TEMPORARY SPOIL FILL NO. 1
ATTACHMENT III-B-4

GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-

FOR

ALABAMA SURFACE MINING COMMISSION

BY

PERC ENGINEERING CO., INC.
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DECEMBER12, 2012

PERC
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December 12, 2012

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

RE: Global Met Coal Corp.
Black Creek Mine
P-

Dear Michael:

I hereby certify the attached detailed design plans for Temporary Spoil Fill No. 1 for the above referenced mine are in accordance with current prudent engineering practices and the Regulations of the Alabama Surface Mining Commission as adopted by Act 81-435 of December 18, 1981 and amended to date, and are true and correct to the best of my knowledge and belief.

If you have any questions or required additional information, please feel free to call.

Sincerely,
PERC Engineering Co., Inc.

Leslie G. Stephens, P.E. & P.L.S.
AL. REG. NO. 14117-E

ALABAMA
PROFESSIONAL ENGINEER AND
REGISTERED
No.14117
LAND SURVEYOR
LESLIE G. STEPHENS

INTRODUCTION

The purpose of this study was to fulfill the Alabama Surface Mining Commission's requirements for the design and plan approval of the proposed temporary spoil fill. This temporary spoil fill will be mined through and eliminated as this property is mined.

SITE LOCATION

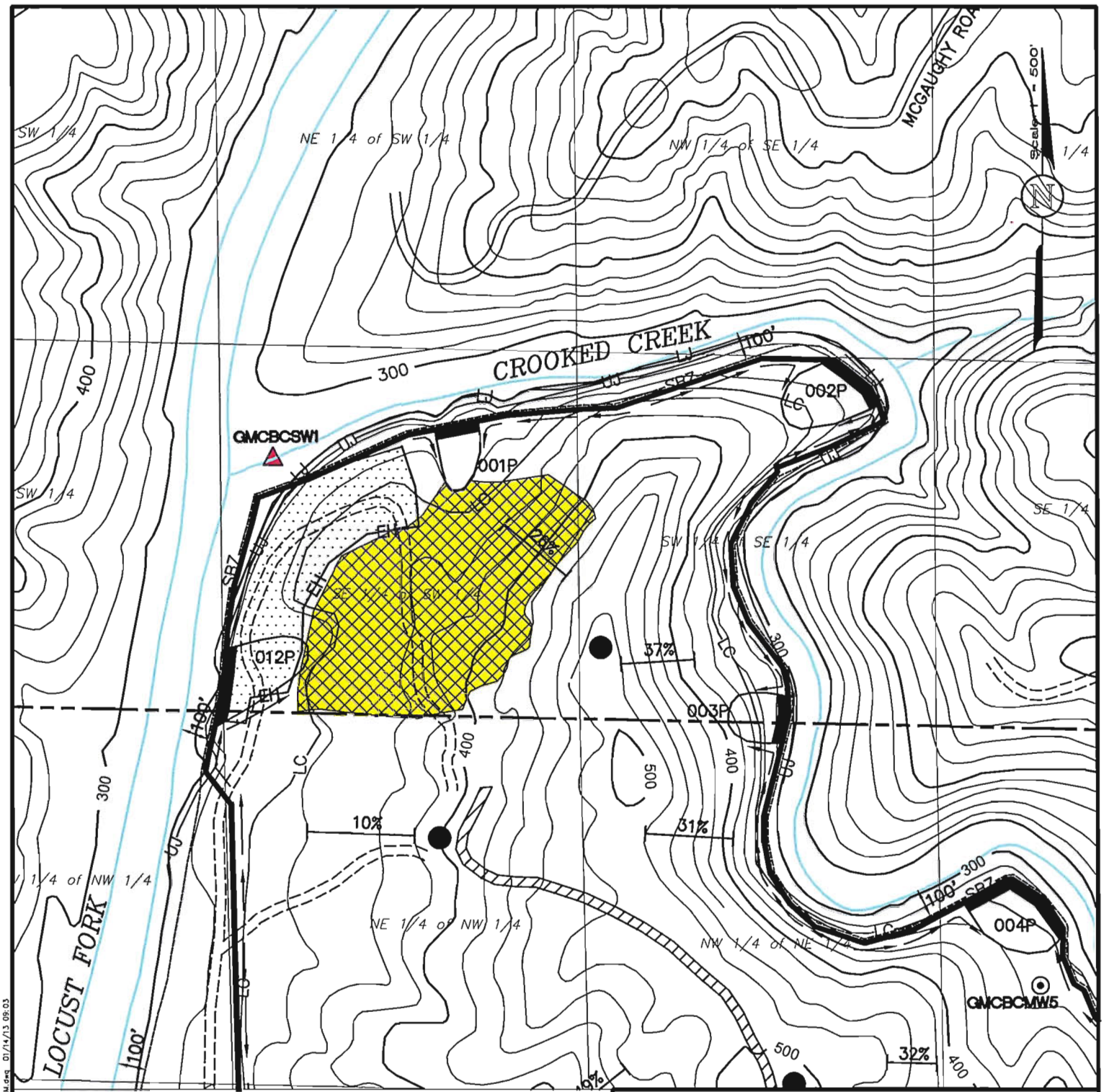
Temporary Spoil Fill No. 1 is found in Jefferson County, Alabama approximately two (2) miles southeast of the Bagley Community. The fill is found in the SE1/4 of SW1/4, and W ½ of SW 1/4 of SE1/4, Section 6, and NE1/4 of NW1/4 Section 7, Township 15 South, Range 3 West, Jefferson County, Alabama, as found on the Creel Quadrangle. The fill site will be located on land under control by global Met Coal Corp.

SITE GEOLOGY

The fill sites are underlain by rocks of the Pottsville Formation of the Pennsylvania age. These strata consist primarily of alternating sandstones, shaley sandstones, shales, sandy shales, coal seams, and underclays. The strike of strata within the permit area is complex due to local open folding, however, the strike ranges from approximately North 51° West to North 78° West and in general the strata dips to the Southeast at 1°. The area is in the Appalachian Plateau physiographic province, and seismic zone 2. Faults were not found to exist at the proposed fill sites.

UNDERGROUND MINE LOCATIONS

There are no known underground mine workings at this site.



MAP LEGEND:

PERMIT BOUNDARY

TEMPORARY SPOIL FILL NO. 1

PERC ENGINEERING CO., INC.

GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
SITE LOCATION MAP

DRAWN BY:	C.M.O.	DATE:	12-10-12
DWG. NAME:	GMBC-SLM		
APPROVED BY:	W.P.G.	SCALE:	1"=500'

V:\Steve Miles\Steve Docs\Mines\Global Met\Temporary Excess Spoil Fill No. 1\GMBC-SLM.dwg 01/14/13 09:03

INVESTIGATIVE FINDINGS

One (1) boring was performed at the proposed fill site. The boring location is shown on the attached planview drawings. Results from the boring show a sandstone foundation overlain by a clay material. The fill will consist of spoil material produced by the mining of the Black Creek, and Jefferson coal seams. Our findings suggest that the design slopes as shown in the accompanying set of plans are stable with a factor of safety equal to those recommended in the Design Guidelines prepared by the regulatory authority.

LABORATORY TESTING AND SAMPLING

Field operations performed by PERC Engineering Co., Inc. was conducted by ASTM standard specifications where applicable, and procedures adopted for the specific appraisal of conditions existing at proposed fill site.

BORING METHOD

One (1) boring was performed at the proposed fill site. The boring were made manually by PERC Engineering Co., Inc. personnel to determine depth and type of foundation material at the fill site. The sample obtained by this method was inspected during the boring operation.

BORING RESULTS

Resulting values and analysis of the borings indicate a shale and sandstone foundation overlain by a clay material. These resulting investigations show the material to be of a sound and excellent nature.

LABORATORY TESTING

Laboratory testing was conducted by Perc Engineering Co., Inc., Jasper, Alabama. The clay material overlying the sandstone foundation was taken from the proposed fill site. The sample underwent laboratory classification analysis. The foundation material for Fill No. 1 is to be a clay material, classified as an "SM-SC" material. From the United States Department of Interior Bureau of Reclamation Design of Small Dams, page 137, an effective cohesion of 187.2 pounds per square foot, a density of 136 pounds per cubic foot, and an angle of internal friction of 30.5 degrees was obtained for the “SM-SC” material.

The material selected to represent the fill material is an unconsolidated spoil material classified as a "ML" material. From the United States Department of Interior Bureau of Reclamation Design of Small Dams, page 137, an effective cohesion of 100.8 pounds per square foot, a density of 129.5 pounds per cubic foot, and an angle of internal friction of 29.7 degrees was obtained for the "ML" material.

A Walker Drilling Services, Inc. drilled Geochemical Analysis Site GMCBCOB4 in November and December of 2011 with a Gardner-Denver GD1500 air rotary drill utilizing a 7 and 7/8 inch drill bit and a 4 3/4 drill bit. Samples were collected from drill cuttings by personnel of Walker Drilling Services, Inc. every 5 ft. or change in lithology. Collected samples were cataloged and stored in plastic reclosable bags for later inspection and testing. These samples were transported to the PERC Engineering Co., Inc.'s Laboratory. Collected samples from GMCBCOB4 were utilized for geochemical analysis, including paste pH, and neutralization potential by the PERC Engineering Laboratory and conducted according to ASTM guidelines. Collected samples were sent to and analyzed at Energy Technical Services, LLC in Northport, Alabama for sulfur content. Due to the fact that all overburden at this site does not occupy similar areas, intervals shown in the overburden analysis which are located in the upper portions of the drill log occupy a smaller volume than intervals which are located closer to the bottom, consequently, their acid-base accounts do not contribute as substantially to the overall chemistry of the overburden. In an attempt to more accurately describe the acid-base potential of the overburden at the Black Creek Mine site, a spreadsheet which was developed at the Pennsylvania Dept. of Environmental Resources, Bureau of Mining and Reclamation was employed. This spreadsheet not only takes into account the volume occupied by each interval tested, but also the amount of coal lost into the spoil. The results of this method from overburden geochemical analysis site GMCBCOB4 (as shown in the attached Volumetric Overburden Calculation Sheets) are favorable: overburden at the Black Creek Mine contains an average of +11.70 (tons CaCO3/1000 tons material) excess neutralization potential.

SOIL PARAMETERS

The soil and foundation parameters selected for the design are shown below. These values used are the results of laboratory testing by Perc Engineering Co., Inc., Jasper, Alabama.

MATERIAL	LOCATION	UNIT WEIGHT (WET) PCF	EFFECTIVE ANGLE OF FRICTION	EFFECTIVE COHESION PSF
Spoil	Fill	129.5	29.7 degrees	100.8
SC-SM	Foundation Fill No. 1	136.0	30.5 degrees	187.2

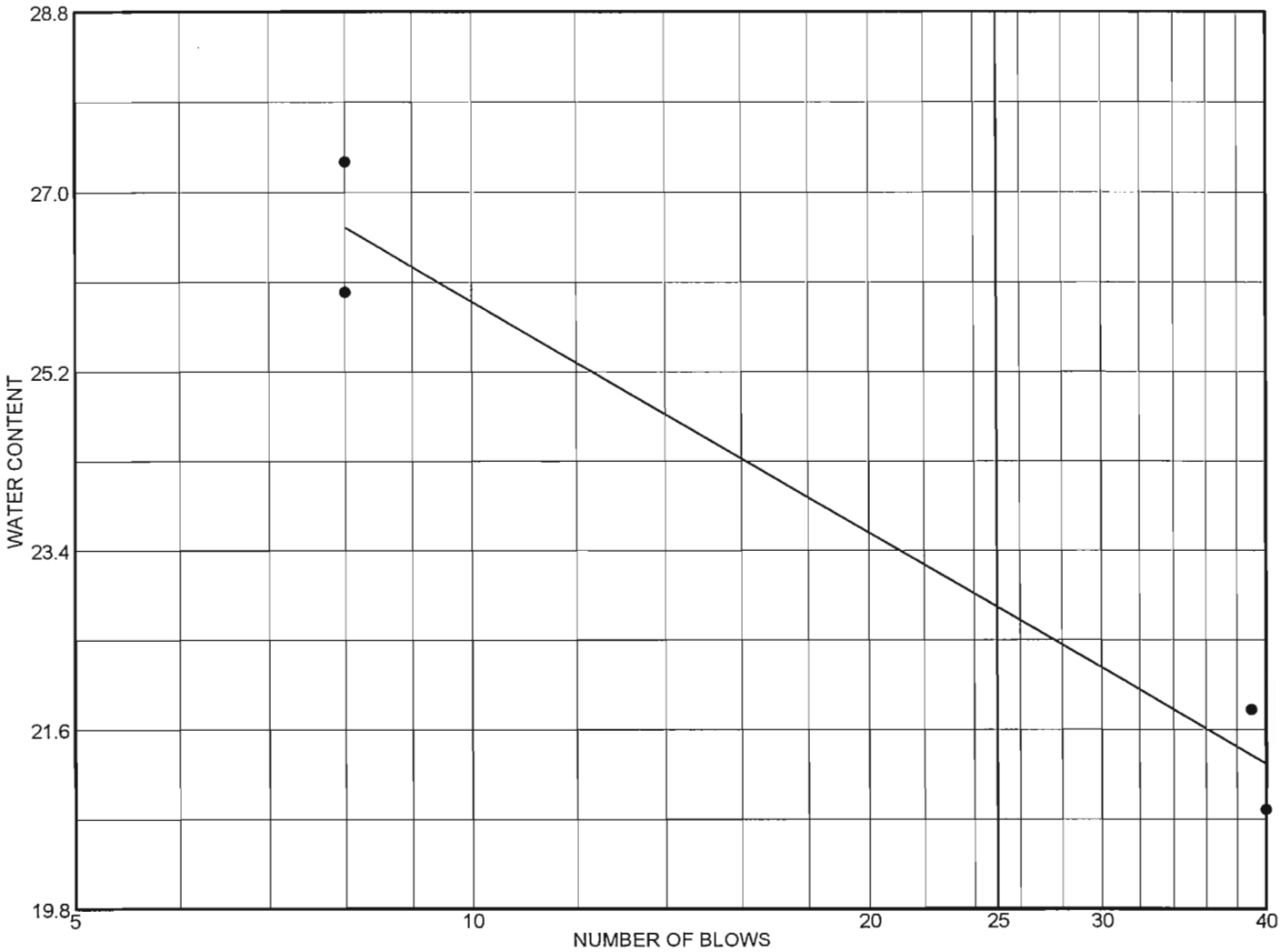
STABILITY ANALYSIS

The proposed fill was evaluated under static loading conditions. A pore pressure ratio of 0.1 was used in the stability analyses. The stability analyses were performed using an approximate form of the limiting equilibrium approach as developed by Bishop. The location of the failure surface yielding the minimum safety factor was determined by allowing the computer to use a grid and search routine. The computer program used was the Reame Slope Stability program by Dr. Yang H. Huang, P.E. of the University of Kentucky. Results of the stability analyses show that Temporary Spoil Fill No. 1 can be built safely. Tabular results of the analyses are as follows:

SECTION	STATIC SAFETY FACTOR
1-2	1.5

* All calculations performed using simplified Bishop Method of Analysis.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty, clayey sand with gravel	23	18	5	58.80	44.7	SC-SM

Project No. **Client:** Global Met. Coal Corporation

Project: Temporary Spoil Fill No. 1 Foundation Sample

● **Location:** Black Creek Mine

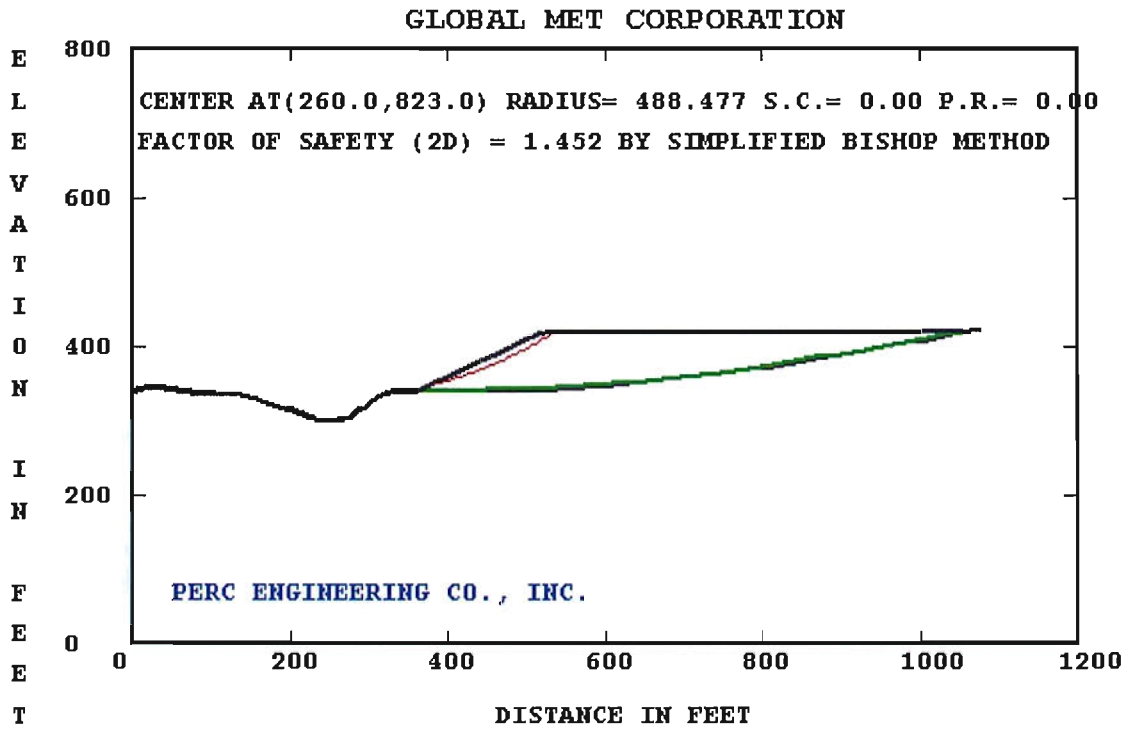
Remarks:

● Foundation Sample

PERC ENGINEERING CO., INC.

Jasper, Alabama

Date 1-15-13


GLOBAL MET CORPORATION
CENTER AT(260.0,823.0) RADIUS= 488.477 S.C.= 0.00 P.R.= 0.00
FACTOR OF SAFETY (2D) = 1.452 BY SIMPLIFIED BISHOP METHOD
PERC ENGINEERING CO., INC.
ELEVATION IN FEET
800
600
400
200
0
0
200
400
600
800
1000
1200
DISTANCE IN FEET

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REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EARTHWORKS)
THIS 2004 VERSION IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO

                     PERC ENGINEERING CO., INC.

INPUT FILE NAME  -C:\REAME2004\PROJECTS\GMBC TF1.DAT

TITLE -GLOBAL MET CORPORATION
       BLACK CREEK MINE
       TEMPORARY SPOIL FILL NO. 1
       SECTION 1-2
       STATIC

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) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 43
 1  X COORD.= 0             Y COORD.= 339
 2  X COORD.= 13.41         Y COORD.= 344
 3  X COORD.= 41.41         Y COORD.= 344
 4  X COORD.= 72.23         Y COORD.= 339
 5  X COORD.= 138.14        Y COORD.= 334
 6  X COORD.= 156.65        Y COORD.= 329
 7  X COORD.= 171.13        Y COORD.= 324
 8  X COORD.= 186.47        Y COORD.= 319
 9  X COORD.= 203.43        Y COORD.= 314
 10 X COORD.= 216.45        Y COORD.= 309
 11 X COORD.= 229.65        Y COORD.= 304
 12 X COORD.= 230.33        Y COORD.= 302.61
 13 X COORD.= 239.69        Y COORD.= 299.95
 14 X COORD.= 245.06        Y COORD.= 300.23
 15 X COORD.= 257.67        Y COORD.= 301.06
 16 X COORD.= 267.43        Y COORD.= 302.55
 17 X COORD.= 274.77        Y COORD.= 303.32
 18 X COORD.= 275.35        Y COORD.= 304
 19 X COORD.= 279.91        Y COORD.= 309
 20 X COORD.= 285.5         Y COORD.= 314
 21 X COORD.= 295.18        Y COORD.= 319
 22 X COORD.= 301.18        Y COORD.= 324
 23 X COORD.= 307.8         Y COORD.= 329
 24 X COORD.= 315.19        Y COORD.= 334
 25 X COORD.= 325.98        Y COORD.= 339
 26 X COORD.= 362.043       Y COORD.= 339.856
 27 X COORD.= 536.61        Y COORD.= 344
 28 X COORD.= 606.82        Y COORD.= 349
 29 X COORD.= 650.47        Y COORD.= 354
 30 X COORD.= 693.8         Y COORD.= 359
 31 X COORD.= 745.3         Y COORD.= 364
 32 X COORD.= 780.59        Y COORD.= 369
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 33 X COORD.= 811.64        Y COORD.= 374
 34 X COORD.= 839.59        Y COORD.= 379
 35 X COORD.= 864.85        Y COORD.= 384
 36 X COORD.= 899.24        Y COORD.= 389
 37 X COORD.= 928           Y COORD.= 394
 38 X COORD.= 950.45        Y COORD.= 399
 39 X COORD.= 979.55        Y COORD.= 404
 40 X COORD.= 1006.36       Y COORD.= 409
 41 X COORD.= 1028.02       Y COORD.= 414
 42 X COORD.= 1050.77       Y COORD.= 419
 43 X COORD.= 1075.1        Y COORD.= 424

NO. OF POINTS ON BOUNDARY LINE 2 = 43
 1  X COORD.= 0             Y COORD.= 340
 2  X COORD.= 13.41         Y COORD.= 345
 3  X COORD.= 41.41         Y COORD.= 345
 4  X COORD.= 72.23         Y COORD.= 340
 5  X COORD.= 138.14        Y COORD.= 335
 6  X COORD.= 156.65        Y COORD.= 330
 7  X COORD.= 171.13        Y COORD.= 325
 8  X COORD.= 186.47        Y COORD.= 320
 9  X COORD.= 203.43        Y COORD.= 315
 10 X COORD.= 216.45        Y COORD.= 310
 11 X COORD.= 229.65        Y COORD.= 305
 12 X COORD.= 230.33        Y COORD.= 303.61
 13 X COORD.= 239.69        Y COORD.= 300.95
 14 X COORD.= 245.06        Y COORD.= 301.23
 15 X COORD.= 257.67        Y COORD.= 302.06
 16 X COORD.= 267.43        Y COORD.= 303.55
 17 X COORD.= 274.77        Y COORD.= 304.32
 18 X COORD.= 275.35        Y COORD.= 305
 19 X COORD.= 279.91        Y COORD.= 310
 20 X COORD.= 285.5         Y COORD.= 315
 21 X COORD.= 295.18        Y COORD.= 320
 22 X COORD.= 301.18        Y COORD.= 325
 23 X COORD.= 307.8         Y COORD.= 330
 24 X COORD.= 315.19        Y COORD.= 335
 25 X COORD.= 325.98        Y COORD.= 340
 26 X COORD.= 362.043       Y COORD.= 340.856
 27 X COORD.= 536.61        Y COORD.= 345
 28 X COORD.= 606.82        Y COORD.= 350
 29 X COORD.= 650.47        Y COORD.= 355
 30 X COORD.= 693.8         Y COORD.= 360
 31 X COORD.= 745.3         Y COORD.= 365
 32 X COORD.= 780.59        Y COORD.= 370
 33 X COORD.= 811.64        Y COORD.= 375
 34 X COORD.= 839.59        Y COORD.= 380
 35 X COORD.= 864.85        Y COORD.= 385
 36 X COORD.= 899.24        Y COORD.= 390
 37 X COORD.= 928           Y COORD.= 395
 38 X COORD.= 950.45        Y COORD.= 400
 39 X COORD.= 979.55        Y COORD.= 405
 40 X COORD.= 1006.36       Y COORD.= 410
 41 X COORD.= 1028.02       Y COORD.= 415
 42 X COORD.= 1050.77       Y COORD.= 420
 43 X COORD.= 1075.1        Y COORD.= 425
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NO. OF POINTS ON BOUNDARY LINE 3 = 36

1	X COORD.= 0	Y COORD.= 340
2	X COORD.= 13.41	Y COORD.= 345
3	X COORD.= 41.41	Y COORD.= 345
4	X COORD.= 72.23	Y COORD.= 340
5	X COORD.= 138.14	Y COORD.= 335
6	X COORD.= 156.65	Y COORD.= 330
7	X COORD.= 171.13	Y COORD.= 325
8	X COORD.= 186.47	Y COORD.= 320
9	X COORD.= 203.43	Y COORD.= 315
10	X COORD.= 216.45	Y COORD.= 310
11	X COORD.= 229.65	Y COORD.= 305
12	X COORD.= 230.33	Y COORD.= 303.61
13	X COORD.= 239.69	Y COORD.= 300.95
14	X COORD.= 245.06	Y COORD.= 301.23
15	X COORD.= 257.67	Y COORD.= 302.06
16	X COORD.= 267.43	Y COORD.= 303.55
17	X COORD.= 274.77	Y COORD.= 304.32
18	X COORD.= 275.35	Y COORD.= 305
19	X COORD.= 279.91	Y COORD.= 310
20	X COORD.= 285.5	Y COORD.= 315
21	X COORD.= 295.18	Y COORD.= 320
22	X COORD.= 301.18	Y COORD.= 325
23	X COORD.= 307.8	Y COORD.= 330
24	X COORD.= 315.19	Y COORD.= 335
25	X COORD.= 325.98	Y COORD.= 340
26	X COORD.= 362.043	Y COORD.= 340.856
27	X COORD.= 380.33	Y COORD.= 350
28	X COORD.= 400.33	Y COORD.= 360
29	X COORD.= 420.33	Y COORD.= 370
30	X COORD.= 440.32	Y COORD.= 380
31	X COORD.= 460.32	Y COORD.= 390
32	X COORD.= 480.32	Y COORD.= 400
33	X COORD.= 500.32	Y COORD.= 410
34	X COORD.= 520.32	Y COORD.= 420
35	X COORD.= 1050.77	Y COORD.= 420
36	X COORD.= 1075.1	Y COORD.= 425

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.373	0.000	-0.162	-0.076	-0.270	-0.345
	-0.326	-0.295	-0.384	-0.379	-2.044	-0.284
	0.052	0.066	0.153	0.105	1.172	1.096
	0.894	0.517	0.833	0.755	0.677	0.463
	0.024	0.024	0.071	0.115	0.115	0.097
	0.142	0.161	0.179	0.198	0.145	0.174
	0.223	0.172	0.186	0.231	0.220	0.206
2	0.373	0.000	-0.162	-0.076	-0.270	-0.345
	-0.326	-0.295	-0.384	-0.379	-2.044	-0.284
	0.052	0.066	0.153	0.105	1.172	1.096
	0.894	0.517	0.833	0.755	0.677	0.463
	0.024	0.024	0.071	0.115	0.115	0.097
	0.142	0.161	0.179	0.198	0.145	0.174
	0.223	0.172	0.186	0.231	0.220	0.206
3	0.373	0.000	-0.162	-0.076	-0.270	-0.345
	-0.326	-0.295	-0.384	-0.379	-2.044	-0.284
	0.052	0.066	0.153	0.105	1.172	1.096
	0.894	0.517	0.833	0.755	0.677	0.463

```
         0.024       0.500       0.500       0.500       0.500       0.500
         0.500       0.500       0.500       0.000       0.206

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              43

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.      COHESION      FRIC. ANGLE   UNIT WEIGHT
 1             187.2         30.5          136
 2             100.8         29.7          129.5

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. =-120    Y COORD. = 1370
POINT 2 X COORD. =-120    Y COORD. = 420
POINT 3 X COORD. = 640    Y COORD. = 420

X INCREMENT (XINC) = 92     Y INCREMENT (YINC) = 92
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 4
FACTOR OF SAFETY OF EACH CIRCLE IS PRINTED (NPRT = 1)
SLICES WILL BE SUBDIVIDED

AUTOMATIC SEARCH WILL FOLLOW AFTER GRID

FACTORS OF SAFETY BASED ON GRID
AT POINT (-120  1370 ) THE RADIUS AND FACTOR OF SAFETY ARE:
   1034.637   25.693   1034.439   31.076   1034.240   40.045
   1034.042   57.986   1033.844  111.843
LOWEST FACTOR OF SAFETY = 25.693 AND OCCURS AT RADIUS= 1034.637

AT POINT (-120  1180 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    846.578   21.192    846.380   25.610    846.183   32.975
    845.985   47.703    845.788   91.598
LOWEST FACTOR OF SAFETY = 21.192 AND OCCURS AT RADIUS= 846.578

AT POINT (-120  990 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    659.632   16.686    659.436   20.152    659.240   25.932
    659.044   37.495    658.848   72.186
LOWEST FACTOR OF SAFETY = 16.686 AND OCCURS AT RADIUS= 659.632

AT POINT (-120  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
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    475.115   12.087    474.923   14.609    474.731   18.827
    474.539   27.288    474.347   52.726
LOWEST FACTOR OF SAFETY = 12.087 AND OCCURS AT RADIUS= 475.115


****  WARNING AT NEXT CENTER  ****
MAXIMUM RADIUS IS LIMITED BY END POINT OF GROUND LINE

AT POINT (-120  610 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    295.466 1000.000
LOWEST FACTOR OF SAFETY = 1000.000 AND OCCURS AT RADIUS= 295.466


****  WARNING AT NEXT CENTER  ****
MAXIMUM RADIUS IS LIMITED BY END POINT OF GROUND LINE

AT POINT (-120  420 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    144.222 1000.000
LOWEST FACTOR OF SAFETY = 1000.000 AND OCCURS AT RADIUS= 144.222

AT POINT ( 70  1370 ) THE RADIUS AND FACTOR OF SAFETY ARE:
   1026.398   92.066   1026.198  114.713   1025.998  153.210
   1025.798  231.921   1025.599  473.621
LOWEST FACTOR OF SAFETY = 92.066 AND OCCURS AT RADIUS= 1026.398

AT POINT ( 70  1180 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    836.489   78.875    836.289   97.761    836.089  129.727
    835.889  194.729    835.689  393.127
LOWEST FACTOR OF SAFETY = 78.875 AND OCCURS AT RADIUS= 836.489

AT POINT ( 70  990 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    646.632   64.626    646.433   79.566    646.233  104.733
    646.033  155.609    645.833  309.764
LOWEST FACTOR OF SAFETY = 64.626 AND OCCURS AT RADIUS= 646.632

AT POINT ( 70  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    456.895   49.000    456.696   59.775    456.496   77.839
    456.297  114.175    456.097  223.728
LOWEST FACTOR OF SAFETY = 49.000 AND OCCURS AT RADIUS= 456.895

AT POINT ( 70  610 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    267.532   31.348    267.333   37.672    267.134   48.257
    266.936   69.534    266.737  133.699
LOWEST FACTOR OF SAFETY = 31.348 AND OCCURS AT RADIUS= 267.532

AT POINT ( 70  420 ) THE RADIUS AND FACTOR OF SAFETY ARE:
     79.598   16.797     79.400   20.039     79.203   25.448
     79.005   36.271     78.808   68.754
LOWEST FACTOR OF SAFETY = 16.797 AND OCCURS AT RADIUS= 79.598

AT POINT ( 260  1370 ) THE RADIUS AND FACTOR OF SAFETY ARE:
   1033.109    2.344   1023.492    2.352   1013.874    2.379
   1004.256    2.453    994.639    2.727
LOWEST FACTOR OF SAFETY = 2.344 AND OCCURS AT RADIUS= 1033.109

AT POINT ( 260  1180 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    843.584    2.028    835.537    2.023    827.489    2.034
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    819.442    2.089    811.395    2.330
    841.572    2.026    839.561    2.024    837.549    2.023
    833.525    2.024    831.513    2.027    829.501    2.030
LOWEST FACTOR OF SAFETY = 2.023 AND OCCURS AT RADIUS= 835.537

AT POINT ( 260  990 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    654.335    1.694    648.794    1.688    643.254    1.697
    637.713    1.749    632.172    1.991
    652.950    1.692    651.565    1.691    650.180    1.690
    647.409    1.688    646.024    1.690    644.639    1.693
LOWEST FACTOR OF SAFETY = 1.688 AND OCCURS AT RADIUS= 647.409

AT POINT ( 260  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    465.698    1.458    463.818    1.507    461.939    1.608
    460.060    1.846    458.180    2.533
LOWEST FACTOR OF SAFETY = 1.458 AND OCCURS AT RADIUS= 465.698

AT POINT ( 260  610 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    278.916   14.247    278.722   17.227    278.528   22.197
    278.334   32.139    278.139   61.979
LOWEST FACTOR OF SAFETY = 14.247 AND OCCURS AT RADIUS= 278.916

AT POINT ( 260  420 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    102.186    6.086    102.018    7.443    101.850    9.777
    101.682   14.223    101.514   27.783
LOWEST FACTOR OF SAFETY = 6.086 AND OCCURS AT RADIUS= 102.186

AT POINT ( 450  1370 ) THE RADIUS AND FACTOR OF SAFETY ARE:
   1027.766    4.307   1012.733    4.445    997.700    4.733
    982.666    5.230    967.632    6.393
LOWEST FACTOR OF SAFETY = 4.307 AND OCCURS AT RADIUS= 1027.766

AT POINT ( 450  1180 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    837.820    3.928    822.905    4.017    807.991    4.229
    793.076    4.606    778.161    5.504
LOWEST FACTOR OF SAFETY = 3.928 AND OCCURS AT RADIUS= 837.820

AT POINT ( 450  990 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    647.874    3.507    633.163    3.543    618.453    3.670
    603.742    3.908    589.032    4.528
LOWEST FACTOR OF SAFETY = 3.507 AND OCCURS AT RADIUS= 647.874

AT POINT ( 450  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    457.927    3.033    443.632    3.002    429.337    3.031
    415.042    3.124    400.747    3.439
    454.353    2.997    450.780    2.998    447.206    2.999
    440.058    3.006    436.484    3.012    432.911    3.021
LOWEST FACTOR OF SAFETY = 2.997 AND OCCURS AT RADIUS= 454.353

AT POINT ( 450  610 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    267.981    2.485    254.904    2.373    241.827    2.288
    228.750    2.213    215.672    2.215
    238.557    2.269    235.288    2.247    232.019    2.229
    225.480    2.200    222.211    2.192    218.942    2.195
LOWEST FACTOR OF SAFETY = 2.192 AND OCCURS AT RADIUS= 222.211

AT POINT ( 450  420 ) THE RADIUS AND FACTOR OF SAFETY ARE:
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     78.034    2.280     68.717    2.114     59.400    1.984
     50.082    1.853     40.765    1.772
     38.436    1.798     36.107    1.913     33.777    2.397
LOWEST FACTOR OF SAFETY = 1.772 AND OCCURS AT RADIUS= 40.765

AT POINT ( 640  1370 ) THE RADIUS AND FACTOR OF SAFETY ARE:
   1010.620   12.836    998.496   15.265    986.372   20.427
    974.248   34.607    962.124  175.705
LOWEST FACTOR OF SAFETY = 12.836 AND OCCURS AT RADIUS= 1010.620

AT POINT ( 640  1180 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    822.357   13.056    809.885   15.804    797.414   21.809
    784.943   39.982    772.471  364.525
LOWEST FACTOR OF SAFETY = 13.056 AND OCCURS AT RADIUS= 822.357

AT POINT ( 640  990 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    633.246   14.060    620.597   17.627    607.947   25.952
    595.298   56.783
LOWEST FACTOR OF SAFETY = 14.060 AND OCCURS AT RADIUS= 633.246

AT POINT ( 640  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    444.260   17.233    431.408   23.360    418.556   40.475
    405.704  157.326
LOWEST FACTOR OF SAFETY = 17.233 AND OCCURS AT RADIUS= 444.260

AT POINT ( 640  610 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    255.513   37.175    242.410   73.478    229.308  449.726
LOWEST FACTOR OF SAFETY = 37.175 AND OCCURS AT RADIUS= 255.513

AT POINT ( 640  420 ) THE RADIUS AND FACTOR OF SAFETY ARE:
     66.763 1000.000
LOWEST FACTOR OF SAFETY = 1000.000 AND OCCURS AT RADIUS= 66.763



LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE  -120.000    70.000   260.000   450.000   640.000
  1370.000    25.693    92.066     2.344     4.307    12.836
  1180.000    21.192    78.875     2.023     3.928    13.056
   990.000    16.686    64.626     1.688     3.507    14.060
   800.000    12.087    49.000     1.458     2.997    17.233
   610.000  1000.000    31.348    14.247     2.192    37.175
   420.000  1000.000    16.797     6.086     1.772  1000.000

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING  3  CENTERS

FACTOR OF SAFETY = 12.087 AT (-120.000,800.000)
FACTOR OF SAFETY = 1.458 AT (260.000,800.000)
FACTOR OF SAFETY = 1.772 AT (450.000,420.000)

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  800 ) RADIUS 465.698
THE MINIMUM FACTOR OF SAFETY IS 1.458
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FACTORS OF SAFETY BASED ON SEARCH
AT POINT ( 260  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    465.698    1.458    463.818    1.507    461.939    1.608
    460.060    1.846    458.180    2.533
LOWEST FACTOR OF SAFETY = 1.458 AND OCCURS AT RADIUS= 465.698

AT POINT ( 352  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    460.253    1.921    451.324    1.845    442.396    1.812
    433.467    1.801    424.539    1.898
    440.164    1.806    437.931    1.801    435.699    1.799
    431.235    1.806    429.003    1.820    426.771    1.847
LOWEST FACTOR OF SAFETY = 1.799 AND OCCURS AT RADIUS= 435.699

AT POINT ( 168  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    466.924   28.408    466.724   34.393    466.525   44.357
    466.325   64.310    466.126  124.461
LOWEST FACTOR OF SAFETY = 28.408 AND OCCURS AT RADIUS= 466.924

AT POINT ( 260  892 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    556.922    1.529    553.255    1.533    549.589    1.556
    545.922    1.626    542.255    1.896
LOWEST FACTOR OF SAFETY = 1.529 AND OCCURS AT RADIUS= 556.922

AT POINT ( 260  708 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    374.852    4.256    374.656    5.214    374.459    7.021
    374.262   11.740    374.065   82.104
LOWEST FACTOR OF SAFETY = 4.256 AND OCCURS AT RADIUS= 374.852

AT POINT ( 283  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    462.999    1.468    459.602    1.472    456.206    1.495
    452.809    1.571    449.412    1.886
LOWEST FACTOR OF SAFETY = 1.468 AND OCCURS AT RADIUS= 462.999

AT POINT ( 237  800 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    469.509    2.043    468.924    2.263    468.340    2.633
    467.756    3.373    467.171    5.596
LOWEST FACTOR OF SAFETY = 2.043 AND OCCURS AT RADIUS= 469.509

AT POINT ( 260  823 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    488.477    1.452    486.156    1.481    483.835    1.542
    481.514    1.696    479.194    2.271
LOWEST FACTOR OF SAFETY = 1.452 AND OCCURS AT RADIUS= 488.477

AT POINT ( 260  846 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    511.275    1.469    508.509    1.485    505.743    1.527
    502.977    1.636    500.211    2.047
LOWEST FACTOR OF SAFETY = 1.469 AND OCCURS AT RADIUS= 511.275

AT POINT ( 283  823 ) THE RADIUS AND FACTOR OF SAFETY ARE:
    485.905    1.504    482.041    1.503    478.178    1.517
    474.314    1.575    470.450    1.823
    484.939    1.502    483.973    1.502    483.007    1.502
    481.075    1.504    480.109    1.507    479.143    1.511
LOWEST FACTOR OF SAFETY = 1.502 AND OCCURS AT RADIUS= 483.973

AT POINT ( 237  823 ) THE RADIUS AND FACTOR OF SAFETY ARE:
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492.111 1.681 491.121 1.810 490.130 2.028
489.140 2.462 488.149 3.771
LOWEST FACTOR OF SAFETY = 1.681 AND OCCURS AT RADIUS= 492.111

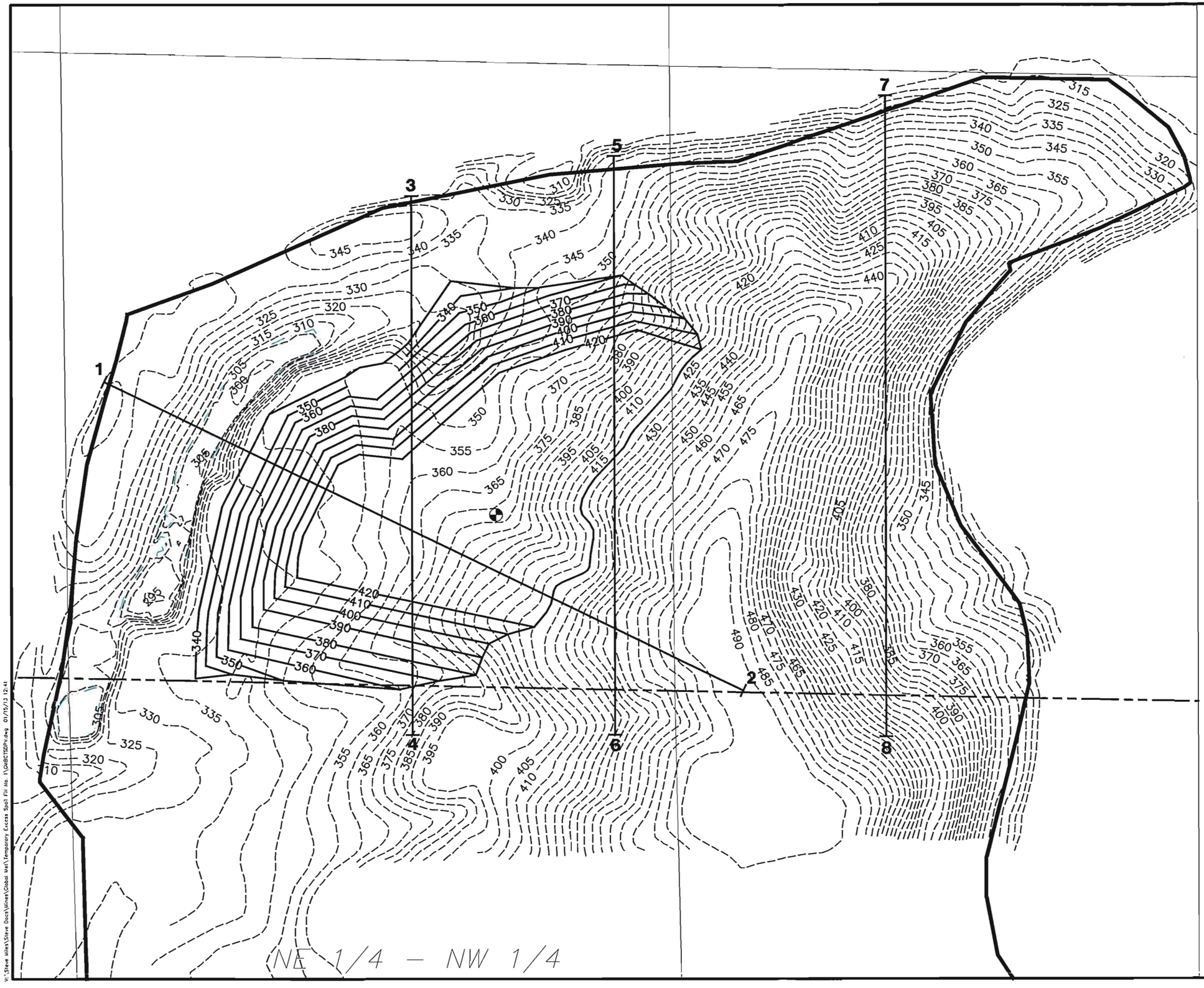
AT POINT (260 823) RADIUS 488.477

THE MINIMUM FACTOR OF SAFETY IS 1.452

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	BOTTOM SINE	TOTAL WEIGHT	EFFEC. WEIGHT	RESIS. MOMENT	DRIVING MOMENT
1	2	1.710	0.213	0.000	.245	.471E+02	.471E+02	.996E+05	.563E+04
2	2	14.032	2.093	0.000	.261	.380E+04	.380E+04	.174E+07	.484E+06
3	2	5.968	4.278	0.000	.281	.331E+04	.331E+04	.119E+07	.454E+06
4	2	9.775	5.835	0.000	.297	.739E+04	.739E+04	.247E+07	.107E+07
5	2	10.225	7.603	0.000	.318	.101E+05	.101E+05	.319E+07	.156E+07
6	2	5.517	8.827	0.000	.334	.631E+04	.631E+04	.194E+07	.103E+07
7	2	14.473	10.164	0.000	.354	.190E+05	.190E+05	.573E+07	.330E+07
8	2	1.270	11.041	0.000	.370	.182E+04	.182E+04	.537E+06	.328E+06
9	2	15.742	11.808	0.000	.388	.241E+05	.241E+05	.702E+07	.456E+07
10	2	2.988	12.434	0.000	.407	.481E+04	.481E+04	.139E+07	.957E+06
11	2	12.754	12.778	0.000	.423	.211E+05	.211E+05	.602E+07	.436E+07
12	2	7.246	12.969	0.000	.444	.122E+05	.122E+05	.344E+07	.264E+07
13	2	8.497	12.919	0.000	.460	.142E+05	.142E+05	.399E+07	.319E+07
14	2	11.503	12.595	0.000	.480	.188E+05	.188E+05	.523E+07	.440E+07
15	2	4.239	12.126	0.000	.496	.666E+04	.666E+04	.185E+07	.161E+07
16	2	15.742	11.252	0.000	.517	.229E+05	.229E+05	.638E+07	.579E+07
17	2	15.742	5.280	0.000	.549	.108E+05	.108E+05	.343E+07	.289E+07
							SUM	.556E+08	.386E+08

AT CENTER (260.000 , 823.000) WITH RADIUS 488.477 AND SEIS. COEFF. 0.00
FACTOR OF SAFETY BY NORMAL METHOD IS 1.440
FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.452



LEGEND

---680---	EXISTING CONTOUR
——680——	POST FILL CONTOUR
1 ——— 2	CROSS–SECTION
⊕	FOUNDATION INVESTIGATION SITE
— · — · —	WATER SURFACE
▬▬▬	PERMIT BOUNDARY

Scale: 1" = 200'

N

PERC ENGINEERING CO., INC.
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P.O. Box 1712 Jasper, Alabama 35502
(205) 384-5553 Office (205) 293-3114 Fax

GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL DISPOSAL AREA NO. 1
PLANVIEW

DRAWN BY:	C.M.O.	DATE:	12–10–12
DWG. NAME:	GMBCTSDPV		
APPROVED BY:	W.P.G.	SCALE:	1"=200'

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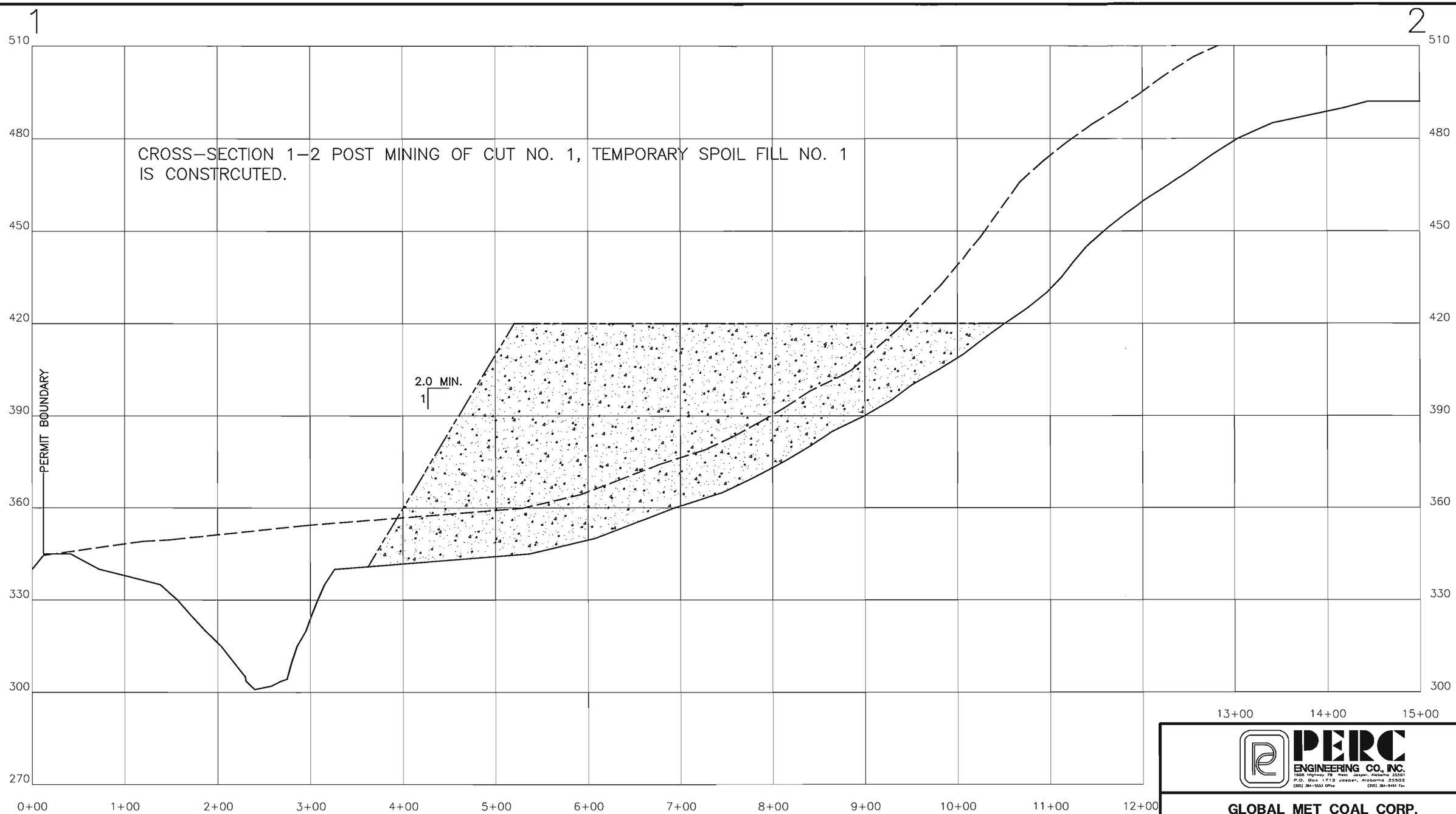

LEGEND

- EXISITNG GRADE
- PROPOSED MINING GRADE
- PROPOSED FINISHED GRADE
- TEMPORARY SPOIL FILL NO. 1

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 1-2 TYPICAL

DRAWN BY: S.D.M. DWG. NAME: GMBCTSCS	DATE: 1/15/2013
APPROVED BY: S.D.M.	SCALE: AS NOTED

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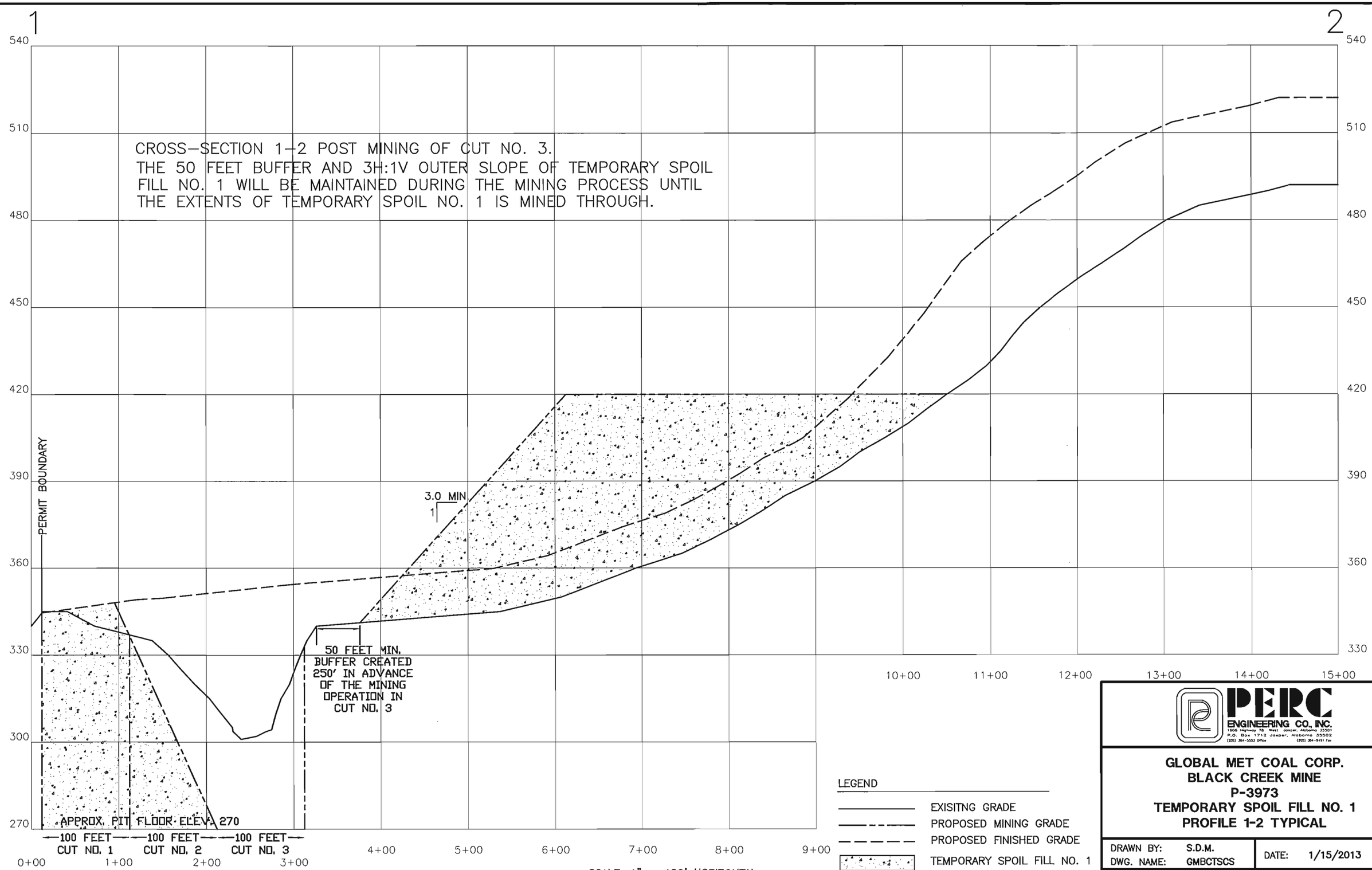

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 1-2 TYPICAL

DRAWN BY:	S.D.M.	DATE:	1/15/2013
DWG. NAME:	GMBCTSCS		
APPROVED BY:	S.D.M.	SCALE:	AS NOTED

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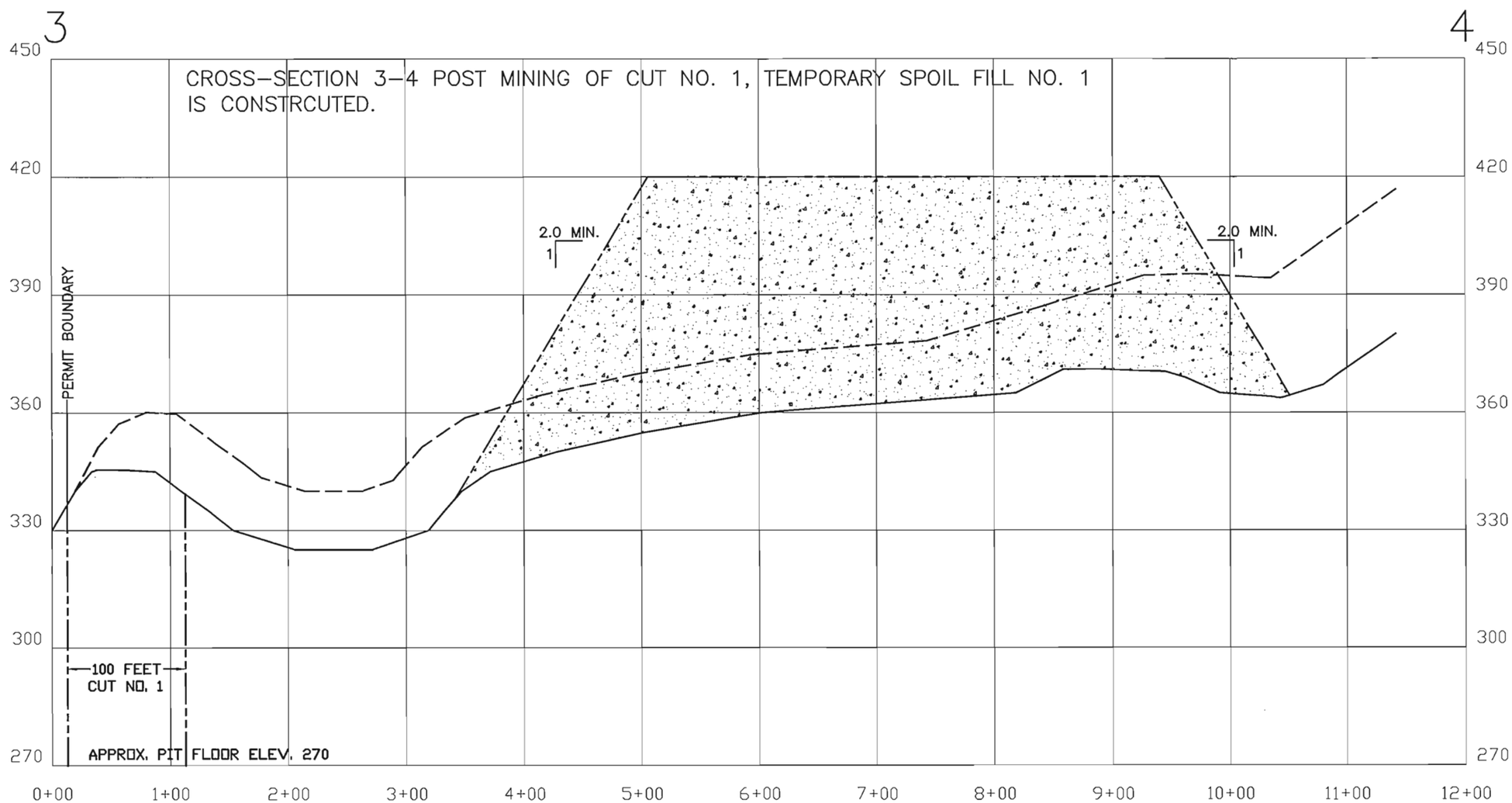

LEGEND

- EXISITNG GRADE
- PROPOSED MINING GRADE
- PROPOSED FINISHED GRADE
- TEMPORARY SPOIL FILL NO. 1

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 3-4 TYPICAL

DRAWN BY: S.D.M. DWG. NAME: GMBCTSCS	DATE: 1/15/2013
APPROVED BY: S.D.M.	SCALE: AS NOTED

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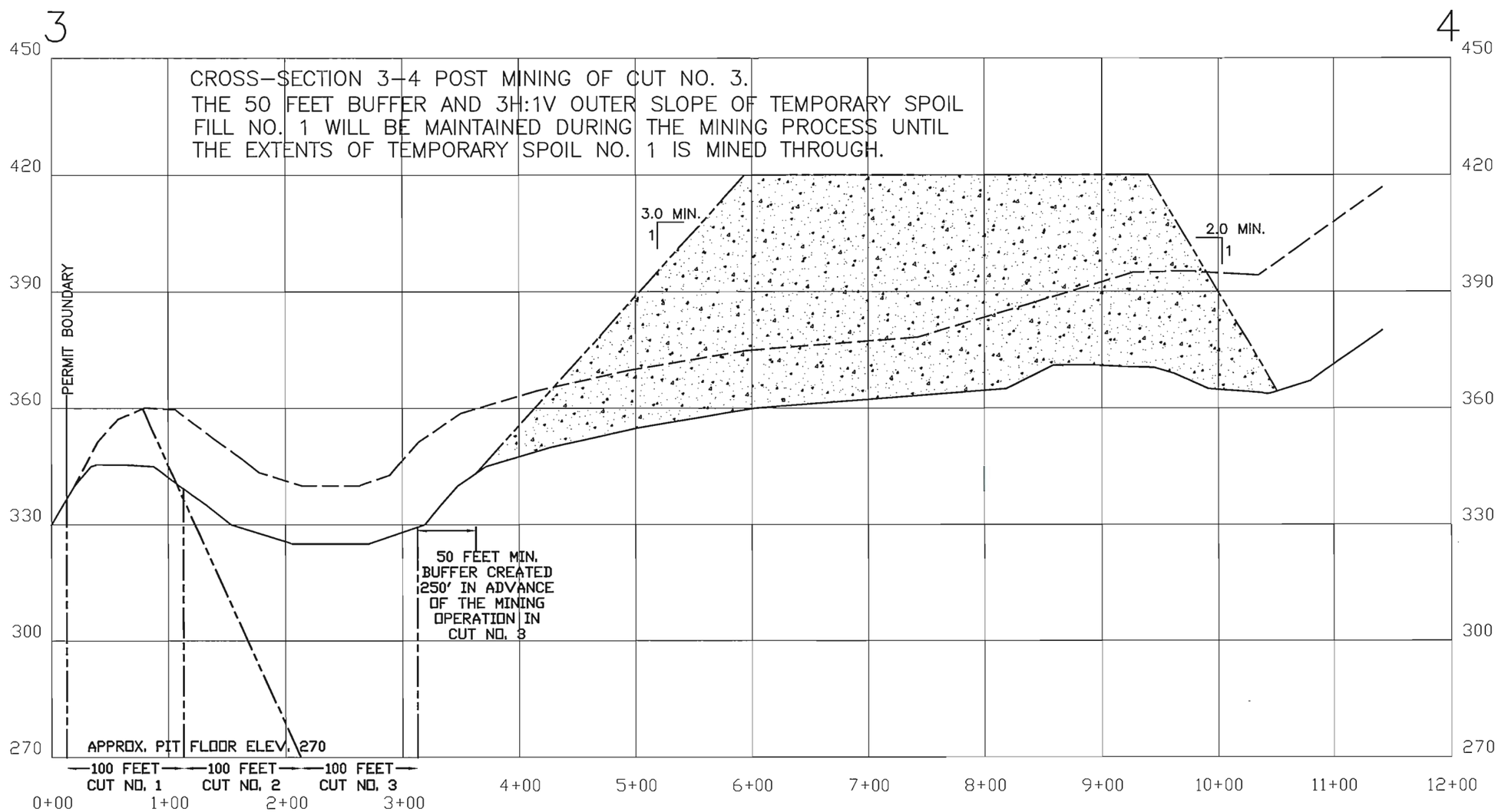

LEGEND

- EXISITNG GRADE
- PROPOSED MINING GRADE
- PROPOSED FINISHED GRADE
- TEMPORARY SPOIL FILL NO. 1

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

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BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 3-4 TYPICAL

DRAWN BY: S.D.M. DWG. NAME: GMBCTSCS	DATE: 1/15/2013
APPROVED BY: S.D.M.	SCALE: AS NOTED

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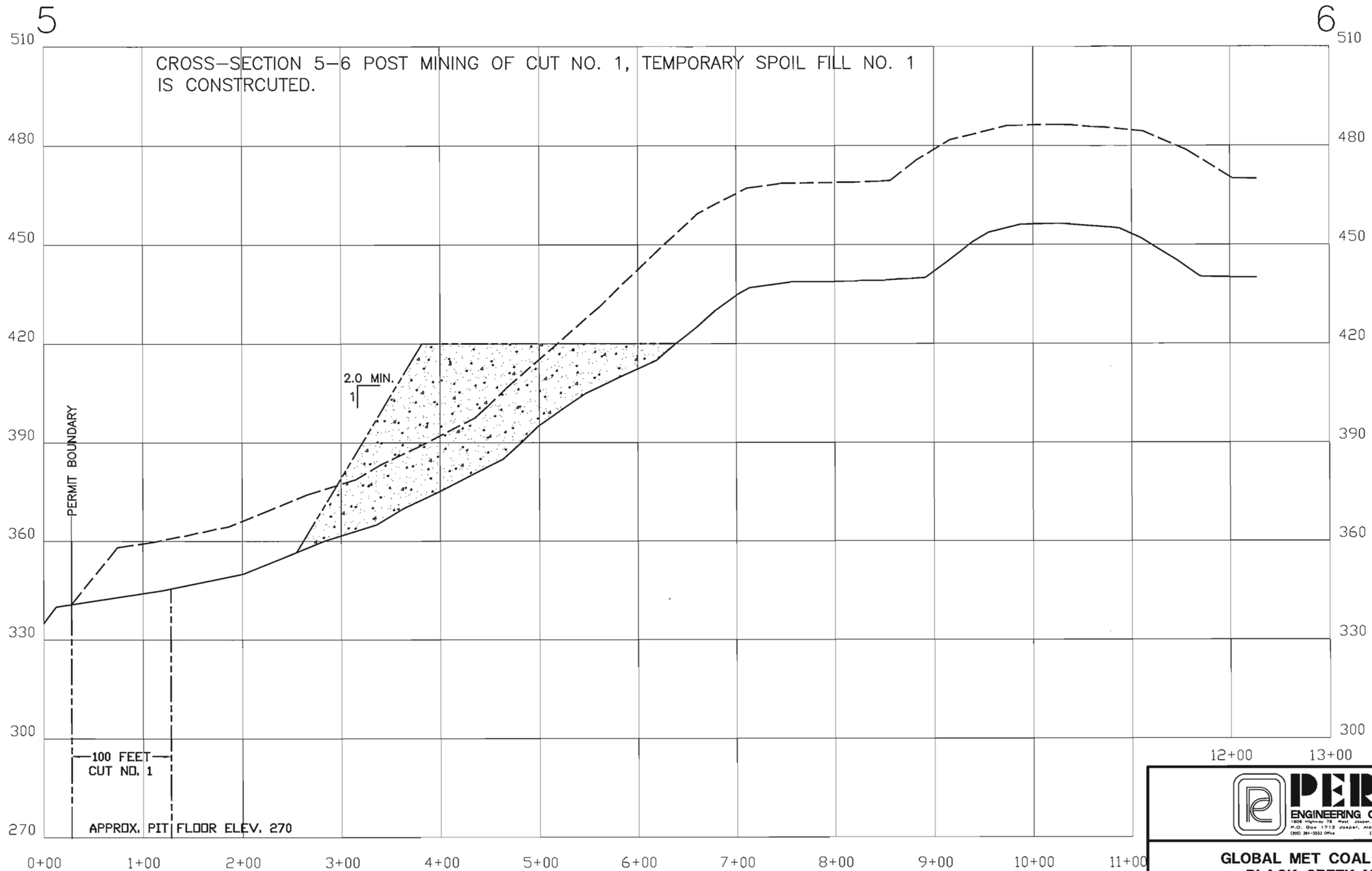

LEGEND

- EXISITNG GRADE
- PROPOSED MINING GRADE
- PROPOSED FINISHED GRADE
- TEMPORARY SPOIL FILL NO. 1

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 5-6 TYPICAL

DRAWN BY: S.D.M. DWG. NAME: GMBCTSCS	DATE: 1/15/2013
APPROVED BY: S.D.M.	SCALE: AS NOTED

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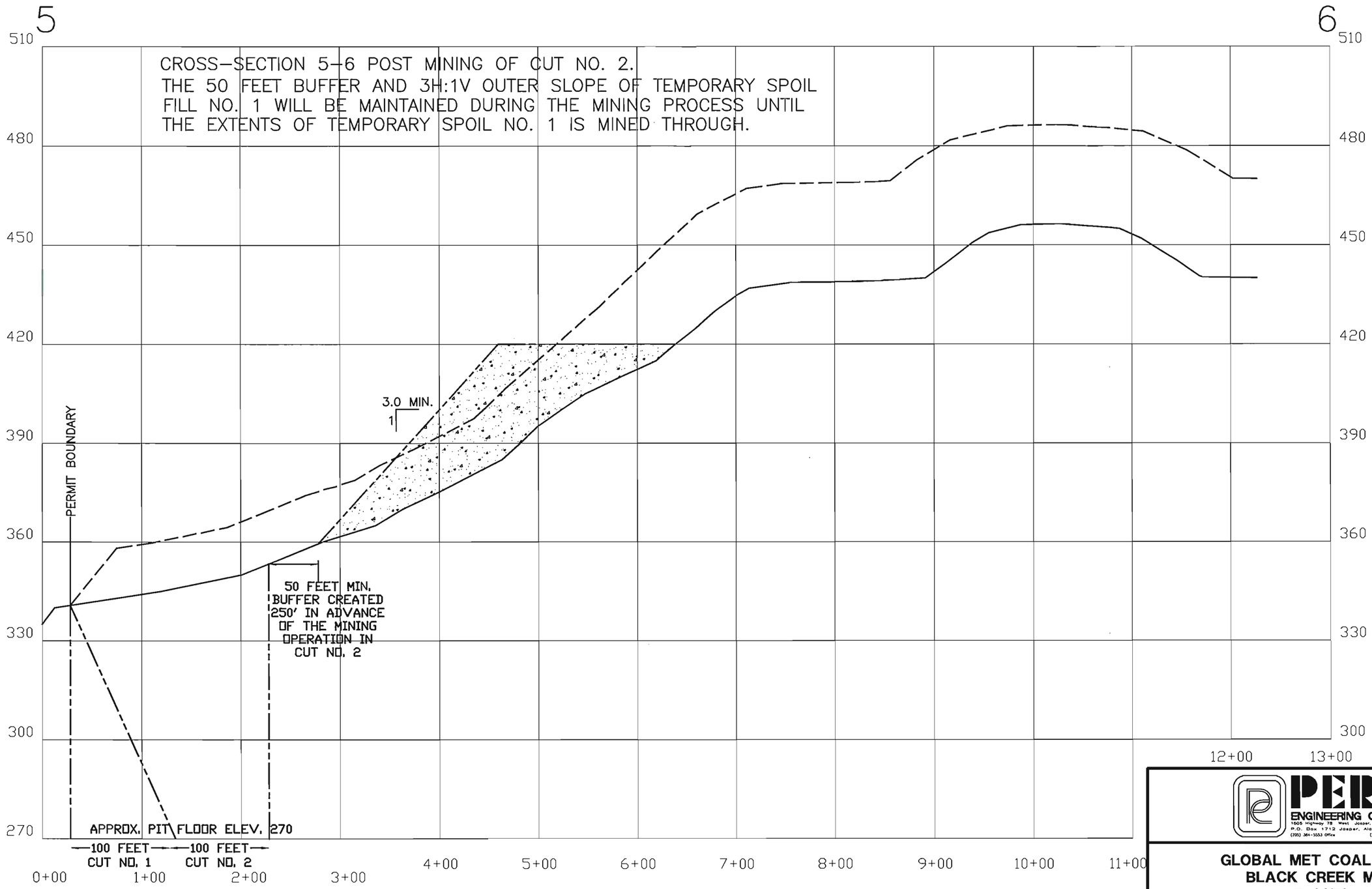

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

LEGEND

- EXISITNG GRADE
- PROPOSED MINING GRADE
- PROPOSED FINISHED GRADE
- TEMPORARY SPOIL FILL NO. 1

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 5-6 TYPICAL

DRAWN BY: S.D.M. DWG. NAME: GMBCTSCS	DATE: 1/15/2013
APPROVED BY: S.D.M.	SCALE: AS NOTED

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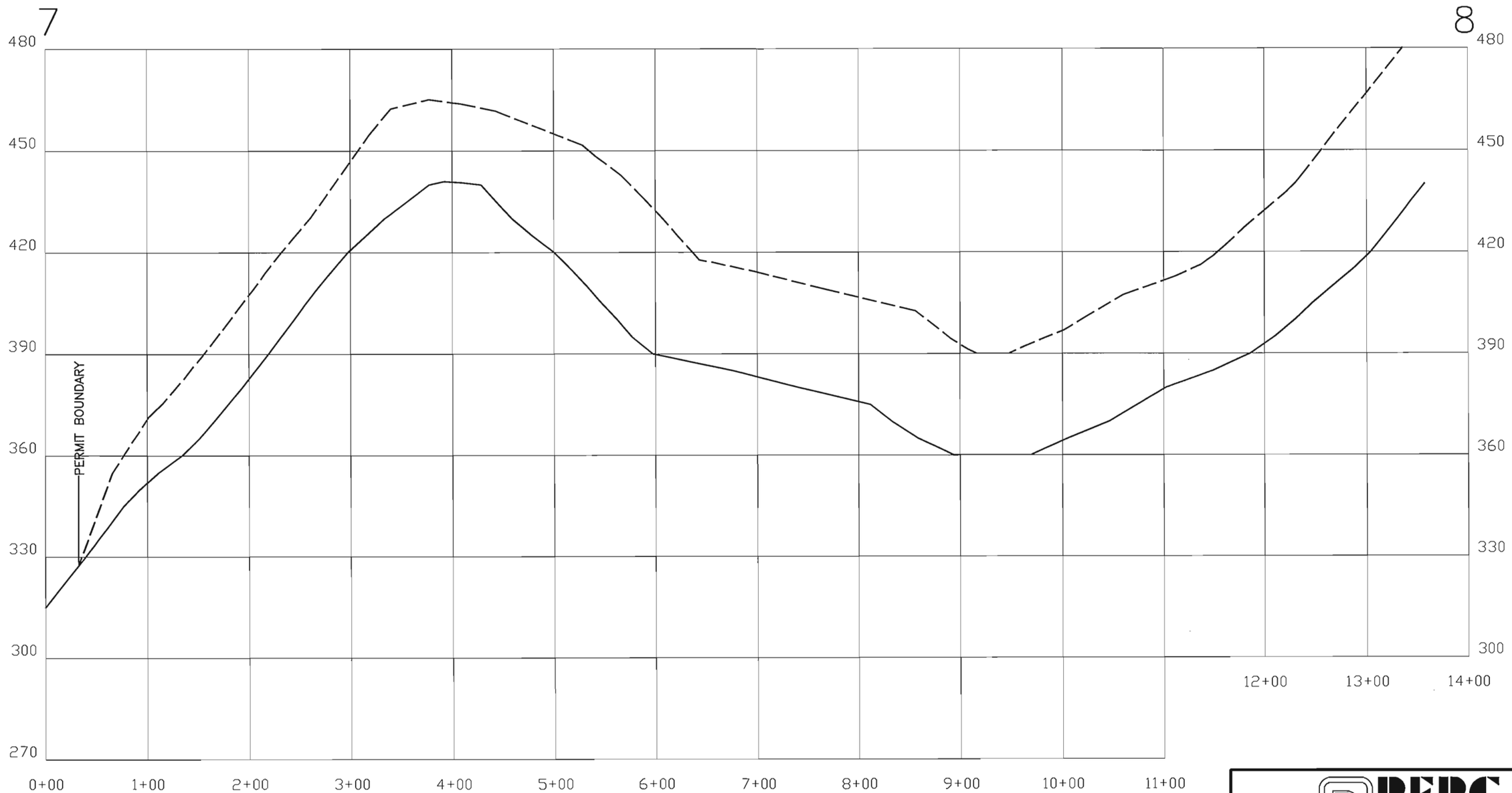

LEGEND

EXISITNG GRADE

PROPOSED FINISHED GRADE

SCALE: 1" = 100' HORIZONTAL
1" = 30' VERTICAL

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GLOBAL MET COAL CORP.
BLACK CREEK MINE
P-3973
TEMPORARY SPOIL FILL NO. 1
PROFILE 7-8

DRAWN BY:	S.D.M.	DATE:	1/15/2013
DWG. NAME:	GMBCTSCS		
APPROVED BY:	S.D.M.	SCALE:	AS NOTED

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SITE HYDROLOGY

Site inspections were performed at the fill sites to determine the existence of seeps or springs. No evidence of seeps or springs was observed. All drainage from the area ultimately flows into the Locust Fork of the Black Warrior River

DIVERSIONS

This is a temporary disposal site for mine spoil. It will be mined through and removed. There is no need for diversion ditches.

UNDERDRAINS

This is a temporary disposal site for mine spoil. It will be eliminated as mining progresses. Due to the nonexistence of seeps and springs at the fill sites and due to the material to be disposed of within the fills consisting of large cobble type material, underdrains are not proposed. Due to its nature, the spoil material will function as an underdrain system itself.

CONSTRUCTION

Construction of Temporary Spoil Fills No. 1 will occur in four phases. These four phases are listed below:

Phase I - Site Preparation

- Step A - Removal of Vegetation
- Step B - Removal and Segregation of Soil Material

Phase II - Construction

- Step A - Placing and Compacting of Fill Material
- Step B - Construction of Diversion Ditches

Phase III - Revegetation

- Step A - Revegetation

Phase IV - Removal

- Step A - Removal

The fill will be inspected by a qualified registered professional engineer or other qualified professional specialist under the direct supervision of the professional engineer. Inspections will be made at least quarterly and during the times of removal of topsoil, vegetative, and organic materials, placement and compaction of spoil material, and revegetation of the areas. Certified inspection reports will be filed with the Regulatory Authority on a quarterly basis until the final configuration of the fill is reached stating that proper construction and maintenance are occurring in accordance with approved design plans. Inspection reports will be retained at the facility office.

PHASE I

Preparation of the site will consist of the removal of all vegetation and the grubbing of the fill area. Topsoil and subsoil from the site will be stockpiled, if required, in order to be replaced on the finished slopes of the proposed fill, if required.

PHASE II

The material to be placed in the temporary disposal fill will consist of spoil material produced from the mining of the Black Creek, and Jefferson coal seams. The fill material shall be placed and spread over the entire fill area in horizontal lifts not to exceed four (4) feet in thickness and compacted to 90% of the standard proctor density. Compaction will be accomplished using mobile equipment.

As shown on the cross-sections within these design plans, once mining progresses adjacent to the temporary spoil fill and an open pit is within 50 feet of the temporary spoil fill a 50 feet buffer will be maintained from the toe of the temporary spoil fill to the active pit created 250 feet in advance of the mining operation. Also, the outer slope of the temporary spoil fill will be maintained on a 3H:1V slope. The above safety measures will ensure the safety of the men working in the pit during the mining process. As mining progresses through Temporary Spoil Fill No. 1 the spoil material will be placed within subsequent open pits from the previous cuts. And, the 50 feet buffer and outer 3H:1V slope will be maintained throughout the mining of Temporary Spoil Fill No. 1.

PHASE III

Revegetation of all outslopes shall be performed prior to mining of the temporary spoil fill. The revegetation of the ouslopes shall be performed according to the mixtures and application rates given in the following Permanent Cover-Mixtures and Rates Attachment. Seeding will commence during the first normal planting season to establish a diverse, effective and permanent vegetative cover. Seed bed preparation shall include discing or scarifying the soil to permit seed application and to aid in the mixing of the soil amendments. All areas shall be mulched with hay at a rate of 1 ½ - 3 tons per acre to control erosion, to promote seed germination, and to increase the moisture retention of the soil.

PHASE IV

Phase IV will consist of mining through the temporary spoil disposal fill as the mining progresses. The fill will be utilized to achieve approximate original contours for the mine reclamation.

SPECIFICATIONS FOR TEMPORARY DISPOSAL OF SPOIL

Spoil material taken from the Black Creek Mine initial pits of and any subsequent pits that are necessary to ensure the safe and efficient operation for Increment No.1 will be stored within Temporary Spoil Disposal Area No.1 The disposal area plans shall be designed and certified by a qualified registered professional engineer and subsequently submitted to the Regulatory Authority for approval.

Due to the spoil material being placed within the fills being large cobble sized stones and the disposal areas being free of springs, groundwater seeps, and natural drainage courses, no underdrain systems are required.

All topsoil, vegetative and organic material will be removed from the disposal area prior to the transportation of any fill material. The topsoil will be stored onsite in stockpiles, to be redistributed over the disposal area prior to revegetation.

Spoil material taken from the initial cuts will be transported to the disposal area via mobile equipment in a controlled and safe manner. The spoil material will be spread in horizontal lifts not to exceed four (4) feet thick and compacted to 90% of the standard proctor as outlined in the ASTM, as to ensure stability of the area. No combustible material will be allowed to be stored in the disposal area. With the acid-base count of the material at this mine site, no acid or toxic forming material is expected. However, should any such material be encountered, it will be placed as near the center of the fill as possible and encapsulated with three feet of compacted clay.

Analysis of the foundation and fill materials will be performed by a qualified laboratory and the results will be utilized in the stability analysis in the detailed Temporary spoil disposal plans. The slopes of the fill area will be designed to have a 1.5 minimum static safety factor.

The fill will be inspected by a qualified registered professional engineer or other qualified professional specialist under the direct supervision of the professional engineer. Inspections will be made at least quarterly and during the times of removal of topsoil, vegetative, and organic materials, installation of diversion ditches, placement and compaction of spoil material, and revegetation of the areas. Certified inspection reports will be filed with the Regulatory Authority on a quarterly basis until the final configuration of the fill is reached stating that proper construction and maintenance are occurring in accordance with approved design plans. Inspection reports will be retained at the facility office.

The final configuration of the disposal area will be graded in such a manner as to be consistent with the surrounding area and revegetated in such a manner as to be consistent with the landuse of the surrounding area.

Slope protection will be achieved through the use of seed and mulch. The disposal area will be revegetated as entailed in the reclamation plan.

Routine maintenance of the disposal area will consist of repair and stabilization of any rills and gullies which may develop upon the final configuration, repairs to erosion protection structures as required,

repairs to diversion structures as necessary and the maintenance of vegetation as necessary to ensure the establishment of a permanent diverse vegetative cover.

PERMANENT COVER-MIXTURES AND RATES

Spring Planting

Species	Planting Rate	Planting Methods	Planting Dates	Areas to be Planted
Fescue	25#/acre	Broadcast	Spring	All Disturbance
Millet	10#/acre	Broadcast	Spring	All Disturbance
Sericea	35#/acre	Broadcast	Spring	All Disturbance
Bermuda	15#/acre	Broadcast	Spring	All Disturbance

Fall Planting

Species	Planting Rate	Planting Methods	Planting Dates	Areas to be Planted
Sericea	35#/Acre	Broadcast	Fall	All Disturbance
Fescue	40#/Acre	Broadcast	Fall	All Disturbance
Perennial Ryegrass	20#/Acre	Broadcast	Fall	All Disturbance