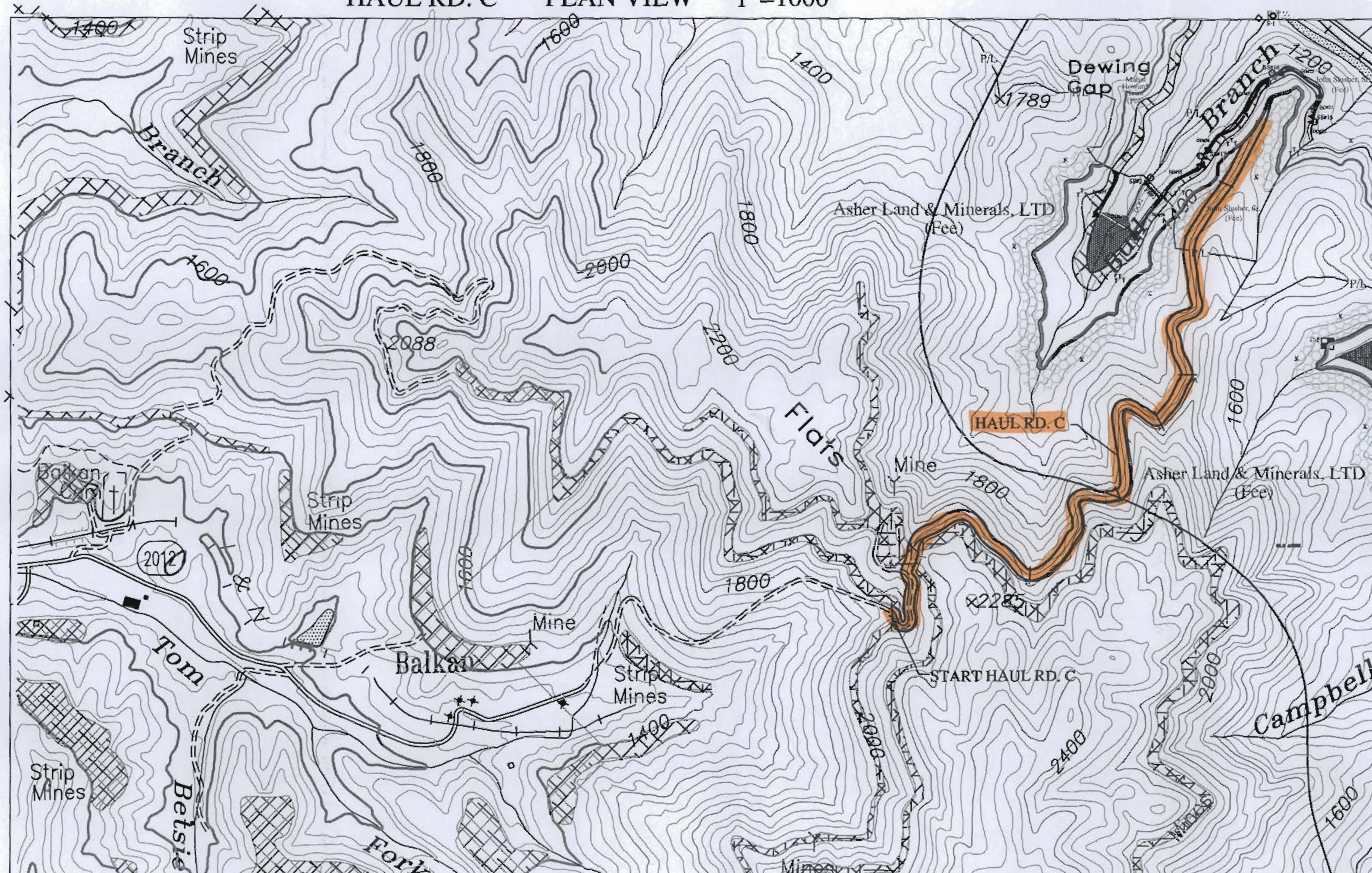
HAUL RD. C PLAN VIEW 1"=1000'



12575 01-24-08
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR ... Section 10, that this document is correct as determined by accepted engineering practices and includes all the ... required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

CULVERT# 1

INPUT

RUNOFF COEFF "C"=	0.15
INTENSITY "I"=	8.88
DRAINAGE AREA "A"=	24.31
LENGTH "L"	1563
HEIGHT "H"	500

OUTPUT

CIA=	32.38 cfs
ADDITIONAL FLOW=	0.00 cfs
TOTAL FLOW=	32.38 cfs
Tc=	3.483

MANNING'S EQ.	Q=CIA Tc = 0.0078(L^1.5/H^0.5)^0.770

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ______________, 12575, 1/24/08
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Culvert#1

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
102.00	1.00	0.0150	4.00	0.00	0.90

Culvert Results:

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

Detailed Performance Curves

Design Discharge = 32.38 cfs

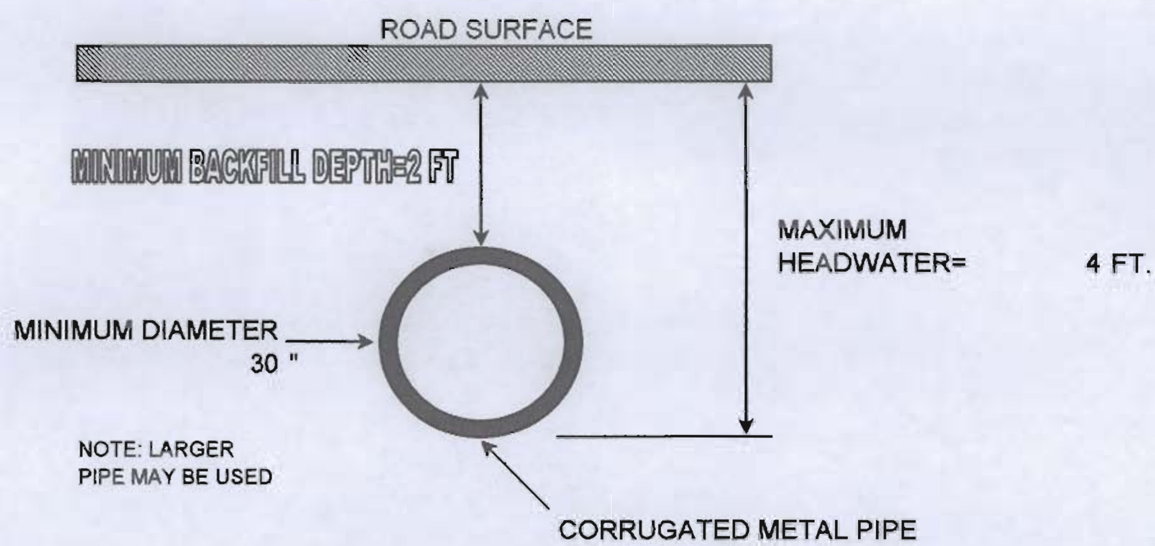
Maximum Headwater = 4.00 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (24 in)	**Discharge (cfs) (30 in)**	Discharge (cfs) (36 in)
0.40	1.07	**1.33**	1.59
0.80	3.00	**3.75**	4.50
1.20	5.51	**6.88**	8.26
1.60	8.48	**10.59**	12.71
2.00	11.85	**14.81**	17.77
2.40	15.35	**19.46**	23.36
2.80	18.22	**24.53**	29.43
3.20	20.74	**28.90**	35.96
3.60	22.74	**32.77**	42.27
4.00	24.24	**36.22**	47.70
4.40	25.67	**39.37**	52.64
4.80	27.01	**42.29**	57.14
5.20	28.29	**44.88**	61.31
5.60	29.52	**47.01**	65.22
6.00	30.69	**49.06**	68.92

CULVERT DESIGN

CULVERT# 1



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

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ATTACHMENT 33.1.G (6)

807-0339

CULVERT# 2

INPUT	
RUNOFF COEFF "C"=	0.15
INTENSITY "I"=	8.88
DRAINAGE AREA "A"=	34.90
LENGTH "L"	2440
HEIGHT "H"	575

OUTPUT	
CIA=	46.49 cfs
ADDITIONAL FLOW=	0.00 cfs
TOTAL FLOW=	46.49 cfs
Tc=	5.522

MANNING'S EQ.	Q=CIA Tc = 0.0078(L^1.5/H^0.5)^0.770

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

I, ______ (signature), 12575 (registration no.), 01-24-08 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Culvert#2

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
102.00	1.00	0.0150	4.00	0.00	0.90

Culvert Results:

Minimum pipe diameter: 1 - 36 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 46.49 cfs

Maximum Headwater = 4.00 ft

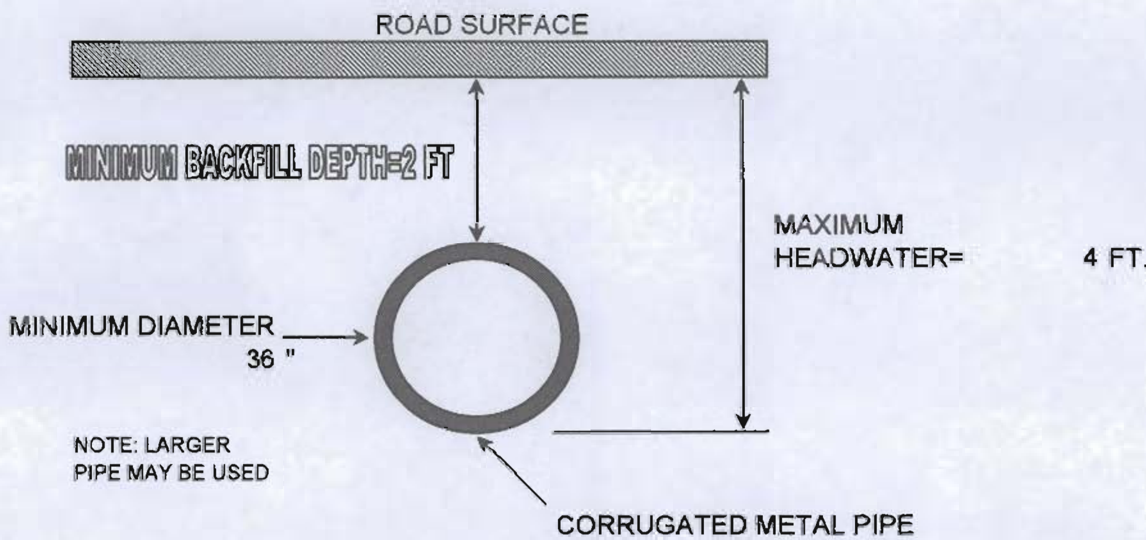
(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (30 in)	**Discharge (cfs) (36 in)**	Discharge (cfs) (42 in)
0.40	1.33	**1.59**	1.86
0.80	3.75	**4.50**	5.24
1.20	6.88	**8.26**	9.63
1.60	10.59	**12.71**	14.83
2.00	14.81	**17.77**	20.73
2.40	19.46	**23.36**	27.25
2.80	24.53	**29.43**	34.34
3.20	28.90	**35.96**	41.95
3.60	32.77	**42.27**	50.06
4.00	36.22	**47.70**	58.63
4.40	39.37	**52.64**	65.63
4.80	42.29	**57.14**	72.28
5.20	44.88	**61.31**	78.36
5.60	47.01	**65.22**	84.01
6.00	49.06	**68.92**	89.30

ATTACHMENT 33.1.G (9) 807-0339

CULVERT DESIGN

CULVERT# 2



STATE OF KENTUCKY
DON R.
ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

_____________, 12575, 01-24-08
(signature) (registration no.) (date)

I hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

CULVERT# 3

INPUT

RUNOFF COEFF "C"=	0.15
INTENSITY "I"=	8.88
DRAINAGE AREA "A"=	8.95
LENGTH "L"	1443
HEIGHT "H"	460

OUTPUT

CIA=	11.92 cfs
ADDITIONAL FLOW=	0.00 cfs
TOTAL FLOW=	11.92 cfs
Tc=	3.280

MANNING'S EQ. Q=CIA
Tc = 0.0078(L^1.5/H^0.5)^0.770

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Culvert#3

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
102.00	1.00	0.0150	2.10	0.00	0.90

Culvert Results:

Minimum pipe diameter: 1 - 24 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 11.92 cfs

Maximum Headwater = 2.10 ft

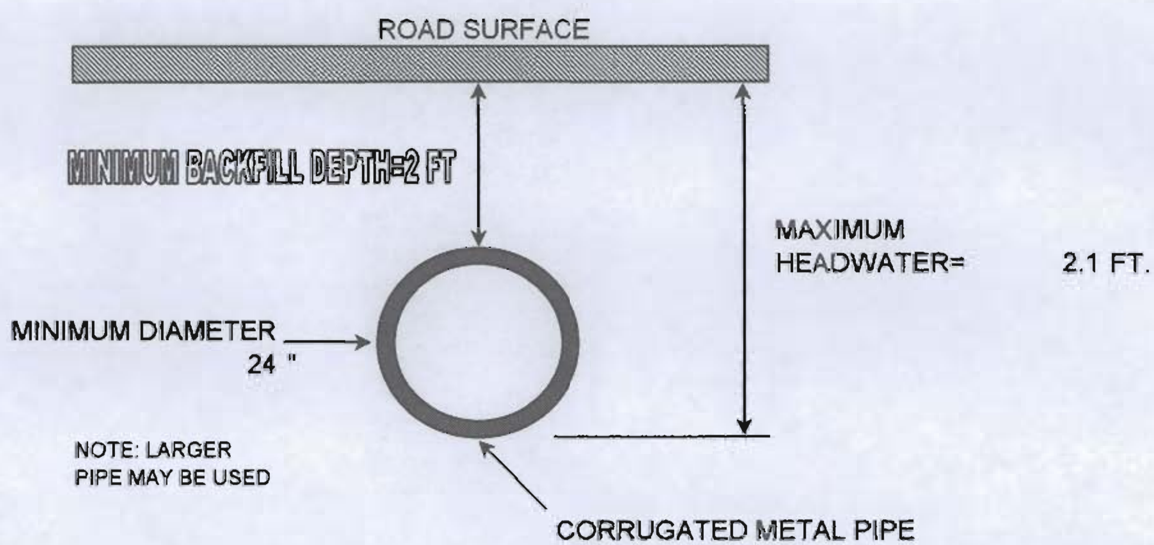
(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (21 in)	**Discharge (cfs) (24 in)**	Discharge (cfs) (30 in)
0.21	0.35	**0.40**	0.52
0.42	1.00	**1.15**	1.43
0.63	1.84	**2.10**	2.62
0.84	2.82	**3.23**	4.03
1.05	3.94	**4.51**	5.63
1.26	5.18	**5.92**	7.40
1.47	6.53	**7.46**	9.33
1.68	7.98	**9.12**	11.40
1.89	9.52	**10.88**	13.60
2.10	11.06	**12.74**	15.93
2.31	12.26	**14.70**	18.38
2.52	13.43	**16.24**	20.94
2.73	14.51	**17.75**	23.61
2.94	15.33	**19.14**	26.23
3.15	15.97	**20.44**	28.37

ATTACHMENT 33.1.G (12)

CULVERT DESIGN

CULVERT# 3



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807-0339

CULVERT# 4

INPUT

RUNOFF COEFF "C"=	0.15
INTENSITY "I"=	8.88
DRAINAGE AREA "A"=	1.33
LENGTH "L"	801
HEIGHT "H"	270

OUTPUT

CIA=	1.77 cfs
ADDITIONAL FLOW=	0.00 cfs
TOTAL FLOW=	1.77 cfs
Tc=	2.040

MANNING'S EQ. Q=CIA

Tc = 0.0078(L^1.5/H^0.5)^0.770

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Culvert#4

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
102.00	1.00	0.0150	1.00	0.00	0.90

Culvert Results:

Minimum pipe diameter: 1 - 12 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 1.77 cfs

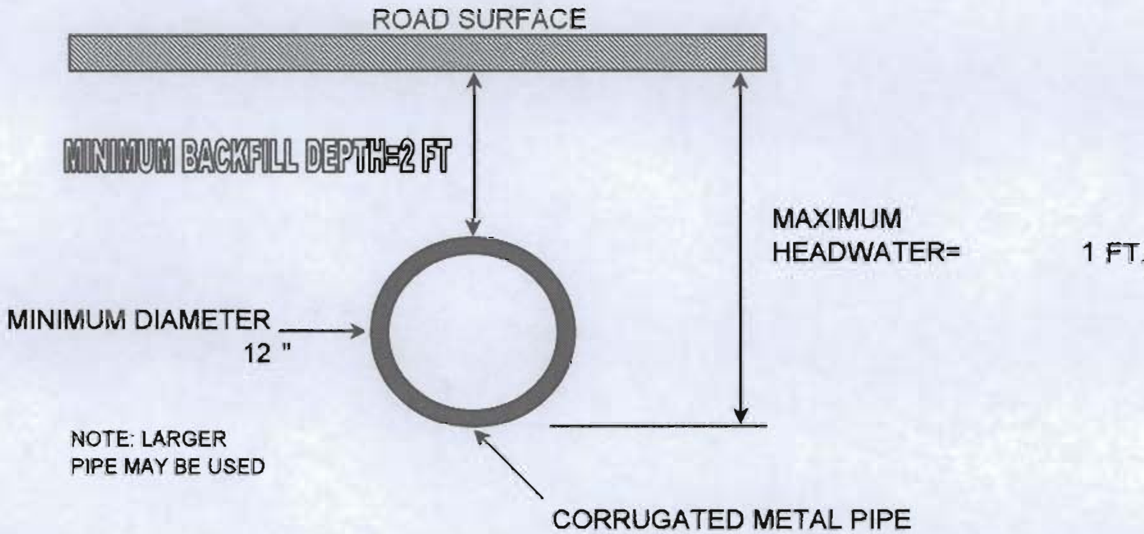
Maximum Headwater = 1.00 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (10 in)	**Discharge (cfs) (12 in)**	Discharge (cfs) (15 in)
0.10	0.07	**0.08**	0.09
0.20	0.16	**0.19**	0.24
0.30	0.29	**0.35**	0.43
0.40	0.44	**0.53**	0.66
0.50	0.62	**0.74**	0.93
0.60	0.81	**0.98**	1.22
0.70	0.99	**1.23**	1.54
0.80	1.15	**1.50**	1.87
0.90	1.30	**1.79**	2.24
1.00	1.55	**2.10**	2.62
1.10	1.91	**2.41**	3.02
1.20	1.97	**2.70**	3.44
1.30	2.03	**2.94**	3.88
1.40	2.09	**3.08**	4.34
1.50	2.16	**3.23**	4.73

CULVERT DESIGN

CULVERT# 4



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ATTACHMENT 33.1.G (15)

807-0339

CULVERT# 5

INPUT

RUNOFF COEFF "C"=	0.15
INTENSITY "I"=	8.88
DRAINAGE AREA "A"=	4.25
LENGTH "L"	1279
HEIGHT "H"	245

OUTPUT

=CIA=	5.66 cfs
ADDITIONAL FLOW=	0.00 cfs
TOTAL FLOW=	5.66 cfs
Tc=	3.637

MANNING'S EQ.	Q=CIA Tc = 0.0078(L^1.5/H^0.5)^0.770

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Culvert#5

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
102.00	1.00	0.0150	1.50	0.00	0.90

Culvert Results:

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

Detailed Performance Curves

Design Discharge = 5.66 cfs

Maximum Headwater = 1.50 ft

(BOLD indicates design pipe size)

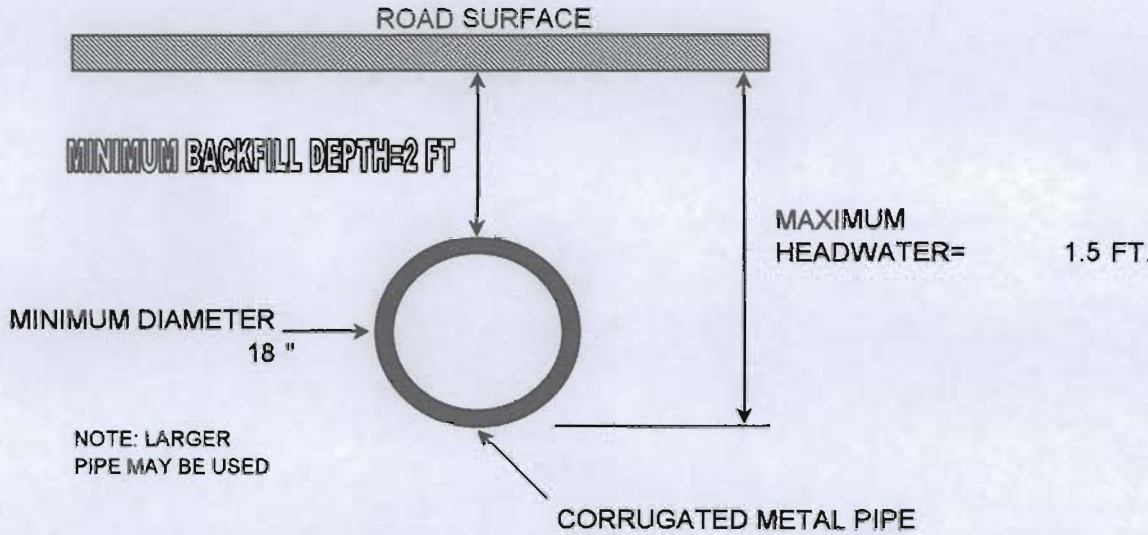
Headwater (ft)	Discharge (cfs) (15 in)	**Discharge (cfs) (18 in)**	Discharge (cfs) (21 in)
0.15	0.15	**0.18**	0.21
0.30	0.43	**0.52**	0.60
0.45	0.80	**0.96**	1.11
0.60	1.22	**1.47**	1.71
0.75	1.70	**2.04**	2.38
0.90	2.24	**2.68**	3.13
1.05	2.82	**3.38**	3.94
1.20	3.44	**4.13**	4.82
1.35	4.11	**4.93**	5.75
1.50	4.75	**5.77**	6.73
1.65	5.28	**6.66**	7.77
1.80	5.72	**7.47**	8.85
1.95	6.03	**8.20**	9.98
2.10	6.28	**8.88**	10.99
2.25	6.50	**9.51**	11.90

ATTACHMENT 33.1.G (18)

807-0339

CULVERT DESIGN

CULVERT# 5



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I, [signature] (signature) 12575 (registration no.) 01-24-08 (date) hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

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Attachment 33.1.H

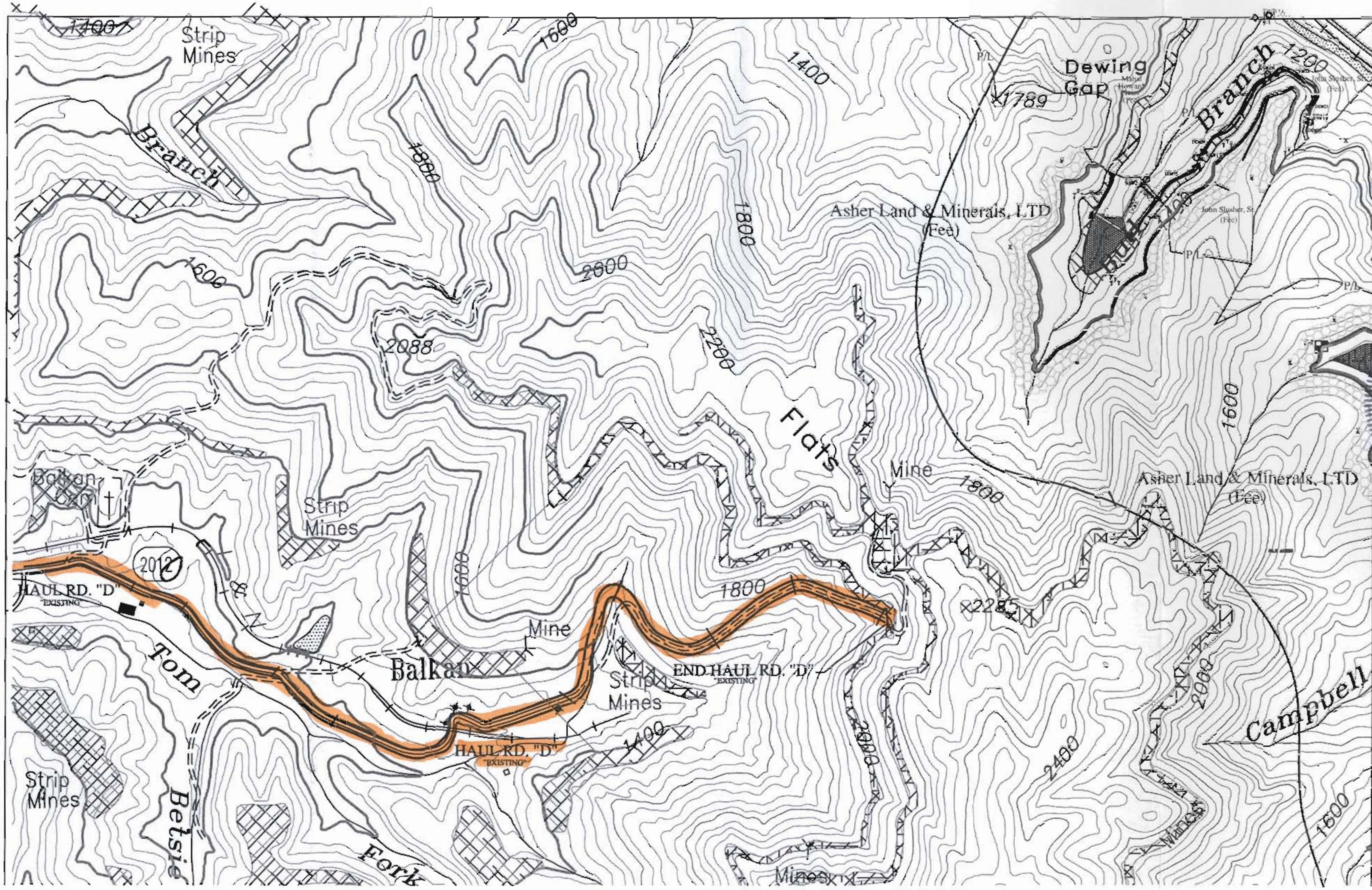
Haul Road "D"

NALLY & HAMILTON ENT., INC.
ROAD SECTION "D"
SCALE: 1' = 100'
ATTACHMENT 33.1.A

Original Engineering Design Work
For Haul Rd "D" Done by J.L. Miller

I, [signature] 12575 08/01/06
(signature) (date)
hereby certify, in accordance [illegible] 7:040E, Section 10, that this document is correct [illegible] by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

HAUL RD. "D" "EXISTING" 1"=1000'



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(signature) 12575 (registration no.) 01-29-08 (date)

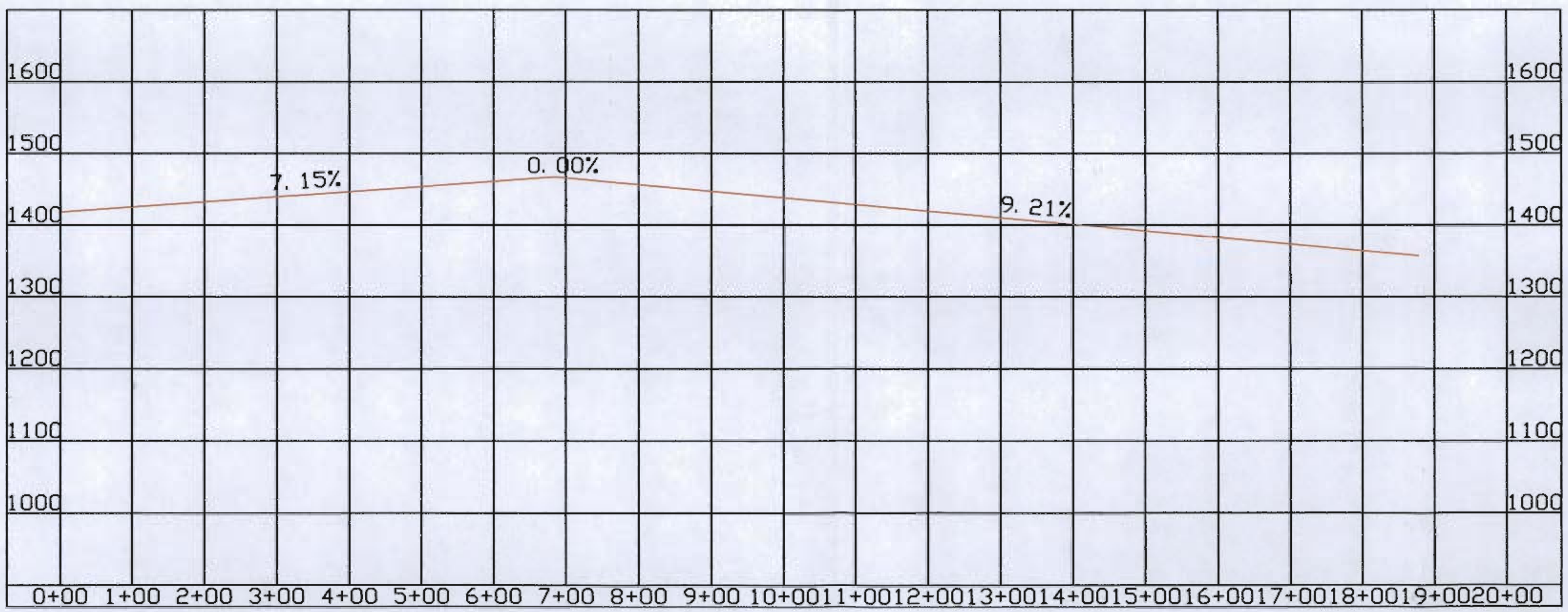
I hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 33.1.I

807-0339

Haul Rd. E

SCALE 1'=200'



I, [signature], 12575, 01-24-08
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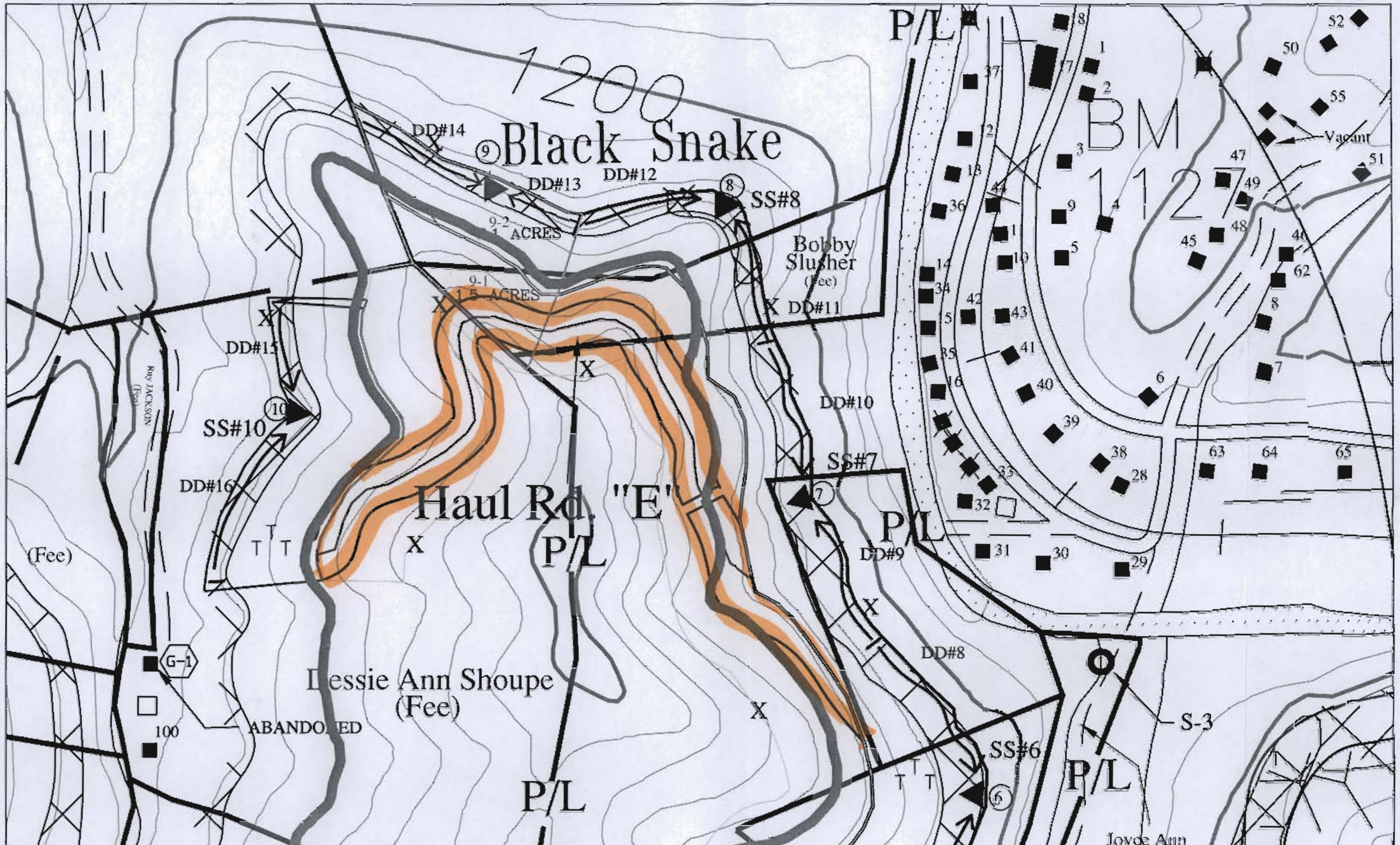
Haul Rd. "E" PLAN VIEW 1"=300'



I, 13575 (registration no.), 01-24-08 (date) (signature) hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

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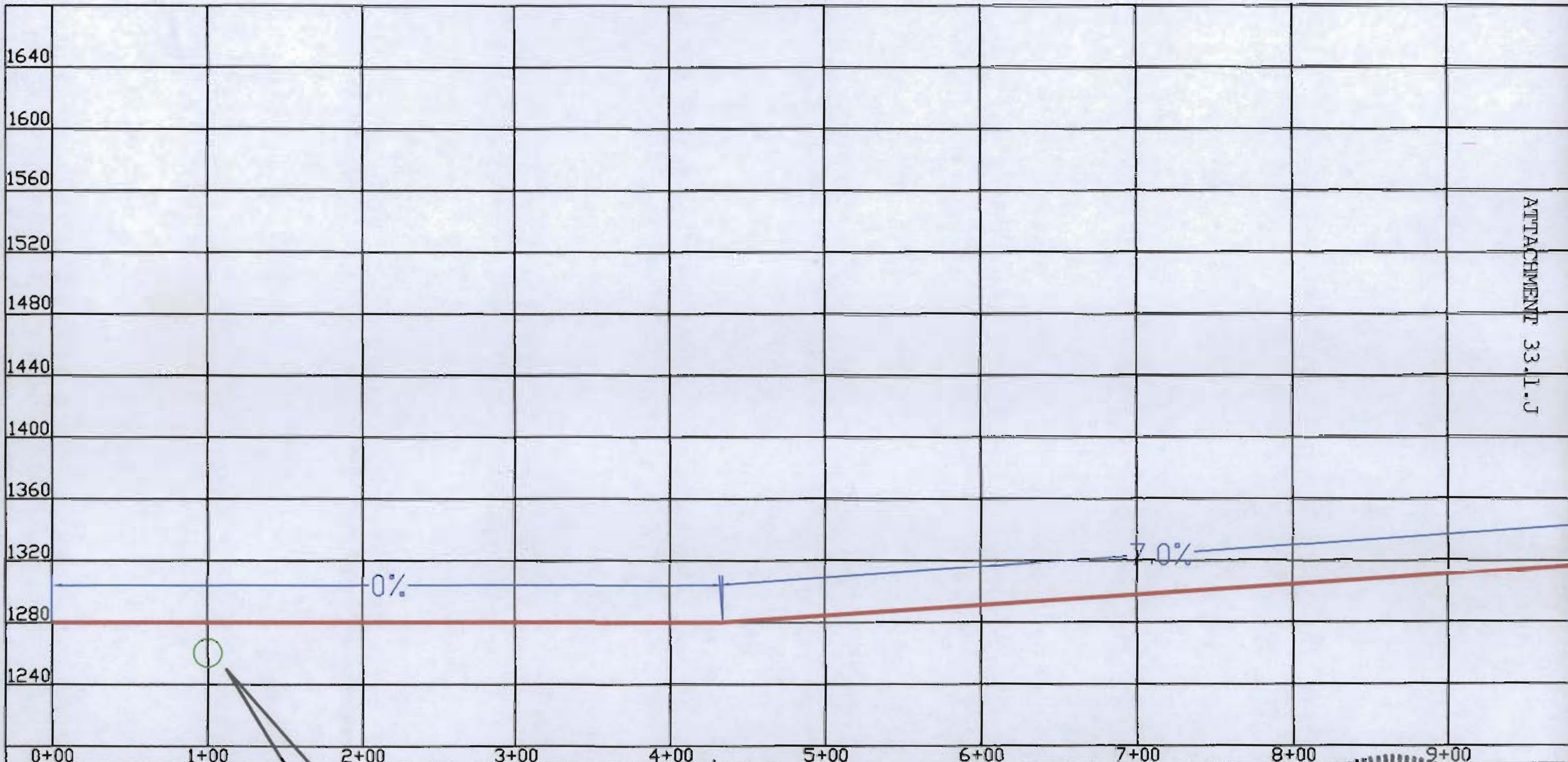
ATTACHMENT 33.1.J



24" Culvert at station 1+00

I, ____________, 12575, 01-24-08

(signature) (registration no.) (date)

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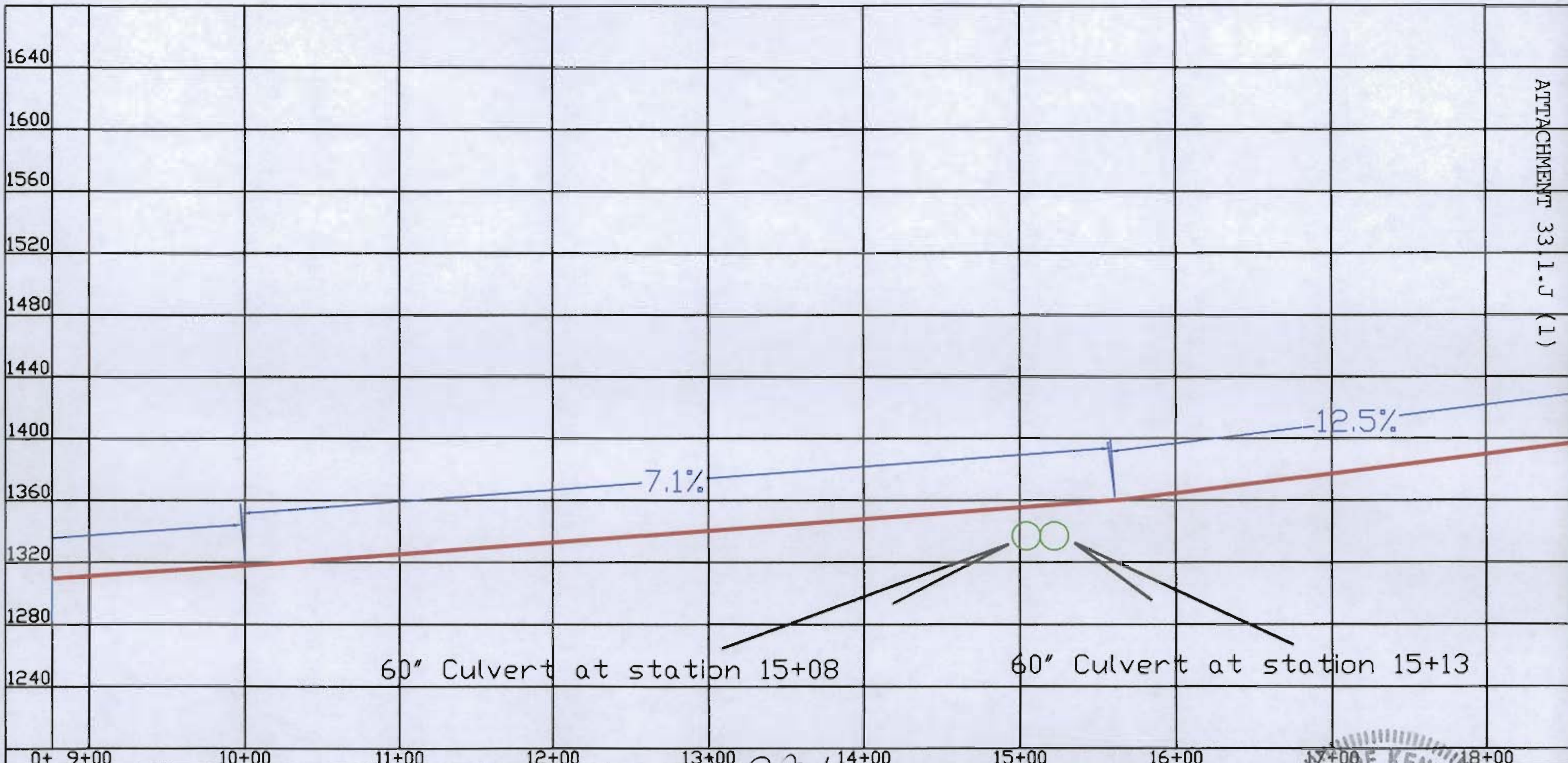
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'

ATTACHMENT 33.1.J (1)



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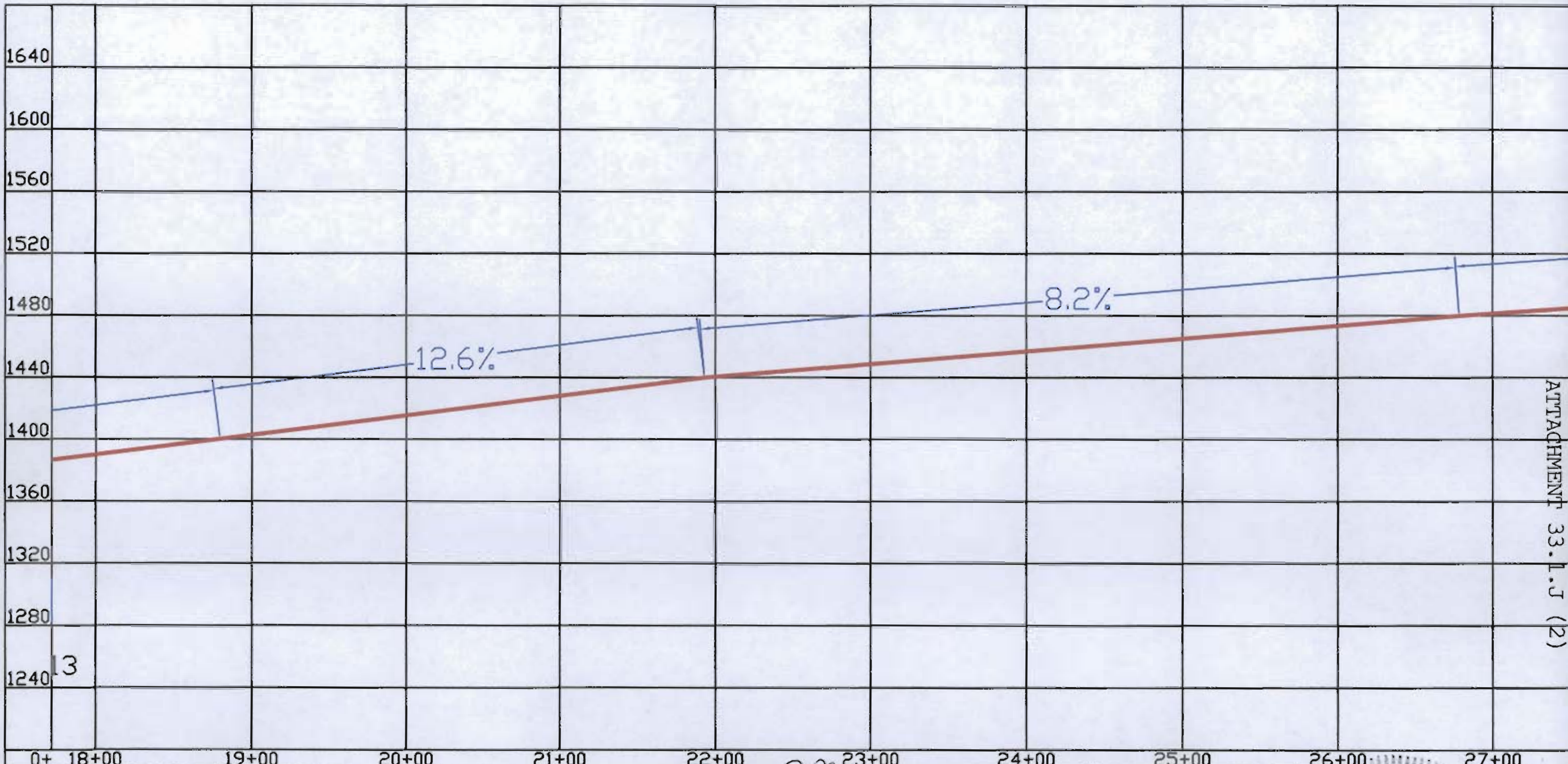
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"	SCALE: 1"=100'



ATTACHMENT 33.1.J (2)

I, [signature], 12575, 01-24-08
(signature) (registration no.) (date)

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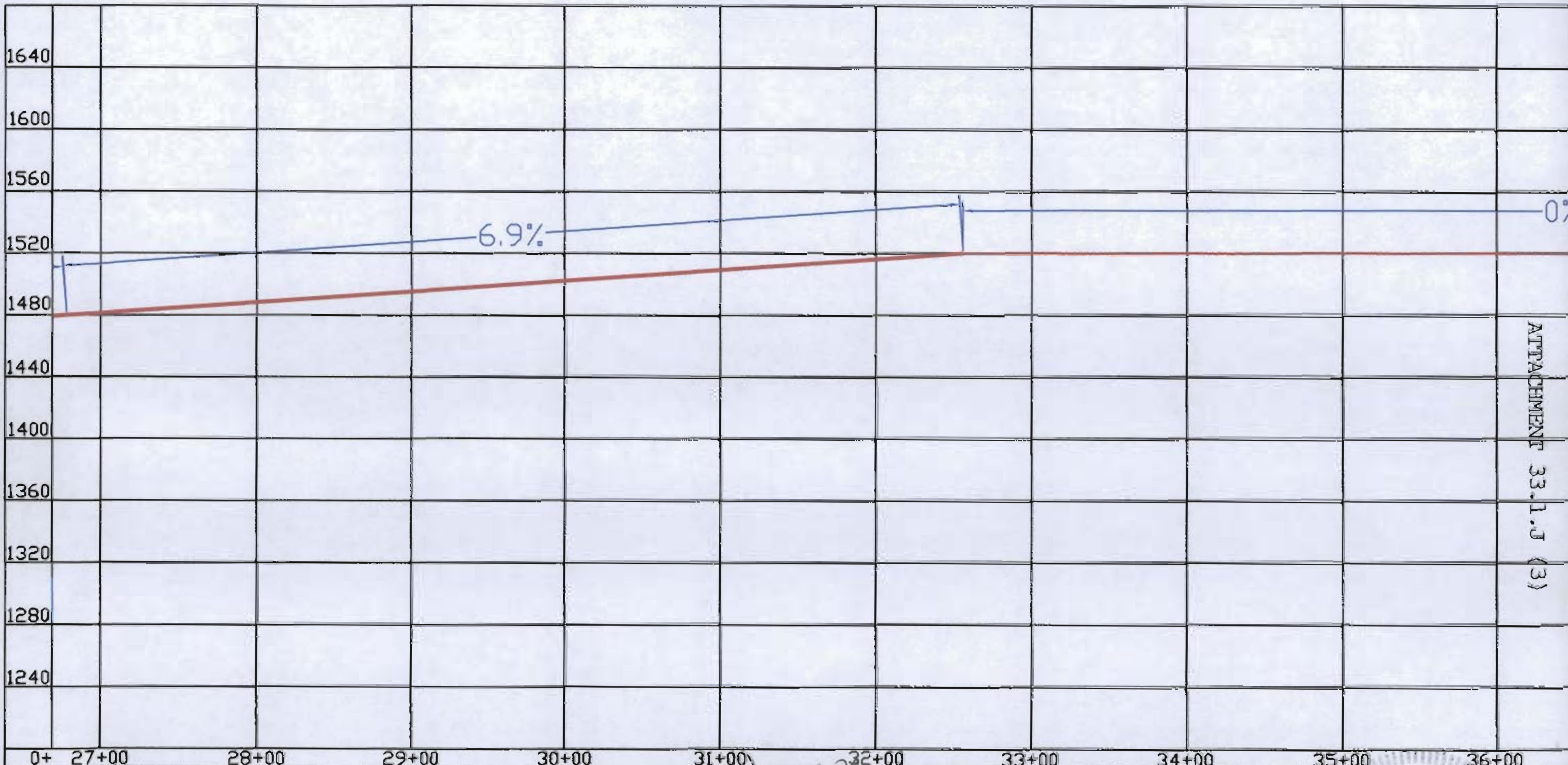
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



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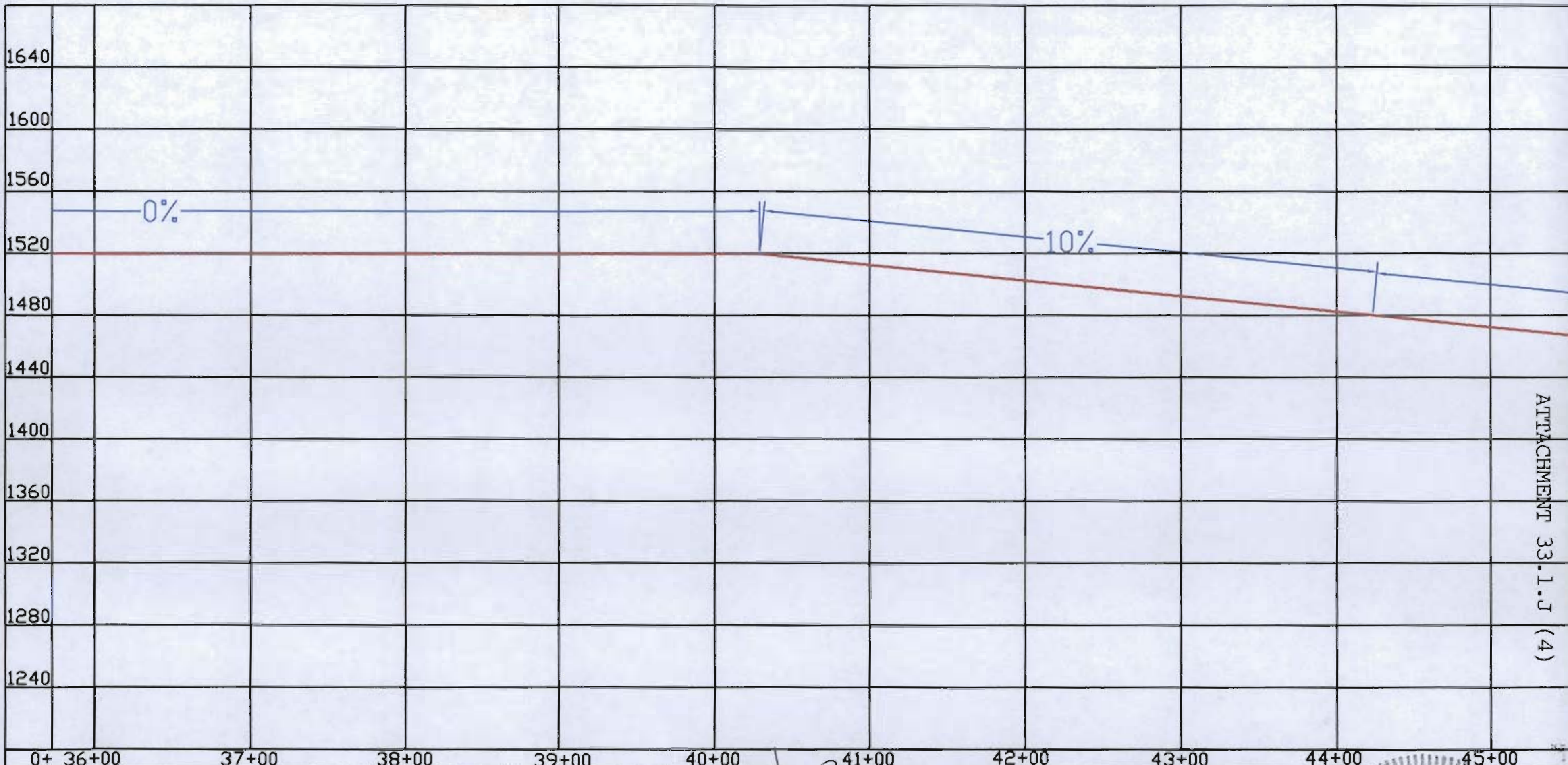
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT 33.1.J (4)

I, [signature], 12575, 01-24-08,
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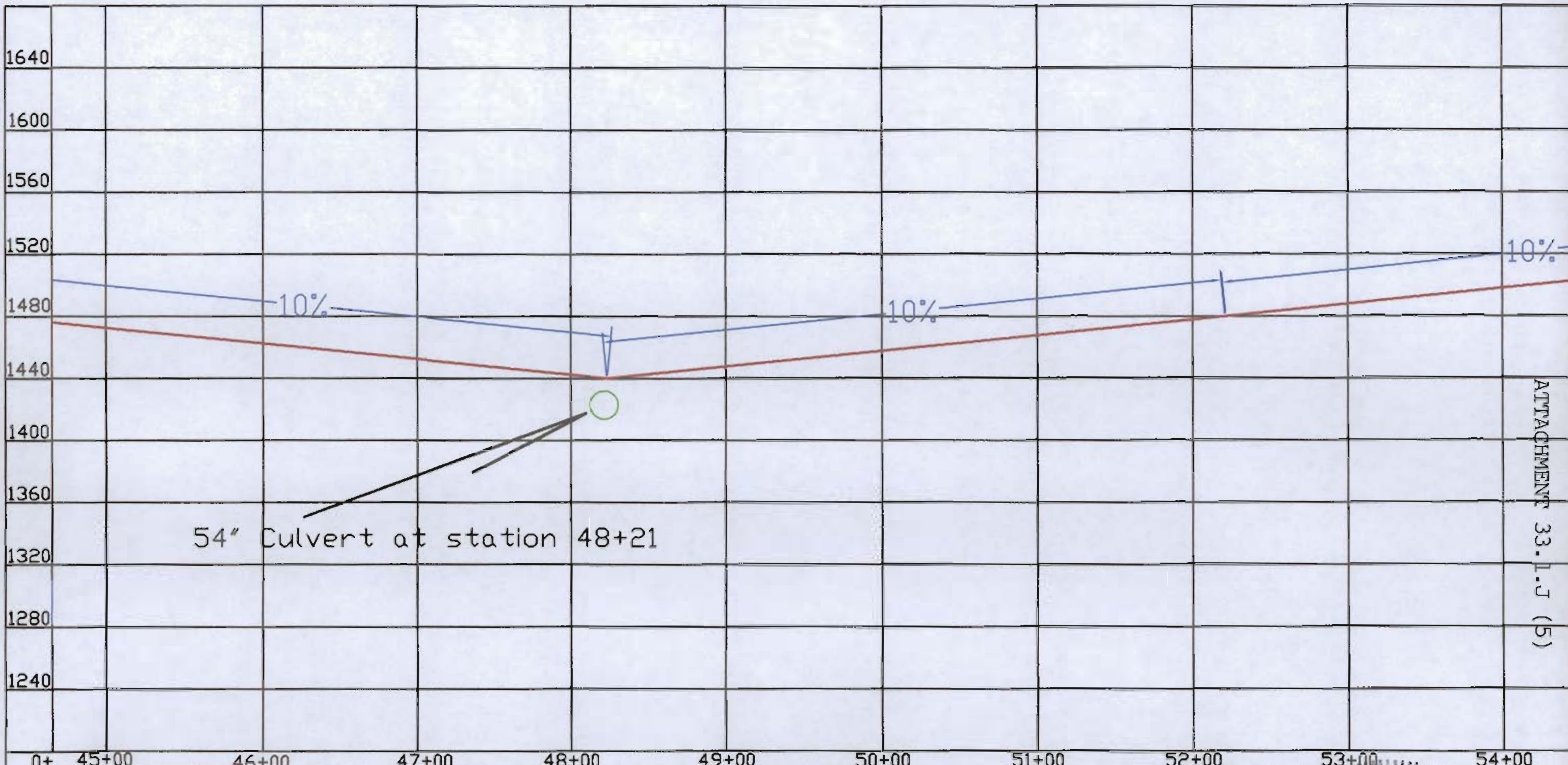
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT 33.1.J (5)

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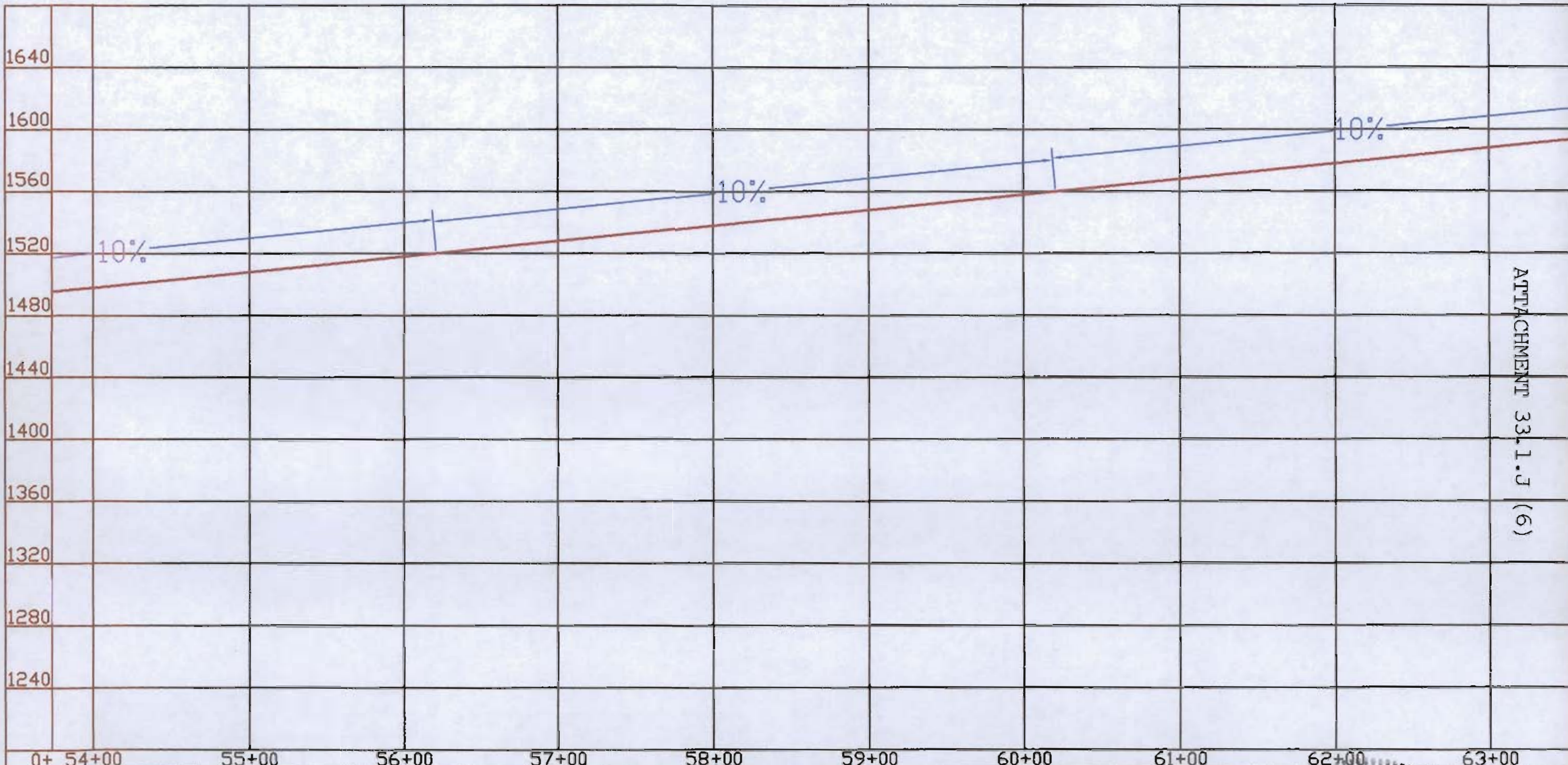
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1″=100′

ATTACHMENT 33.1.J (6)



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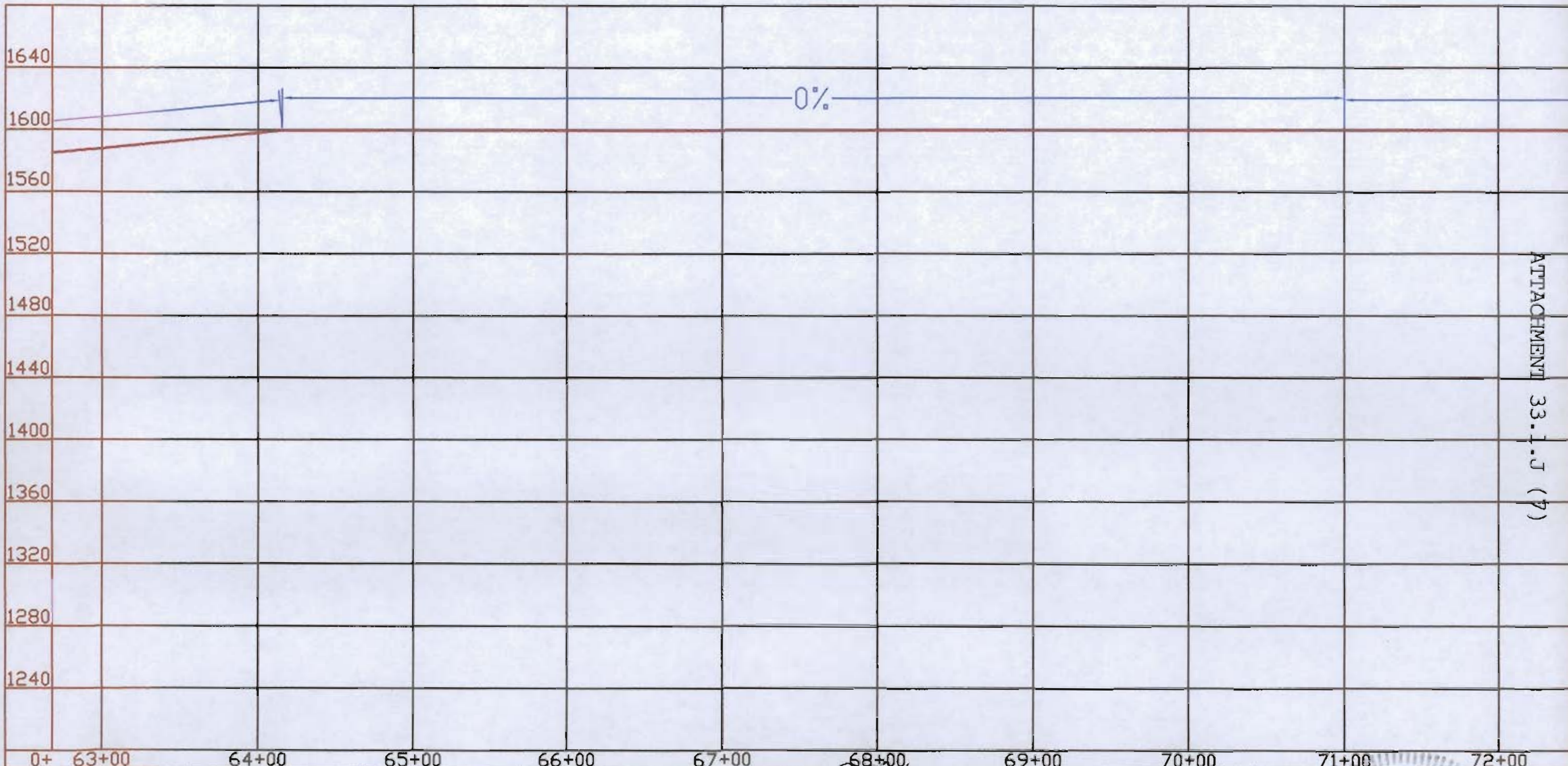
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT 33.1.J (7)

I, [signature] 12575 01-24-08
(registration no.) (date)

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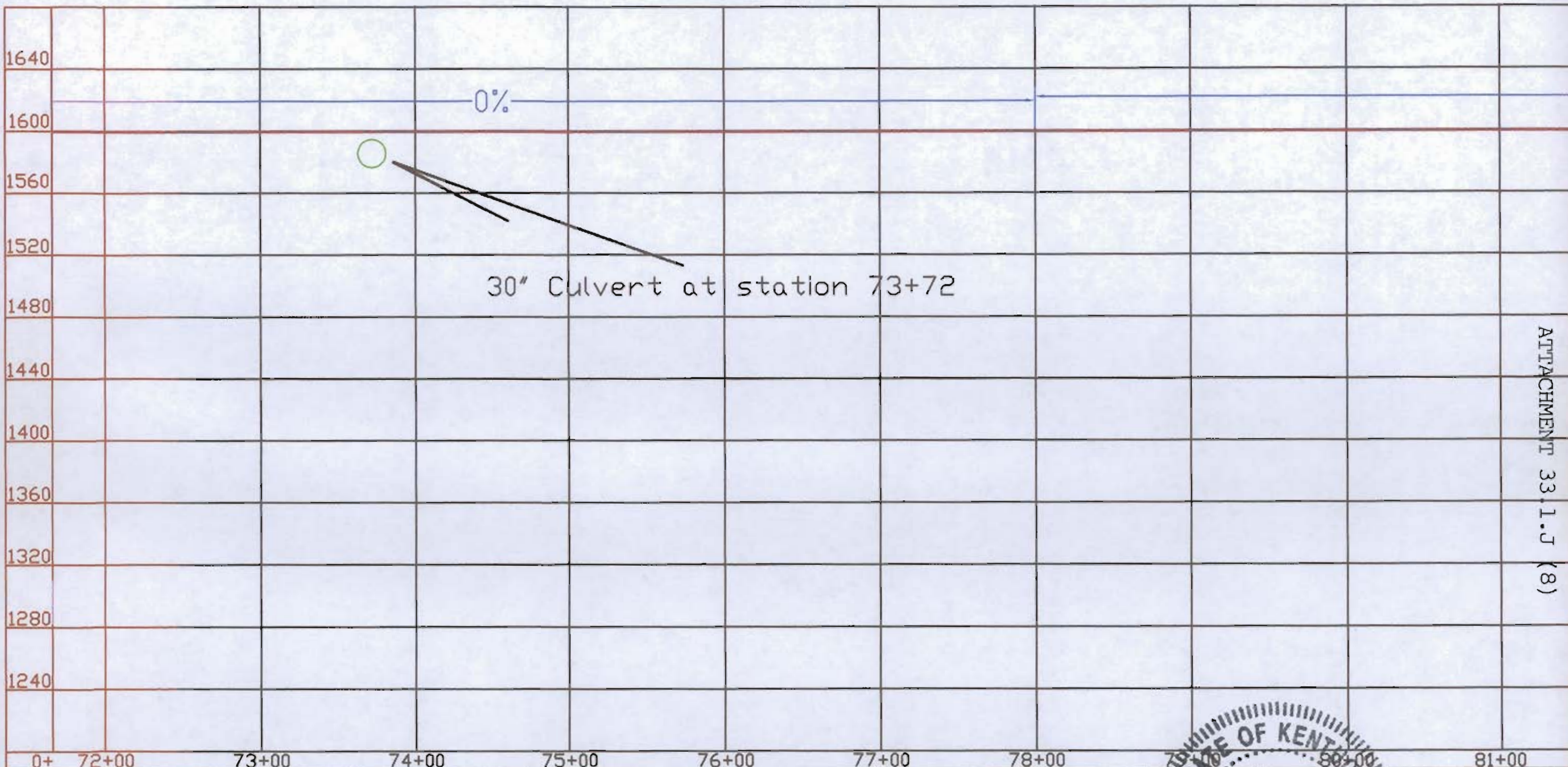
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT 33.1.J (8)

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(date)

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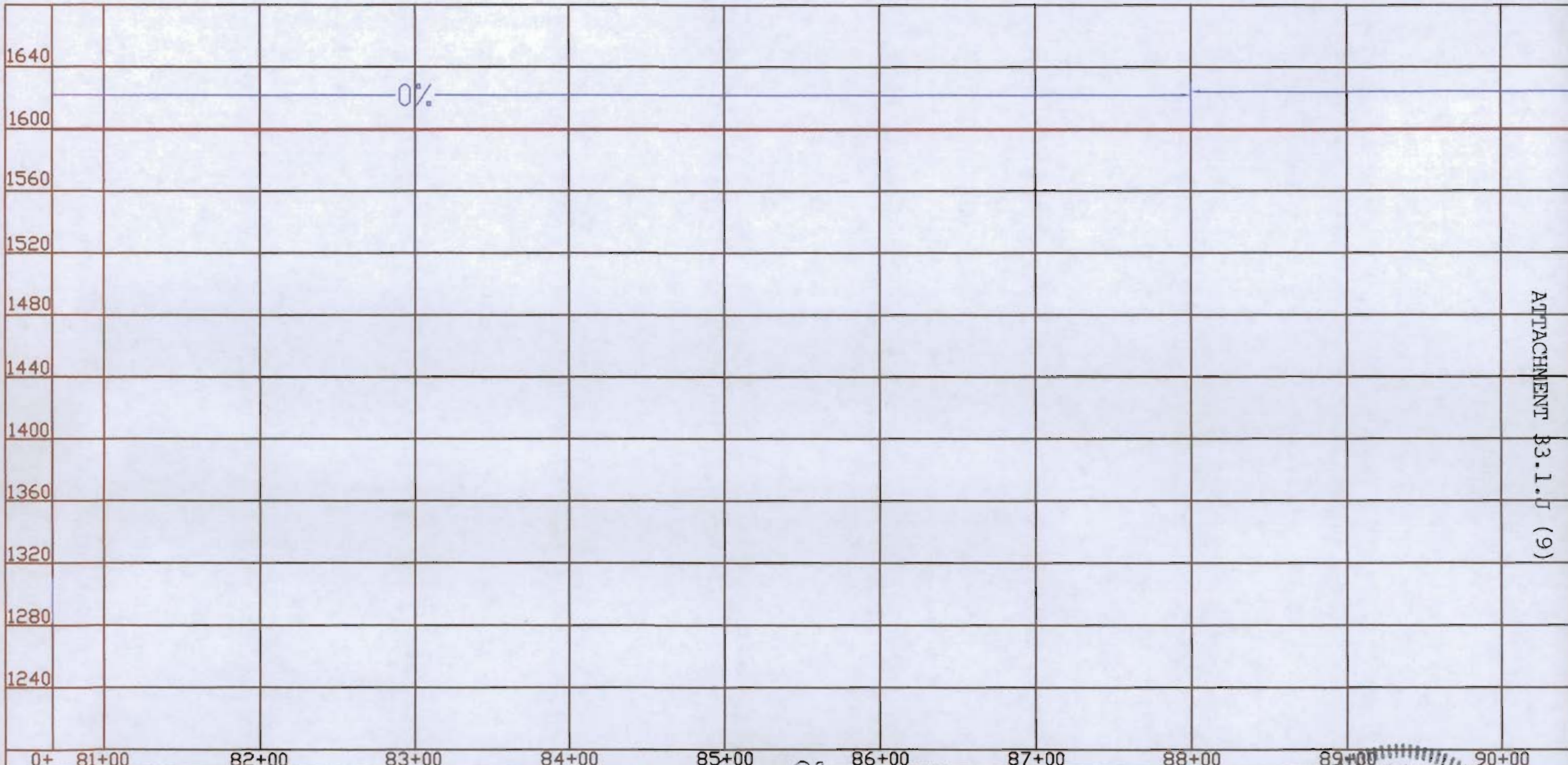
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT B3.1.J (9)

I, [signature], 12575, 01-24-08,
(signature) (registration no.) (date)
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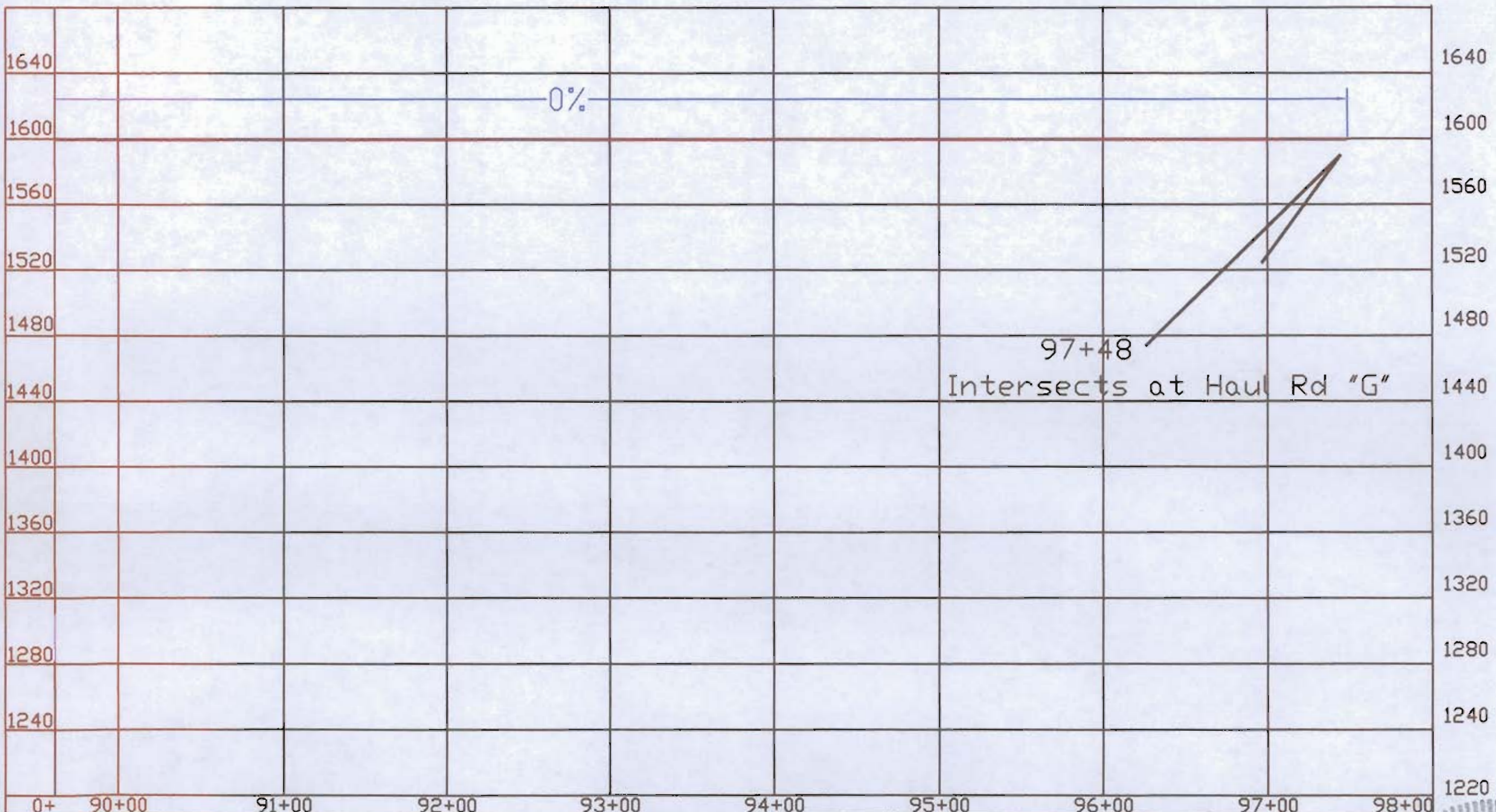
NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'



ATTACHMENT 33.1.J (10)

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(signature) (registration no.) (date)
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NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "F"

SCALE: 1"=100'

Haul Rd "F"
Q100 = C I A

CULVERT at 1+00

A=	13.50	ACRES
C=	0.18	CHART 1003, KY D.O.T. DRAINAGE MANUAL

Tc = 0.0078 (L^1.5/H^0.5) 0.770

L= 1144.00
H= 360.00

Tc= 2.76

I= 8.88 IN./HR (CHART 1005.6)

Q100	=	0.18	8.88	13.50
		C	I	A

Q100 = 21.58 CFS

USING CHART 1045	
SLOPE	0.01 %
DIAMETER	24 IN.
VELOCITY	0.0 FPS.
FLOW DEPTH	0.6 FT.

I, [signature], 12575, 08/01/06
(signature) (registration no.) (date)

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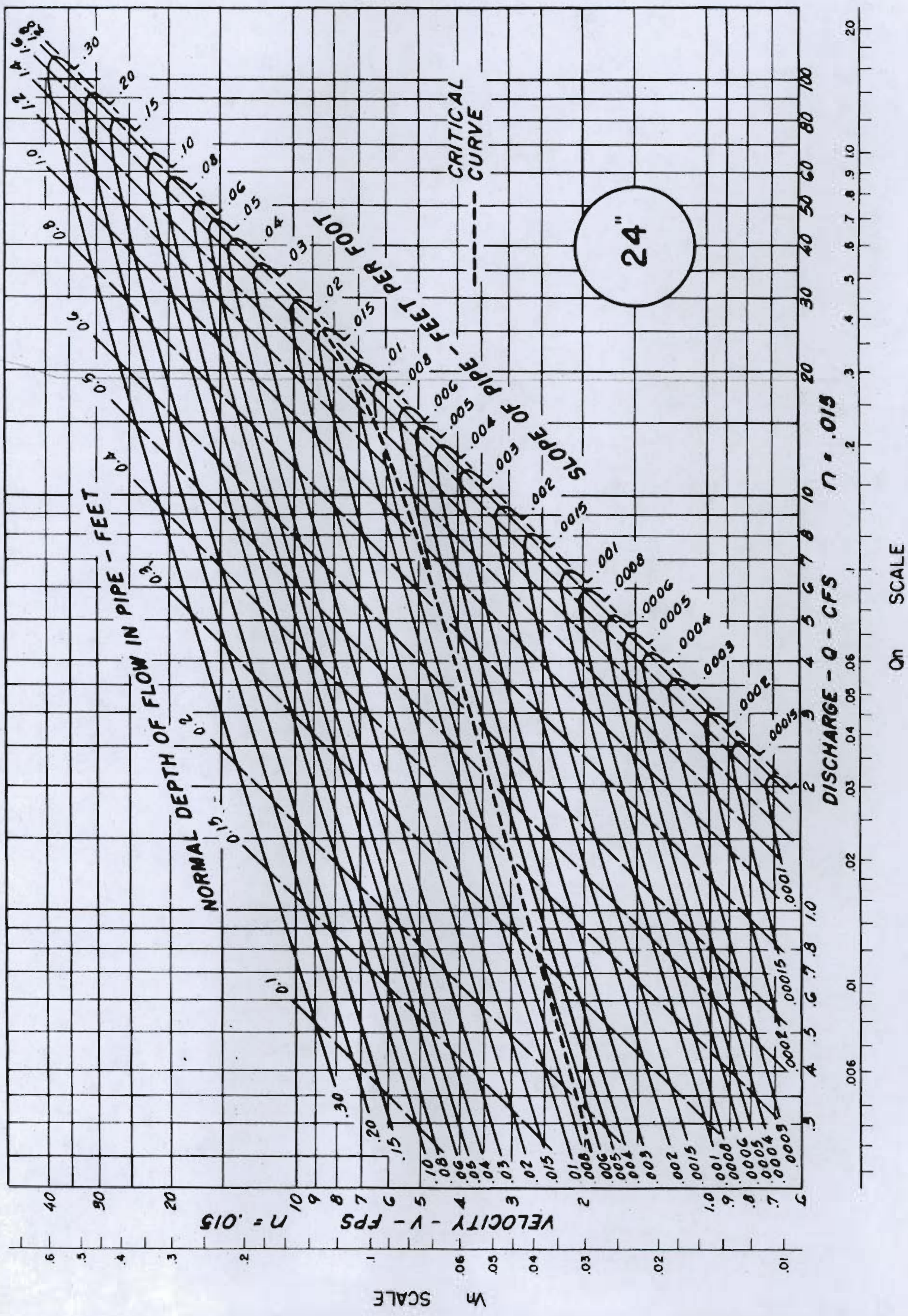


PIPE FLOW CHART
24-INCH DIAMETER

Haul Rd "F"
Q100 = C I A

CULVERT at 15+08

A=	346.20	ACRES
C=	0.18	CHART 1003, KY D.O.T. DRAINAGE MANUAL

Tc = 0.0078 (L^1.5/H^0.5) 0.770

L= 5665.00
H= 1560.00

Tc= 9.95

I= 8.88 IN./HR (CHART 1005.6)

		C	I	A
Q100	=	0.18	8.88	346.20

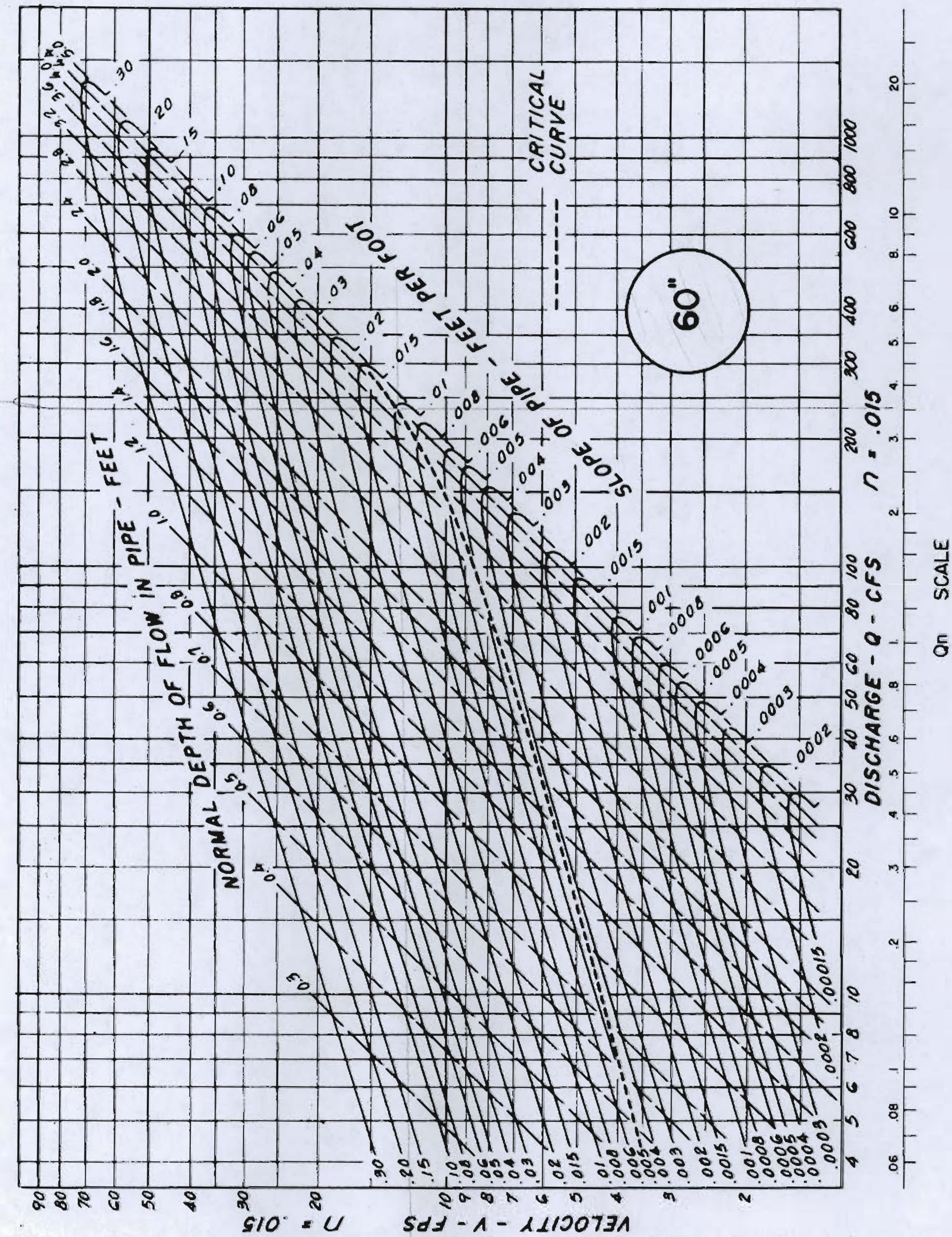
Q100 = 553.37 CFS

USING CHART 1045

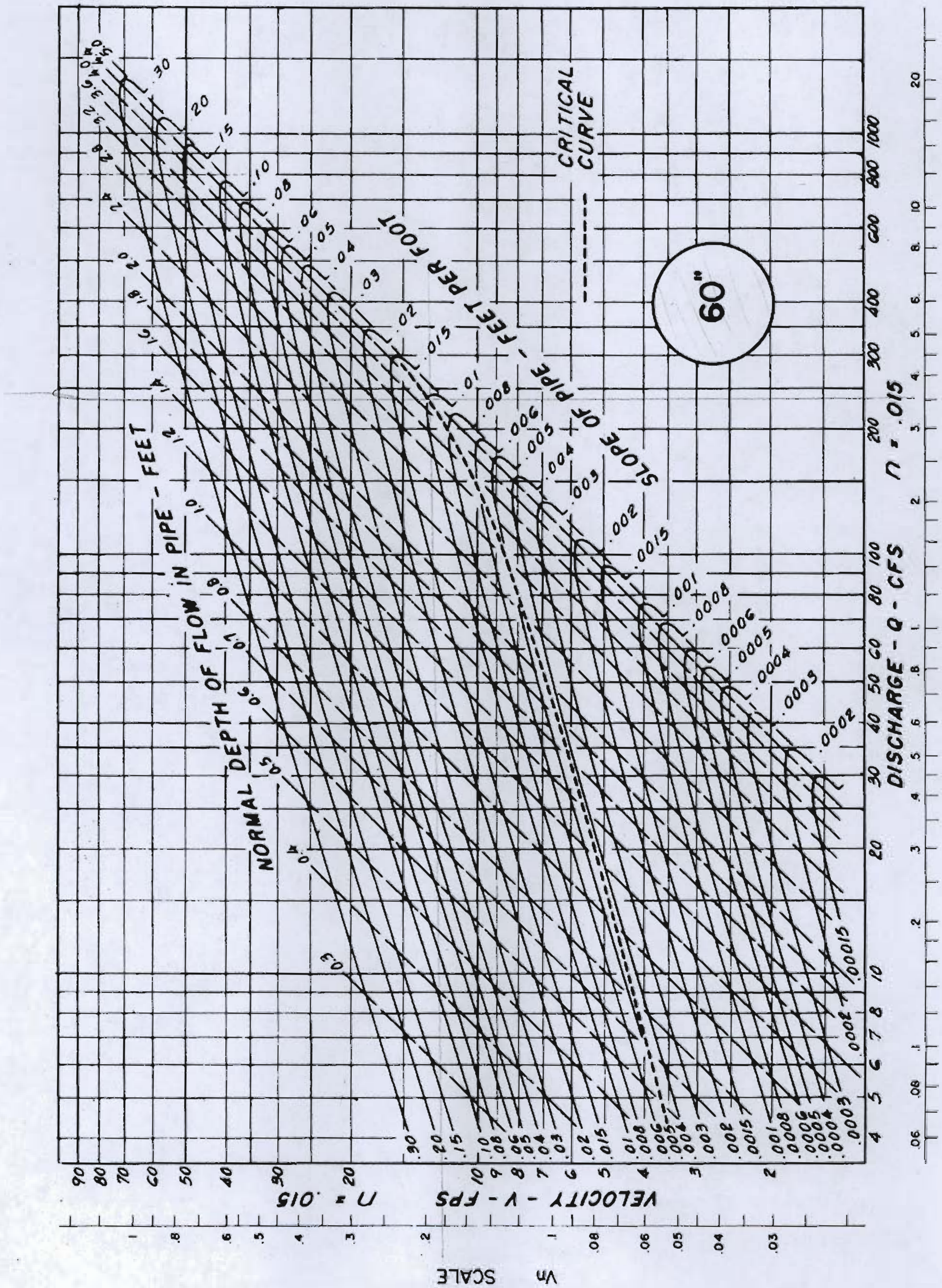
SLOPE	0.01 %
DIAMETER	60 IN.
VELOCITY	0.0 FPS.
FLOW DEPTH	1.4 FT.

I, ______________, 12575, 08/01/06
(signature) (registration no.) (date)

hereby certify in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)



PIPE FLOW CHART
60-INCH DIAMETER



PIPE FLOW CHART
60-INCH DIAMETER

Haul Rd "F"
Q100 = C I A

CULVERT at 15+13

A=	346.20	ACRES
C=	0.18	CHART 1003, KY D.O.T. DRAINAGE MANUAL

$$Tc = 0.0078\ (L^{1.5}/H^{0.5})\ 0.770$$

L= 5665.00
H= 1560.00

Tc= 9.95

I= 8.88 IN./HR (CHART 1005.6)

Q100	=	0.18	8.88	346.20
		C	I	A

Q100 = 553.37 CFS

USING CHART 1045	
SLOPE	0.01 %
DIAMETER	60 IN.
VELOCITY	0.0 FPS.
FLOW DEPTH	1.4 FT.

I, [signature], 12575, 08/01/06,
(signature) (registration no.) (date)
hereby certify in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Haul Rd. "F" - Station 48+21

CULVERT DESIGN

Q100 = C I A

A= 135.53 ACRES

C= 0.18 CHART 1003, KY D.O.T. DRAINAGE MANUAL

$$Tc = 0.0078 (L^{1.5}/H^{0.5})^{0.770}$$

L= 3606.00
H= 1000.00

Tc= 7.01

I= 8.30 IN./HR (CHART 1005.6)

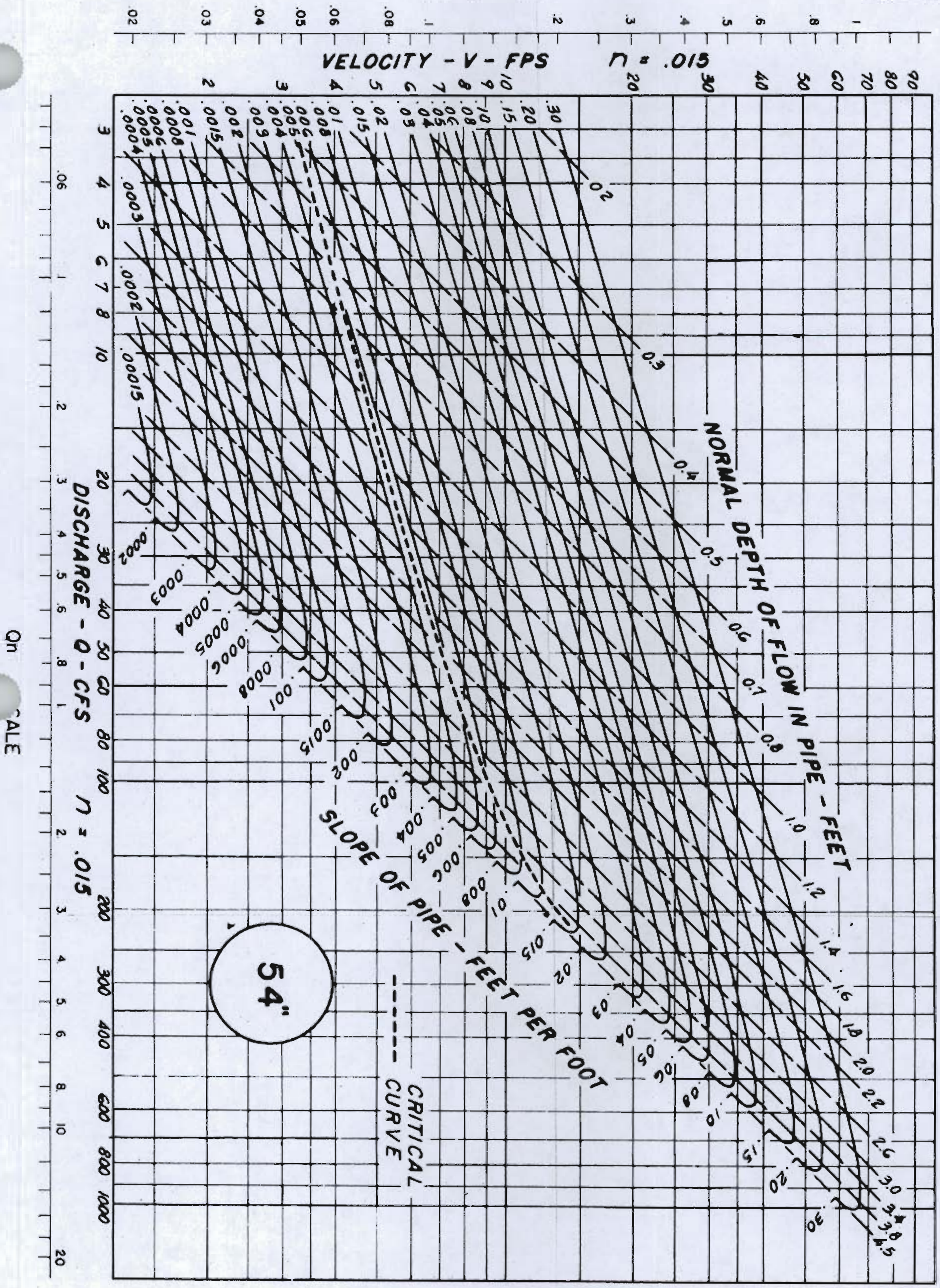
Q100	=	0.18	8.30	135.53
		C	I	A

Q100 = 202.48 CFS

USING CHART 1045	
SLOPE	0.15 %
DIAMETER	54" IN.
VELOCITY	12.0 FPS.
FLOW DEPTH	1.3 FT.

I, [signature], 12575, 08/01/06
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

1045.54



PIPE FLOW CHART
54-INCH DIAMETER

Haul Rd. "F" - Station 73+72

CULVERT DESIGN

Q100 = C I A

A= 30.20 ACRES

C= 0.18 CHART 1003, KY D.O.T. DRAINAGE MANUAL

Tc = 0.0078 (L^1.5/H^0.5) 0.770

L= 1199.00
H= 560.00

Tc= 2.46

I= 8.88 IN./HR (CHART 1005.6)

Q100	=	0.18	8.88	30.20
		C	I	A

Q100 = 48.27 CFS

USING CHART 1045

SLOPE	0.02 %
DIAMETER	30 IN.
VELOCITY	10.0 FPS.
FLOW DEPTH	0.8 FT.

I, [signature], 12575, 08/01/06
(signature) (registration no.) (date)
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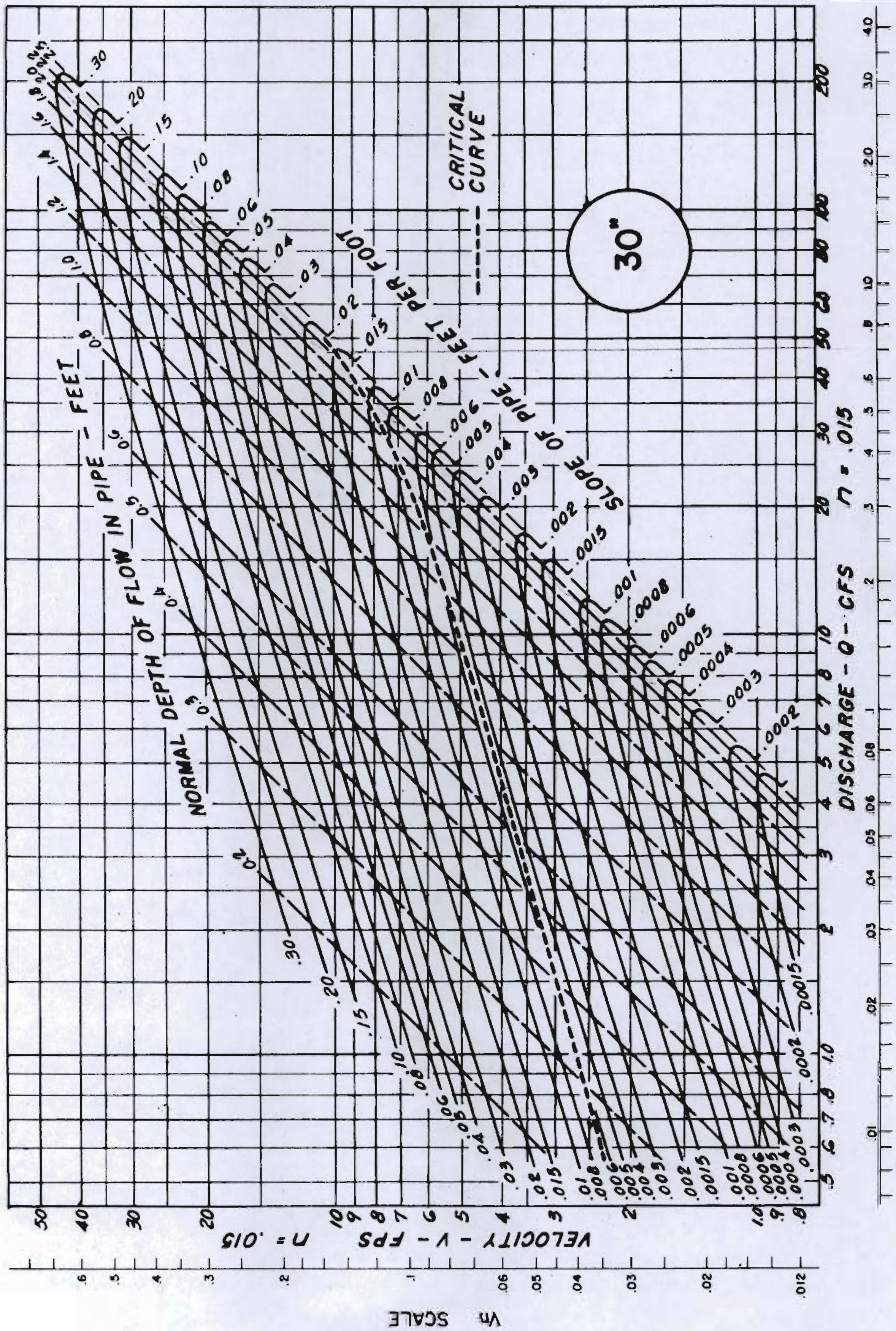
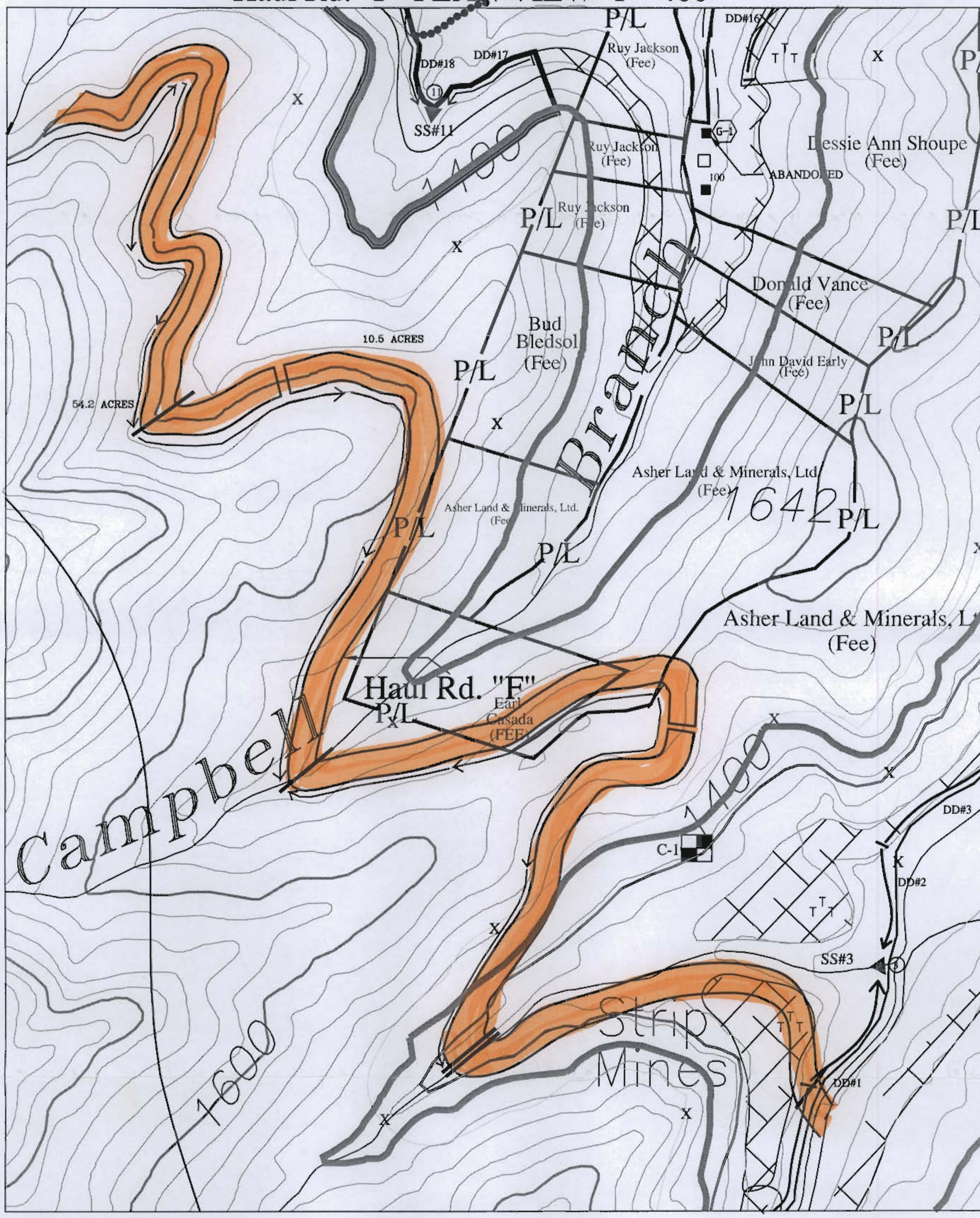


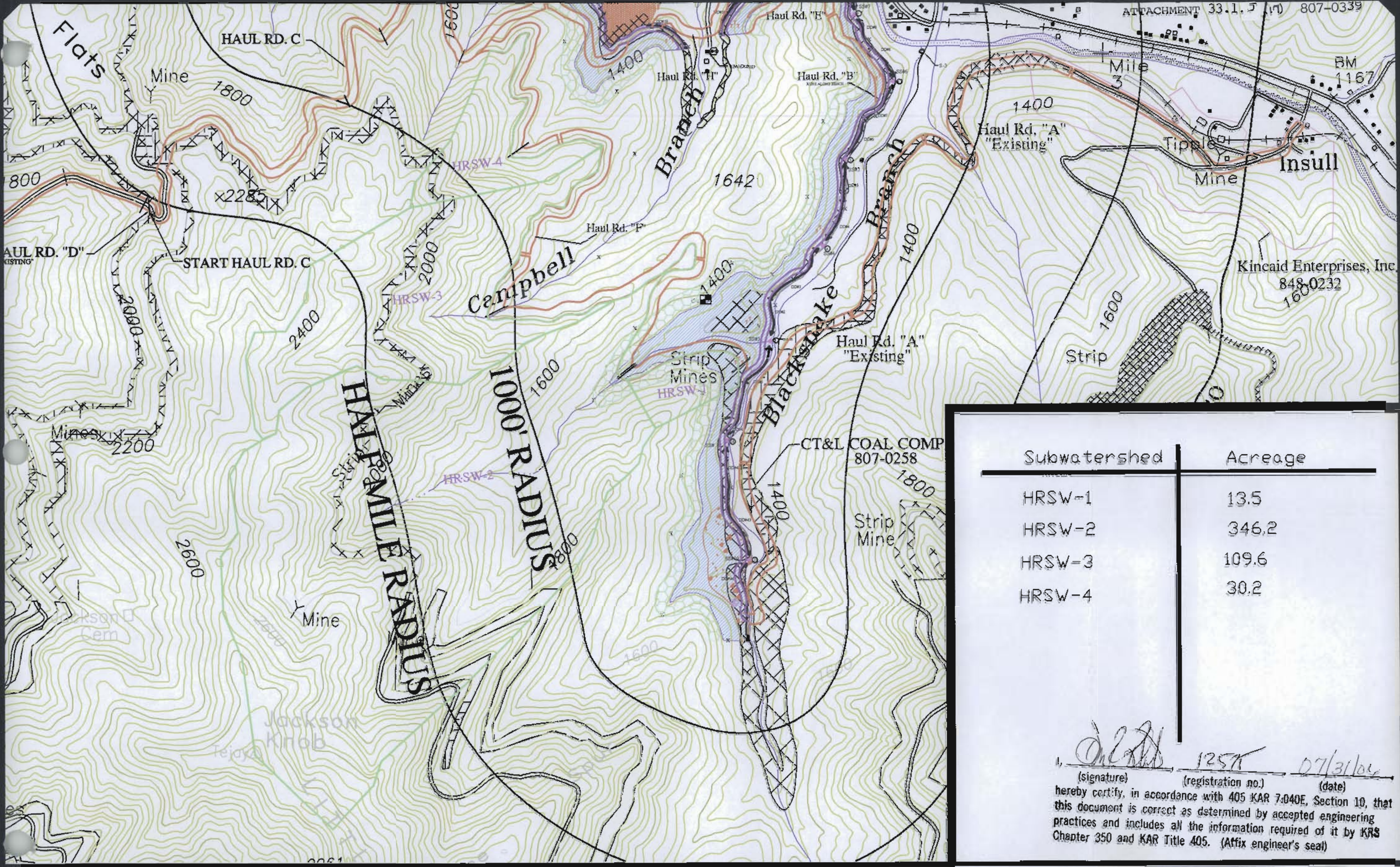
PIPE FLOW CHART
30-INCH DIAMETER

Haul Rd. "F" PLAN VIEW 1"=400'



STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER

I, [signature] (signature), 12575 (registration no.), 01-24-08 (date) hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

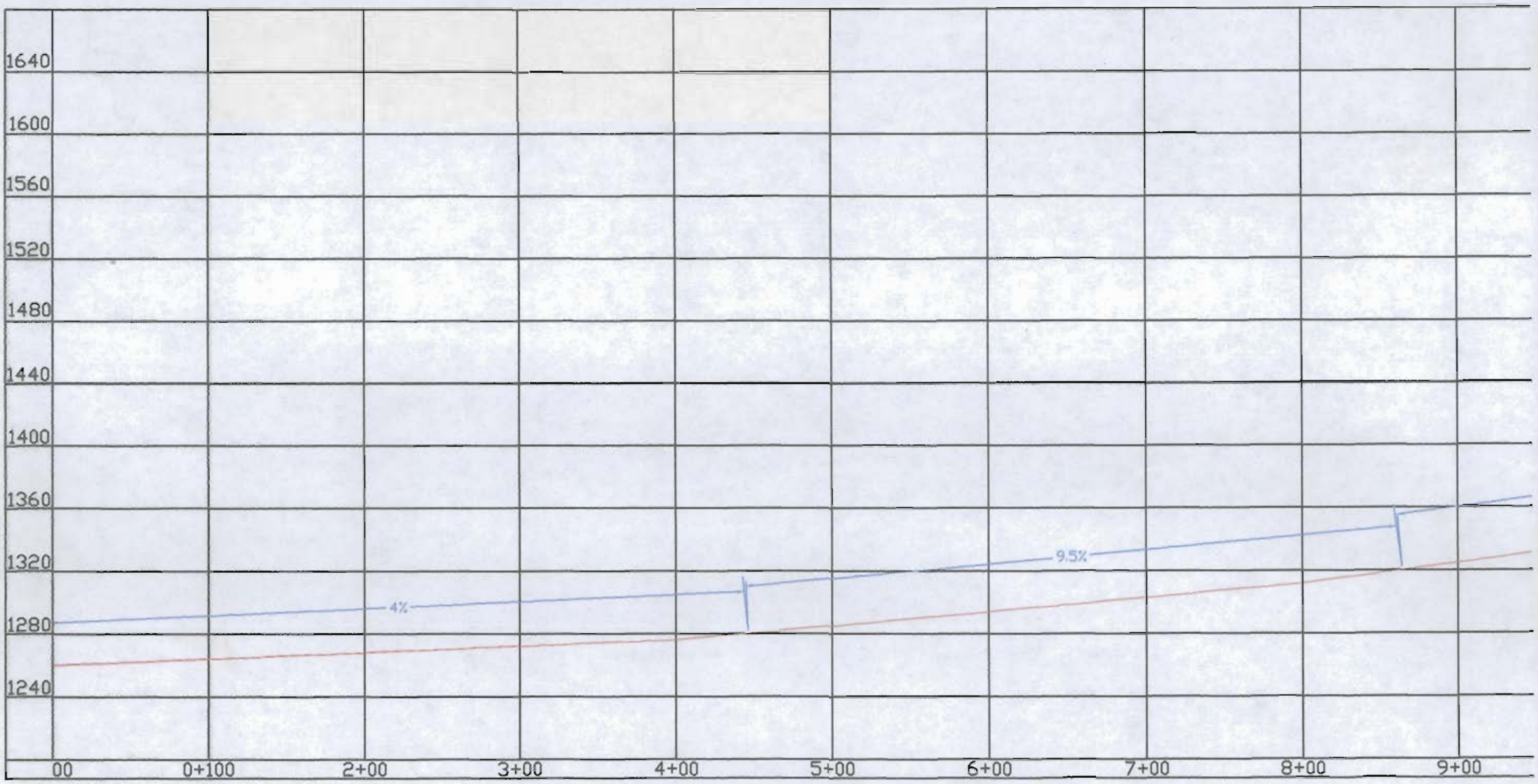


Subwatershed	Acreage
HRSW-1	13.5
HRSW-2	346.2
HRSW-3	109.6
HRSW-4	30.2

I, [signature] (signature) 1257 (registration no.) 07/31/06 (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

Haul Road "F" Subwatershed Map

SCALE: 1"= 1000'



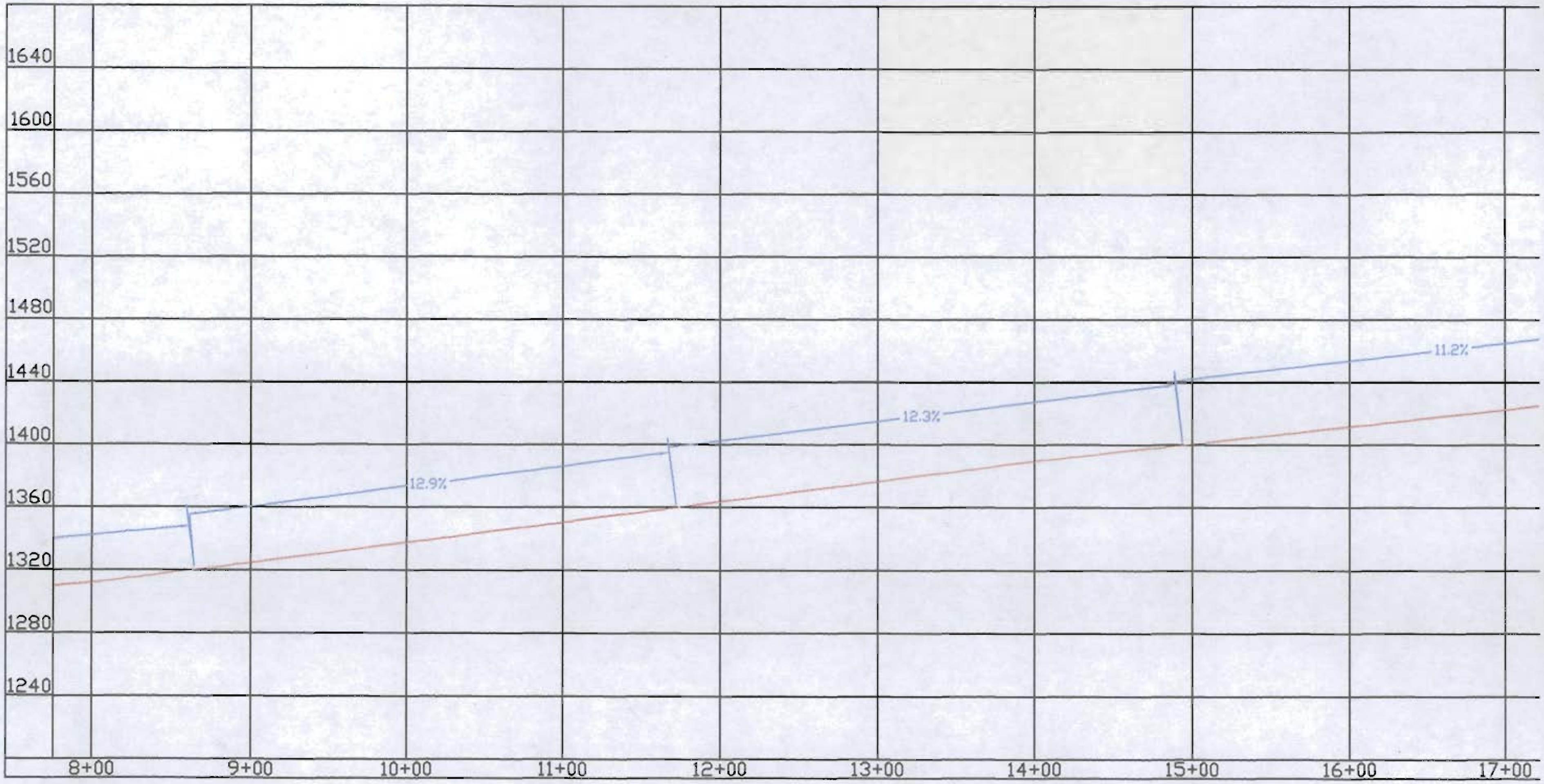
ATTACHMENT 33.1.K

I, ________ (signature), 12575 (registration no.), 08/01/06 (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

807-0339

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G" | SCALE: 1"=100'



ATTACHMENT 33.1.K (1)

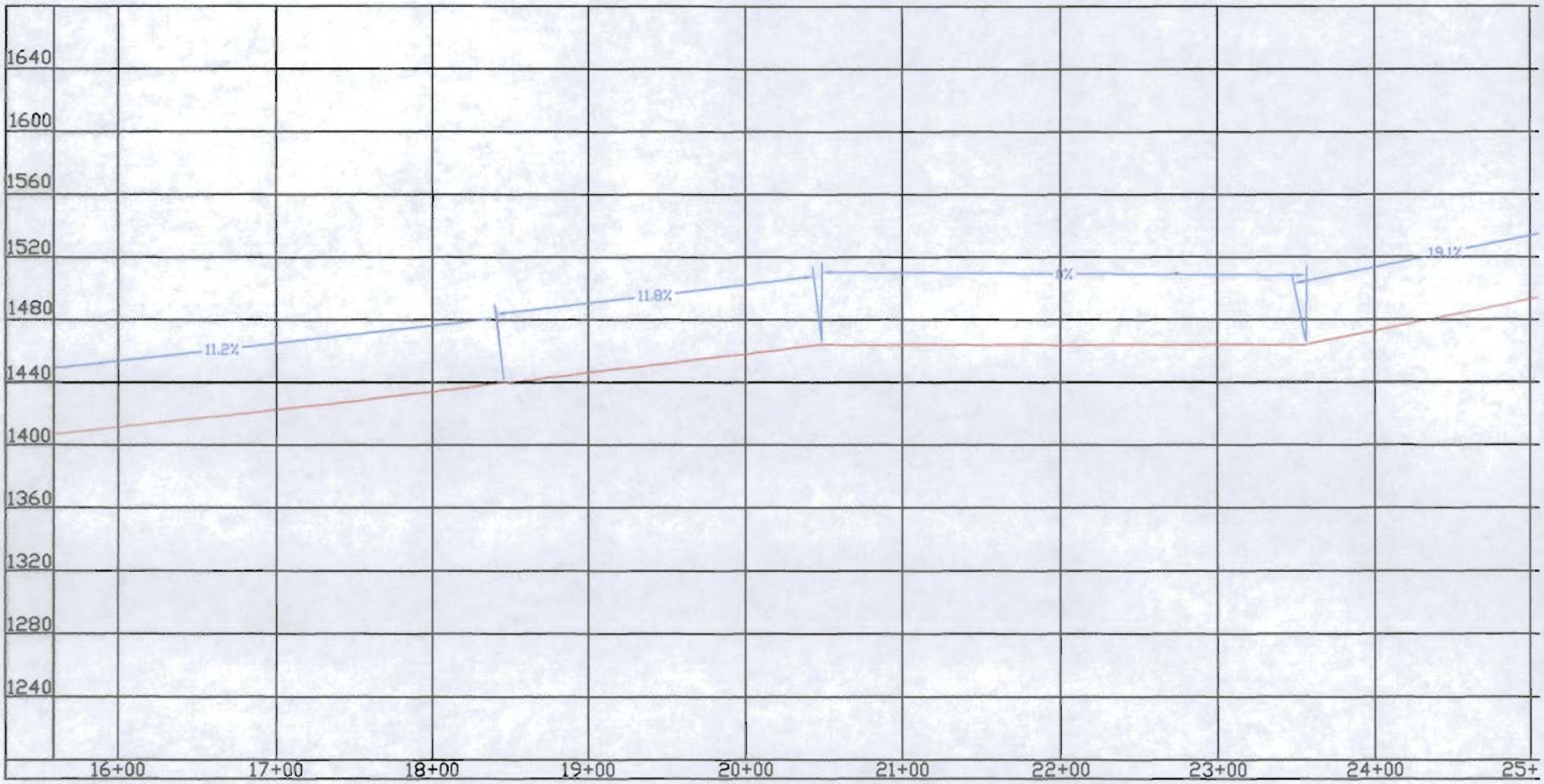
I, [signature], 12575, 08/01/06
(signature) (registration no.) (date)

hereby certify, in accordance with 405 KAR 7:040E, Section 10. that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

807-0339

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G"

SCALE: 1"=100'



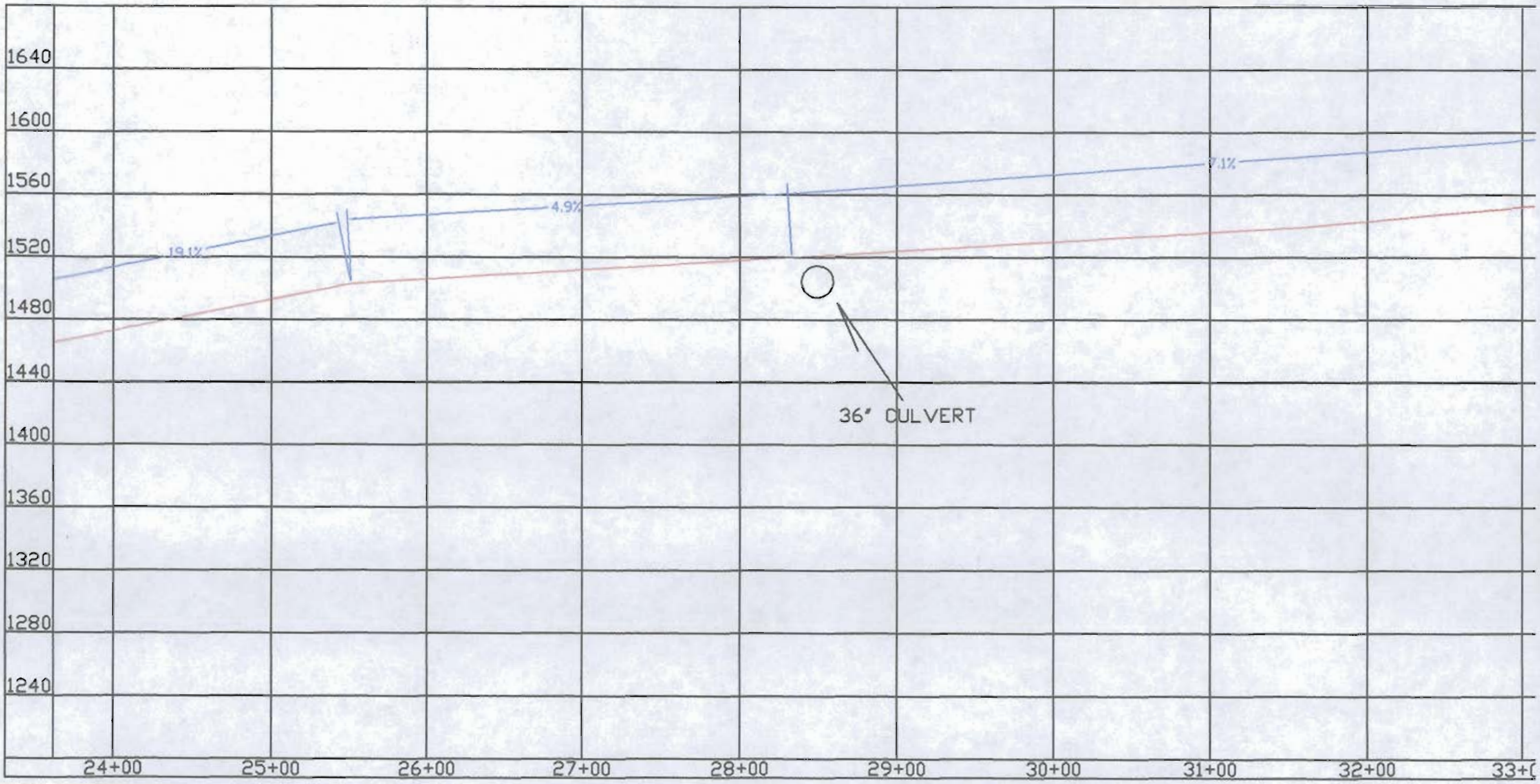
I, ____________ (signature), #2575 (registration no.), 08/01/06 (date), hereby certify in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G"

SCALE: 1"=100'

ATTACHMENT 33.1.K(2)

807-0339



I, ____________, 12575, 08/01/06,
(signature) (registration no.) (date)

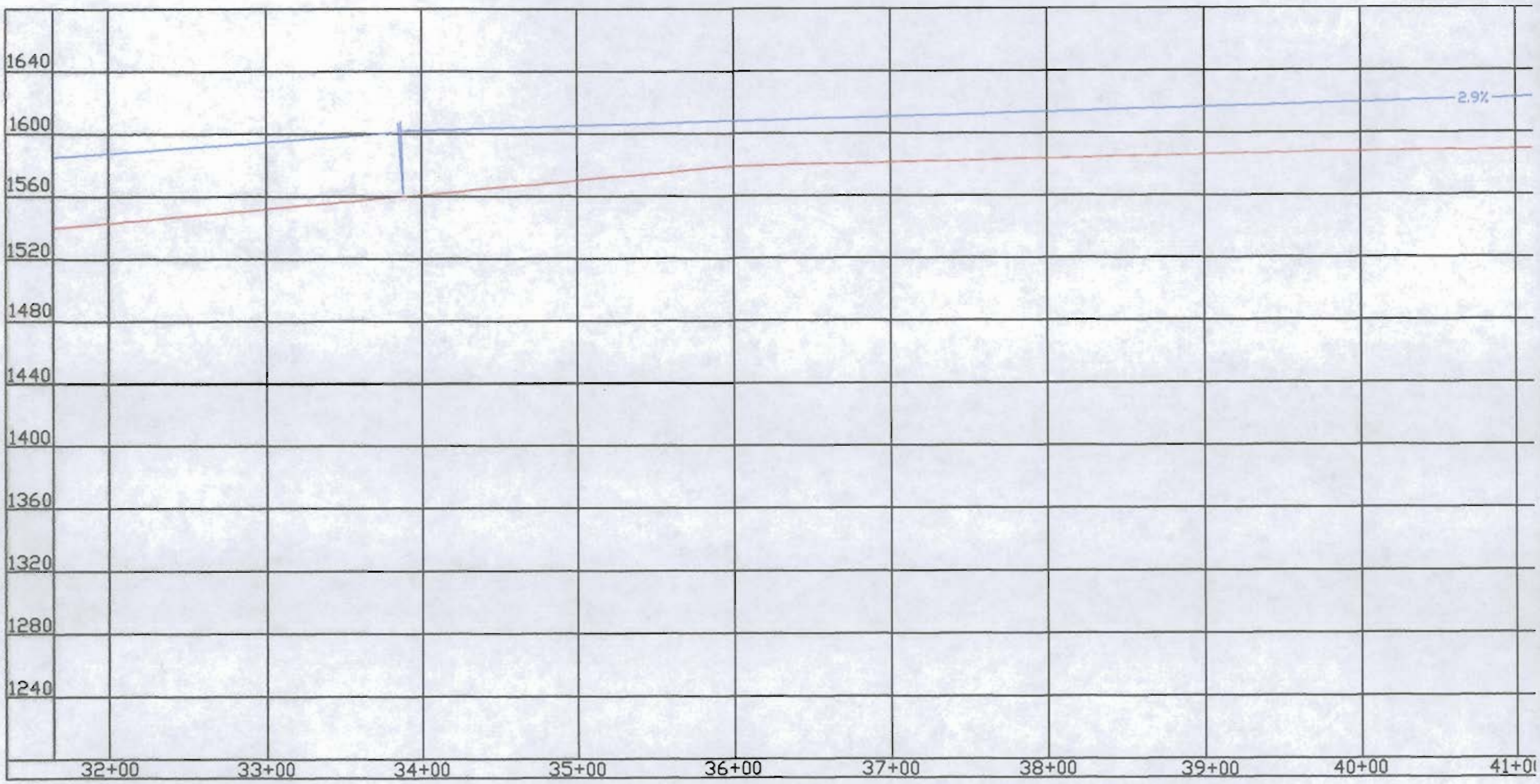
hereby certify, in accordance with 405 KAR 7:040E, Section 10. that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 33.1.K (3)

807-0339

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G"

SCALE: 1"=100'



I, [signature] (signature), 12575 (registration no.), 08/01/06 (date)

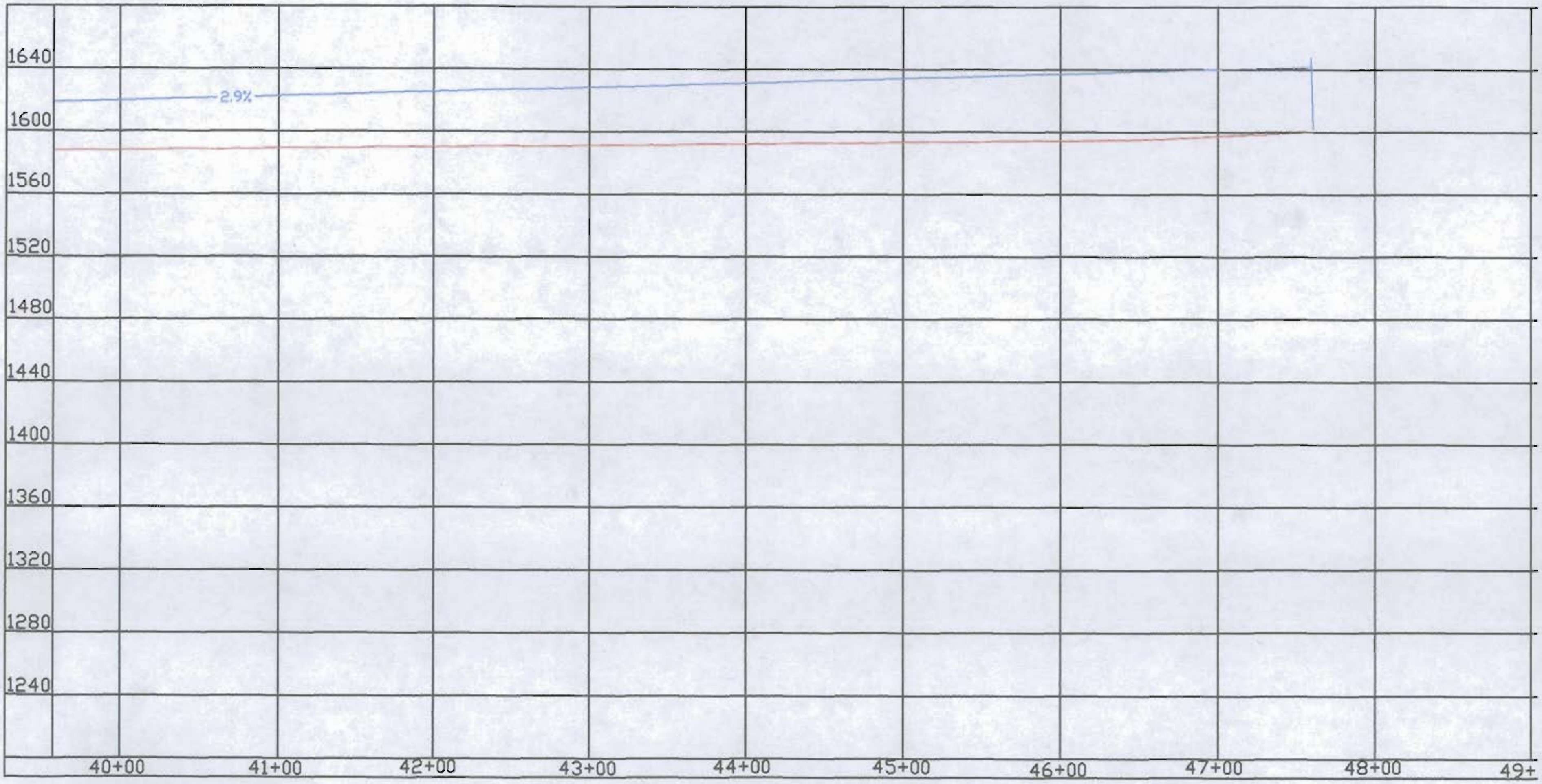
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

ATTACHMENT 33.1.K (4)

807-0339

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G"

SCALE: 1"=100'



I, (signature) 12575 (registration no.), 08/01/06 (date)

hereby certify in accordance with 405 KAR 7:040E, Section 10. that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

NALLY & HAMILTON: BLACKSNAKE #1- HAUL RD. "G"

SCALE: 1"=100'

ATTACHMENT 33.1.K (5)

807-0339

Haul Rd. "G"

36" CULVERT at 19+33

Q100 = C I A

A=	36.24	ACRES
C=	0.15	CHART 1003, KY D.O.T. DRAINAGE MANUAL

Tc = 0.0078 (L^1.5/H^0.5) 0.770

L= 1968.00
H= 1060.00

Tc= 3.40

I= 8.88 IN./HR (CHART 1005.6)

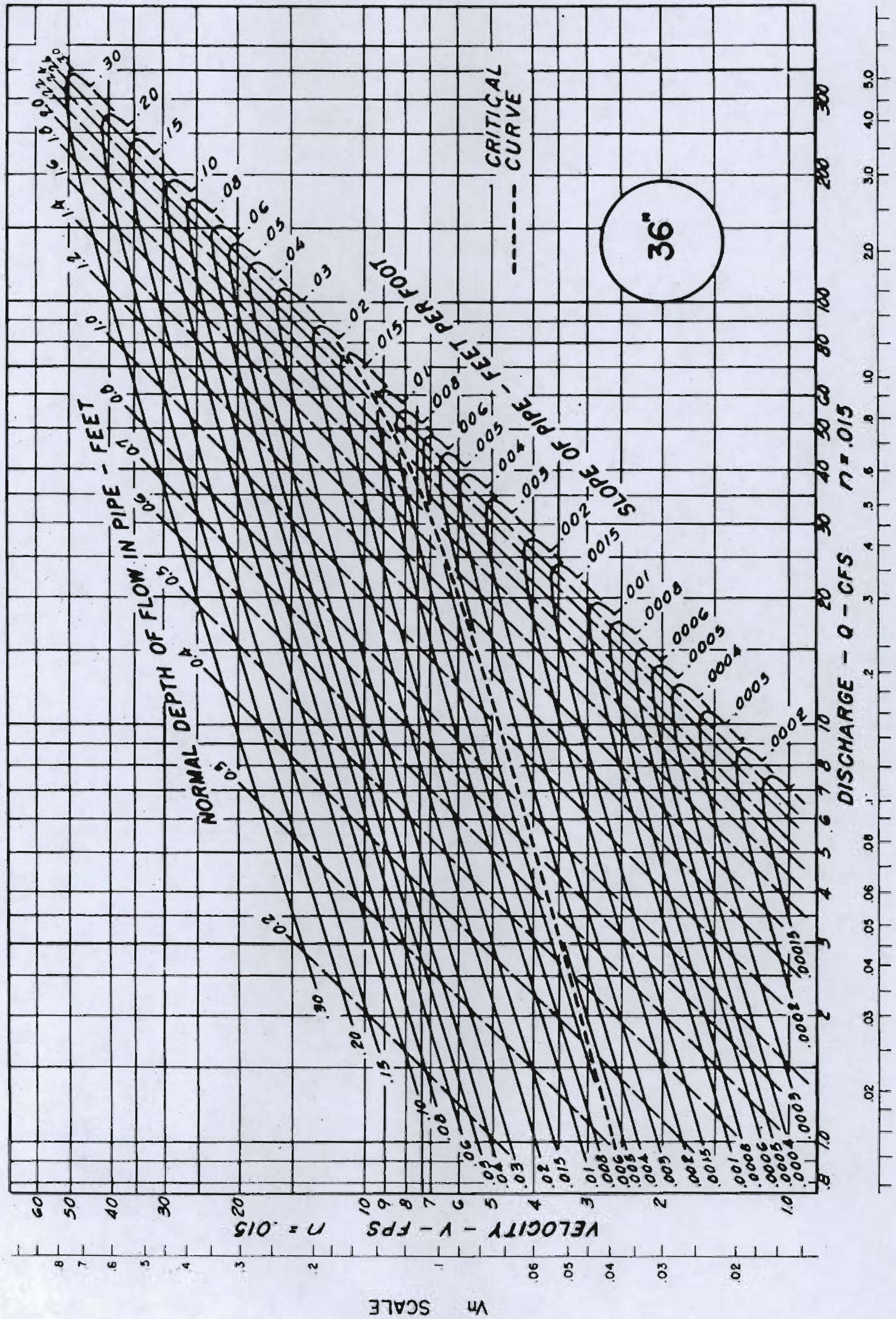
Q100	=	0.15 C	8.88 I	36.24 A
Q100	=	48.27 CFS		

USING CHART 1045

SLOPE	0.02 %
DIAMETER	30 IN.
VELOCITY	10.0 FPS.
FLOW DEPTH	2.2 FT.

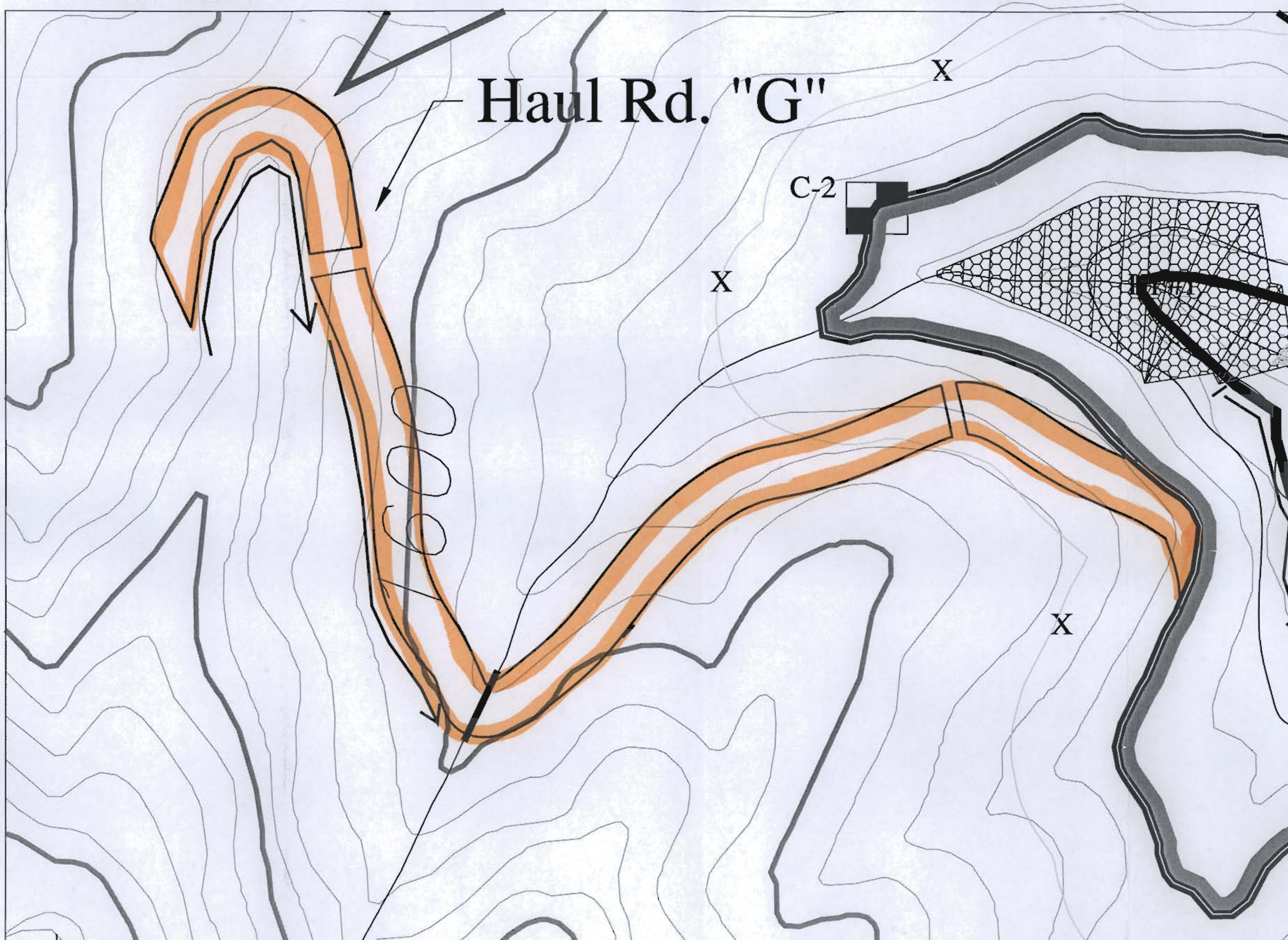
I, [signature], 12575, 08/01/06,
(signature) (registration no.) (date)
hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

1045.36



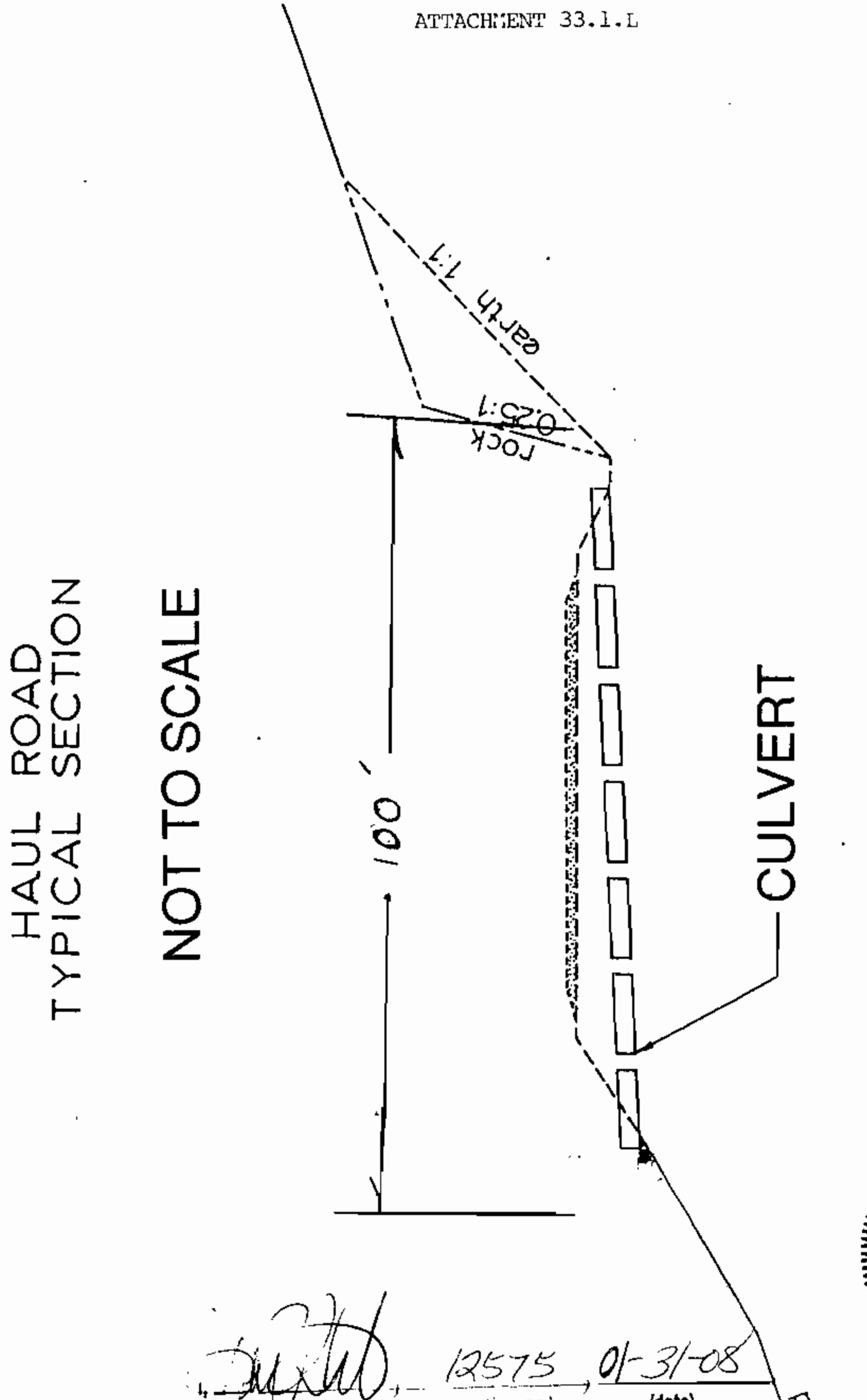
PIPE FLOW CHART
36-INCH DIAMETER

Haul Rd. "G" PLAN VIEW 1"=200'



I, (signature), 12575 (registration no.), 01-24-08 (date), hereby certify, in accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and includes all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED PROFESSIONAL ENGINEER



I, [signature], 12575 01-31-08
(signature) (registration no.) (date)

hereby c[illegible] accordance with 405 KAR 7:040E, Section 10, that this document is correct as determined by accepted engineering practices and [illegible] all the information required of it by KRS Chapter 350 and KAR Title 405. (Affix engineer's seal)

STATE OF KENTUCKY
DON R. ROBERTS
12,575
LICENSED
PROFESSIONAL ENGINEER

ATTACHMENT 34.1.A

The only potential source of air pollution would come from fugitive dust created from excessive use of equipment roads or haul roads. Obviously, this would be a problem during dry periods. Equipment haul roads are usually relatively short and speeds are slow. Therefore, excessive amounts of fugitive dust are unlikely.

Coal haul roads are also relatively short and are traveled at low speeds. Excessive dust from these roads is only expected during coal hauling which is only periodically.

Control of dust is easily accomplished by regular spraying with water. A tank truck, regular truck, or even a front end loader can dampen the road to alleviate any dust problem that might occur.

Air pollution monitoring is not expected to be necessary since negligible air quality effects are expected.

35. Subsidence Control

35.1 If this is an application which includes underground or auger mining, provide as "Attachment 35.1.A", the information required to demonstrate compliance with 405 KAR 8:040, Section 26.
See Attachment 35.1.A

35.2 Does the proposed method of operation include standard room and pillar mining? ☐ YES ☒ NO. If "YES", describe the thickness and engineering properties of clays and soft rock located immediately above and below the coal seam(s) to be mined. If none exists, briefly describe the stratum immediately above and below all coal seams to be mined with this method. Submit description and related information as "Attachment 35.2.A".

35.3 If this application is for a surface mine, indicate if any portion of the proposed permit area have been "undermined". ☐ YES ☒ NO. If "YES", provide a map showing the extent of the underground workings and describe the potential affects subsidence may have on structures such as dams, coal waste disposal areas, fills and other such structures. Submit this information as "Attachment 35.3.A".

36. Applicant/Authorized Agent Signature

36.1 The undersigned, being first duly sworn, states that he/she has read all the information provided in Form MPA-03, Technical Information for a Mining Permit, of this application and has found it to be true and correct. The undersigned further acknowledges that any information provided or omitted herein for the purpose of defrauding or misleading the Natural Resources and Environmental Protection Cabinet may result in criminal charges being instituted pursuant to applicable state laws.

Applicant Company Name Nally & Hamilton Ent., Inc.

Name of Applicant or Agent
Whose Signature Appears Below Stephen Hamilton

Signature of Applicant or Agent* Stephen Hamilton

Date of signature June 21, 2005

Subscribed and sworn to before me by Stephen Hamilton ,

This the 21 Day of June , 2005 .

Notary Public Crystal Hayden

My Commission Expires June 22, 2005 State in which Commissioned Kentucky

***NOTE:** If signer is other than president or secretary of a corporation, attach a notarized copy of power of attorney, or resolution of board of directors which grants signer the legal authority to represent the applicant in this application. (Does not apply to a single proprietorship or partnership.)

ATTACHMENT 35.1.A

Subsidence Survey Relating to Auger Mining

The augering associated with the operation is not expected to affect lands above the area through surface subsidence. Reconnaissance of the small area above the auger mining revealed no structures, dwellings, streams, water impoundments, grazing lands, agricultural or silvicultural production areas, and no aquifers or potential water suppliers. The mining area is located on the hillside just above the valley floor with only a sparse stand of trees above the auger area. The area has been previously logged and does not contain any areas defined as renewable resource land as outlined in the regulations.

HALF MILE RADIUS
1000' RADIUS
Asher Land & Minerals, LTD (Fee)
Kincaid Enterprises, Inc. 848-0232
CT&L COAL COMPANY 807-0258
HAUL RD. "D" "EXISTING"
END HAUL RD. "D" "EXISTING"
START HAUL RD. C
HAUL RD. C
Haul Rd. "G"
Haul Rd. "E"
Haul Rd. "F"
Haul Rd. "A" "Existing"
DIP 0.84° NE
STRIKE N 41° E
Tugglevile
Puckett Creek
Blacksnake Branch
Campbell Branch
Dewing Gap
Pound Mill Br
Balkan
Insull
Tacket Hill Cem
Upland Ch
Nally & Hamilton Enterprises, Inc.
P.O. Box 157
Bardstown, Ky 40004
SCALE AS DRAWN 1"=500'
LOCATION IN DETAIL NEAREST NAMED STREAM AND/OR NEAREST IDENTIFIED PUBLIC ROAD INTERSECTION
0.1 MILES SOUTH FROM OLD SCHOOL RD. JUNCTION WITH KY 72 AND LOCATED 0.1 MILE SOUTH OF PUCKETT CREEK
APPLICATION NUMBER 807-0339
COUNTY BELL
QUADRANGLE BALKAN
LATITUDE 36° 45' 51"
MAP SCALE 1"=500'
CONTOUR INTERVAL 40'
DATE SUBMITTED
LONGITUDE 83° 29' 15"
MRP/ERI MAP
CONTOUR METHOD
SEAM ELEV. ACRES
HANCE 1300-1240 140.4
AUGER METHOD
HANCE 1300-1240 108.8
MOUNTAIN TOP REMOVAL METHOD
SPOIL STORAGE AREA(S)
TYPE HOLLOWFILL#2 3.57
TYPE HOLLOWFILL#1 3.59
*Hollowfill over lap of mining *2.77 Not Included
PR#1 LENGTH 358' WIDTH 20' 'AVG.' 0.2
PR#2 LENGTH 179' WIDTH 20' 'AVG.' 0.1
HAUL RD(S) LENGTH 45553' WIDTH 100' 'AVG.' 104.6
DC#1. LENGTH 303' WIDTH 30' 'AVG.' 0.2
DC#2. LENGTH 358' WIDTH 30' 'AVG.' 0.2
* Overlap of Mining, Not to be included in total Acerage.
TOTAL ACRES PERMITTED 360.89
TOTAL ACRES TO BE BONDED 254.86
PROPERTY LINES FURNISHED BY OPERATOR.
I, THE UNDERSIGNED, HEREBY CERTIFY, IN ACCORDANCE WITH 405 KAR 7:040E, SECTION 10, THAT THIS DOCUMENT IS CORRECT AS DETERMINED BY ACCEPTED ENGINEERING PRACTICES AND INCLUDES ALL THE INFORMATION REQUIRED OF IT BY KRS CHAPTER 350 AND KAR TITLE 405.
SIGNED (NOTARY PUBLIC)
MY COMMISSION EXPIRES: Sept. 24, 2011
SUBSCRIBED AND SWORN TO BEFORE AS THIS 8 DAY OF May 20
SIGNED (REGISTERED PROFESSIONAL)
REGISTRATION NUMBER 12575
ENGINEERING PROVIDED BY:
LOGOS ENGINEERING
PHONE:(606) 598-6746 MANCHESTER, KY