INITIAL SAFETY FACTOR ASSESSMENT REPORT

BASIN NO. 1

MONTOUR STEAM ELECTRIC STATION
DERRY TOWNSHIP, MONTOUR COUNTY, PENNSYLVANIA

Prepared for:

TALEN GENERATION, LLC

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

CEC Project 150-989.0003

October 13, 2016

Civil & Environmental Consultants, Inc.

Pittsburgh | 333 Baldwin Road | Pittsburgh, PA 15205 | p: 412-429-2324 f: 412-429-2114 | www.cecinc.com

TABLE OF CONTENTS

ATTACHMENTS

1.0 PURPOSE

The purpose of this assessment was to perform an initial slope stability analysis of the Montour Steam Electric Station (MSES) Ash Basin 1 perimeter dike in accordance with Section 257.73(e)(1) of the United States Environmental Protection Agency (USEPA) 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule, dated April 17, 2015 (CCR Rule).

2.0 BACKGROUND

Basin No. 1 went into service in 1971 and was constructed by excavating site soils to construct an embankment dike around the excavation. The top of the dike is set at Elevation 564 (all elevations reported are based on NGVD 1929). The dike ties into natural grade at the east side of the basin. Seepage problems began along the north dike almost immediately after the basin went into service in 1971. As a result, a seepage interceptor system, which is still in service, was installed along the outside toe of the northern portion of the dike. The collected seepage is pumped back into the basin. In 1976 a weighted filter blanket was installed along the northern slope of the dike as a result of seepage on the outside slopes. The filter blanket was extended in 1979 along with the interceptor trench when additional seepage was noted after the water level within the impoundment was raised. In 1984 a slurry wall was installed in the northern portion of the dike to reduce seepage through the dike, and in 1987 the slurry wall was installed in the southern, eastern, and southwestern portions of the dike also to reduce seepage. The slurry wall effectively reduced the seepage through the dike, especially along the northern side.

3.0 PREVIOUS INVESTIGATIONS AND ANALYSES

CEC and others completed subsurface investigations at the site over the life of the basin. Test borings and piezometers/monitoring wells were drilled or installed at various locations within the impoundment and in the surrounding areas outside of the impoundment footprint. The locations of some of these borings and piezometers are shown on Figure 1 in Attachment B. Relevant data obtained from these previous investigations were utilized to estimate the thickness of soils, soil parameters, and groundwater levels in this analysis.

In 2007, Ish Inc. and Key Environmental performed an investigation and stability analysis of two sections on the southern perimeter of the dike. Portions of this report and analysis are presented in Attachment F for reference. This analysis recommended that portions of the southern dike be buttressed with rock fill to increase stability. Construction of the rock buttress was performed in 2007.

4.0 2015 SUBSURFACE INVESTIGATION

CEC presents the following based on the data obtained at the test boring locations and our observations. Subsurface conditions may vary between test borings and in other areas of the site.

4.1 TEST DRILLING

CEC subcontracted Eichelbergers, Inc. to drill seven test borings and install four standpipe piezometers at the site. The subsurface materials encountered in the test borings included topsoil, existing fill, glacial till, and residual soils underlain by bedrock. The test borings drilled at the site included 186.9 feet of soil sampling, drilled between May 4 and May 7, 2015. The test borings ranged in depth from 9.4 to 49.4 feet below the ground surface (bgs). The test boring locations are shown on Figure 1 in Attachment B.

The test borings were advanced through the soil zone using hollow-stem auger drilling methods. The soil zone was generally sampled continuously at 2-foot centers using a split-spoon sampler and standard penetration tests. A split-spoon sampler is a 2-inch outside diameter (OD) tube which is driven into the soil to be sampled. The sampler can be split-open lengthwise for removal and visual identification of the soil obtained. The standard penetration test (SPT) generally consists of driving the 2-inch OD sampling spoon using a 140-pound hammer freely falling a distance of 30 inches. The number of blows required to drive the spoon through three successive 6-inch increments is recorded. The first 6-inch increment is considered a seating interval and is not used to estimate soil conditions. The sum of the number of blows required to drive the sampler through the second and third increments is considered the "N" value of the soil. The "N" value is used to estimate the soil density, strength, and compressibility. Details of the SPT are described in the American Society for Testing and Materials (ASTM) Standard D1586. CEC's project representative described the soil color, texture, apparent origin, and apparent moisture content of the split-spoon samples obtained during drilling. The test borings were generally extended to split-spoon refusal on bedrock. CEC defines split-spoon refusal as the depth at which 50 blows or more are required to drive the sampling spoon 6 inches or less through residual soil after split-spoon refusal was achieved on bedrock.

Detailed soil descriptions appear on the test boring logs and can be found in Attachment C. Attachment C also contains a summary of the definitions of standard terms and symbols used on the boring logs and in this report. A summary of the results of the subsurface investigation is presented on Table 1 in Attachment A.

4.2 TOPSOIL CONDITIONS

Topsoil was encountered in all of the test borings, except for Test Boring B-103. The topsoil thickness ranged from approximately 0.3 to 0.5 feet.

4.3 EXISTING FILL CONDITIONS

Fill consists of disturbed ground or excavated soil and bedrock material placed by man. Existing fill materials were encountered in all of the seven test borings except for Test Borings B-101 and B-201. The fill ranged in thickness from approximately 6 to 36 feet. The fill material sampled in the test borings consisted of variable amounts of clay, sand, and gravel-sized rock fragments. The consistency of the fine-grained fill material sampled during test drilling ranged from soft to very stiff, but was generally stiff. The moisture content of the fill ranged from dry to wet, but was mostly moist.

Laboratory testing was performed on three samples of existing fill material obtained from Test Borings B-102, B-103, B-301, and B-302 at depths ranging from approximately 4 to 14 ft bgs. The samples classified as CL (lean clay with sand) and SC (clayey sand with varying amounts of gravel) according to the Unified Soils Classification System (USCS). The liquid limit of the fill samples tested ranged from 33 to 42 and the plastic limit ranged from 19 to 23. The percentage of fines (silt and clay) ranged from approximately 16% to 71%. The natural moisture content of the tested samples ranged from approximately 13% to 22%.

Two consolidated-undrained (CU) triaxial compression tests were performed on relatively undisturbed samples of existing fill. These samples were obtained from Test Borings B-102 and B-103, which are situated along Cross Section 1-1 as shown on Figure 1 in Attachment B. The effective stress angle of friction ranged from 25 to 31 degrees and the effective stress cohesion ranged from 481 to 616 pounds per spare foot (psf). The total stress angle of friction was 16 degrees for both samples and the total stress cohesion ranged from 338 to 599 psf.

4.4 GLACIAL TILL CONDITIONS

Glacial till is a heterogeneous mixture generally consisting of clay, sand, gravel, and boulders which was deposited by the movement of glaciers. Glacial till is generally unsorted and unstratified. Glacial till was encountered in all of the test borings except Test Borings B-301 and B-302. The glacial till generally

consisted of clay with varying amounts of sand and rock fragments. The glacial till ranged in thickness from approximately 8 to 17 feet. The consistency of the fine-grained glacial till sampled during test drilling ranged from medium stiff to hard, but was generally very stiff. The moisture content of the glacial till ranged from dry to wet, but was mostly moist.

Laboratory testing was performed on three samples of glacial till obtained from Test Borings B-102, B-103, and B-201 at depths ranging from approximately 6 to 48 ft bgs. The samples classified as CL (sandy lean clay) and SC (clayey sand). The liquid limit of the glacial till samples tested ranged from 30 to 34 and the plastic limit ranged from 16 to 18. The percentage of fines (silt and clay) ranged from approximately 37% to 69%. The natural moisture content of the tested samples ranged from approximately 13% to 15%.

4.5 RESIDUAL SOIL CONDITIONS

Residual soil is defined as material derived from the physical and/or chemical weathering of bedrock. Residual soils may retain relic structures of the parent bedrock, such as bedding planes, but they are soft enough to be penetrated by a split-spoon sampler. Residual soil was encountered in all test borings drilled at the site and ranged from approximately 1 to 3 feet in thickness. The residual soil sampled from the test borings consisted of clay or decomposed shale. Highly plastic (fat) clay was encountered in Test Boring B-302 above the decomposed shale. The consistency of the fine-grained residual soil sampled during test drilling ranged from medium stiff to hard, but was generally hard. The moisture content of the residual soil encountered ranged from dry to moist, but was mostly dry.

Laboratory testing was performed on one sample of residual soil obtained from Test Borings B-3 from approximately 4 to 6 feet bgs. This sample classified as CH (fat clay) according to the USCS, and contained approximately 98% fines. The plastic and liquid limits of the sample were 57 and 28, respectively. The moisture content of the sample was approximately 33%.

4.6 GROUNDWATER CONDITIONS

Water level measurements were obtained at the completion of drilling and ranged from approximately 7 to 40 ft bgs, where encountered. Test Borings B-101 and B-302 were dry at the completion of drilling. A 2-inch diameter polyvinyl chloride (PVC) standpipe piezometer was installed in Test Borings B-102, B-103, B-202, and B-301 to monitor the phreatic surface through the dike at the slope stability cross

sections. Logs depicting the depths and screened intervals of the piezometers are presented in Attachment C. Talen personnel recorded water level measurements at these piezometers and some existing piezometers on a monthly basis for use in this assessment. These measurements are summarized on Table 3 in Attachment A.

5.0 SLOPE STABILITY ANALYSIS

5.1 METHODOLOGY

Four cross sections were selected for evaluation that represent different areas of the basin that CEC identified as most critical based on the dike height, groundwater, and slope conditions. CEC used data collected in our 2015 investigation, as well as subsurface data collected from previous investigations and the results of previous analyses. The analyses were prepared in accordance with Section 257.73(e)(1) of the CCR Rule.

A Test Boring and Cross Section Location Plan is included in Attachment B that shows the Basin 1 layout and the approximate locations of Cross Sections 1-1, 2-2, 3-3, and 4-4. The drawing shows both the existing grades in Basin 1 and the proposed grades of conditioned fly ash included in the Major Permit Modification (MPM) issued by PADEP on June 18, 2015. Attachment E includes the stability analysis output for the four sections that were evaluated.

Slope stability software Slide Version 6.0 was used to calculate the minimum slope stability factor of safety (FS) using Spencer's method. The program uses 2D limit equilibrium methods to determine the minimum FS. The FS were calculated at each cross section for the scenarios listed below as required by Section 257.73(e). The minimum required FS is also provided.

- Static FS for the maximum storage pool – minimum required FS = 1.50;
- Static FS for the maximum surcharge pool – minimum required FS = 1.40;
- Seismic FS for the maximum storage pool – minimum required FS = 1.00; and
- Evaluation of dike and dike foundation material for liquefaction potential.

5.2 CROSS SECTION DESCRIPTIONS

Figure 1 in Attachment B shows the four cross section locations. Attachment E presents each cross section utilized in the stability analyses.

Cross Section 1-1 was selected because it is located at the tallest exterior slope of the entire perimeter dike (approximately 40 feet high) and because it is located through the dike supporting Sub-basin C, which is currently and will be used in the future for stormwater management. Two borings (MOMW-12

and MW 1-3) were previously drilled near Cross Section 1-1. MOMW-12 is located at the top of the interior slope and MW 1-3 was located just outside of the dike. Three test borings (B-101, B-102, and B-103) were drilled and two piezometers were installed along Cross Section 1-1 as part of the 2015 investigation. The pool elevation for the Maximum Storage Pool analysis was estimated to be at Elevation 552. This is the anticipated elevation of the normal pool in Sub-basin C which is 1-foot above the invert elevation of the existing discharge pipe in Sub-basin C. The phreatic surface through the dike was created based on the groundwater measurements between July 2014 and April 2016 obtained from the piezometers installed at Test Borings B-102 and B-103 (Table 3). For conservatism, the pool elevation for the Maximum Surcharge Pool analysis was assumed to be at the top of the berm. The logs of Test Borings B-101, B-102, and B-103 are included in Attachment C.

Cross Section 2-2 was selected because it was the tallest exterior slope along the northern perimeter of the dike. Limited subsurface data from previous investigations was available in this area. Two test borings were drilled along Cross Section 2-2 and one piezometer was installed as part of the 2015 investigation. The subsurface profile, material parameters, and water table elevation were assumed based on the data obtained from the 2015 investigation. In this area, the basin has been filled with CCR to the top of the perimeter dike, so there is no storage pool, only a phreatic surface within the CCR.

Cross Section 3-3 was selected to represent the critical section on the southern perimeter of the impoundment due to the close proximity of the homes on Strawberry Ridge Road, and because seepage was previously observed in this area as documented in the Ish, Inc. and Key Environmental, Inc. report included in Attachment F. Two test borings (B-301 and B-302) were drilled and one piezometer was installed along this cross section as part of the 2015 investigation. The subsurface profile, material parameters, and water table were based on the nearby test borings and piezometer measurements. Similarly to Cross Section 2-2, since the basin has been filled with CCR to the top of the perimeter dike in this area, no storage pool surface water is present.

Cross Section 4-4 was analyzed as part of Form 24R in the PADEP MPM. This section was also the more critical of the two cross sections analyzed by Ish and Key in 2007 (P-205 Area Cross Section). The proposed final cover grades of 3% were incorporated into this analysis. The top of bedrock, bottom of CCR surfaces, and subsurface soil conditions were determined based on the results of CEC's previous subsurface investigations and the Ish and Key test borings and piezometers. This information is shown on the attached Figure 1. The elevation summary table and relevant previously drilled test boring logs for this area are included in Attachments G and I, respectively.

For conservatism, at Cross Sections 2-2, 3-3, and 4-4, the groundwater level on the inside of the dike was modeled at Elevation 560 for the maximum storage pool analysis based on the elevations reported in and prepared by CEC. The groundwater on the inside of the dike at these sections was modeled at the top of the embankment for the maximum surcharge pool analysis. All of the cross sections were based on the proposed grades included in the MPM.

5.3 MATERIAL PARAMETERS

Material parameters for the existing CCRs, slurry wall, and bedrock were conservatively based on the results of the 2007 Ish and Key report. The parameters for the shale buttress were based on our experience with similar materials. The material parameters for the glacial till and residual soil were selected based on the data obtained in our 2015 investigation. Different parameters were used for the dike fill depending on the type of material encountered at each section and based on the location of the laboratory test results. The parameters used for the dike fill at Cross Section 1-1 were based on the laboratory shear strength test results obtained from CEC's 2015 investigation and included in Attachment D. The parameters used for the dike fill at Cross Sections 2-2, 3-3, and 4-4 were based on the laboratory shear strength test results reported in the Ish and Key report. A summary of the laboratory test results from the Ish and Key report is included in Attachment F. The material parameters used in our analyses are summarized in the following table.

Material Type	Unit Weight (pcf)	Cohesion (psf)	Angle of Friction (degrees)
Existing CCR	110	0	30
Slurry Wall	140	0	5
Glacial Till	130	250	28
Residual Soil	130	200	19
Bedrock	150	0	45
Dike Fill (Cross Section 1-1)	120	275	28
Dike Fill (Cross Sections 2-2, 3-3, and 4-4)	120	50	32
Shale Fill (Buttress)	115	0	40

5.4 SEISMIC COEFFICIENT

A pseudo-static analysis of each cross section was completed to evaluate the seismic stability of the dike. The horizontal seismic acceleration was modeled by inputting a seismic coefficient into the slide model for each cross section. The peak ground acceleration (PGA) was used based on the guidance provided in the CCR Rule. The PGA is estimated to be 0.062g (6.2% of gravity) based on the U.S.G.S. website

deaggregation with 2% Probability of Exceedance in 50 Years (a mean return time of approximately 2500 years). The deaggregation plot is presented in Attachment G.

6.0 LIQUEFACTION

CEC performed a screening of the dike materials liquefaction potential by reviewing the data obtained as part of the 2015 investigation, previous investigations, and the History of Construction. According to the RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities, liquefiable soils are loose, cohesionless, saturated soils. Based on all of the data obtained at the site, the existing fill, and underlying glacial till and residual soils all contain cohesive materials. Therefore, CEC concludes that the dike materials and dike foundation materials are not susceptible to liquefaction.

7.0 RESULTS AND CONCLUSIONS

The following table summarizes the results of our stability analyses presented in Attachment E.

Cross Section	Scenario	Minimum Calculated FS	§ 257.73(e) Required FS
1-1	Maximum Storage Pool	1.67	1.50
	Maximum Surcharge Pool	1.67	1.40
	Seismic	1.42	1.00
2-2	Maximum Storage Pool	1.62	1.50
	Maximum Surcharge Pool	1.62	1.40
	Seismic	1.38	1.00
3-3	Maximum Storage Pool	1.58	1.50
	Maximum Surcharge Pool	1.58	1.40
	Seismic	1.37	1.00
4-4	Maximum Storage Pool	1.65	1.50
	Maximum Surcharge Pool	1.65	1.40
	Seismic	1.34	1.00

Based on these results, CEC concludes that the MSES Basin 1 Perimeter Dike meets the required minimum FS required by Section 257.73(e) of the CCR Rule.

8.0 CERTIFICATION

The following is provided in accordance with Section 257.73(e)(2) of the CCR Rule.

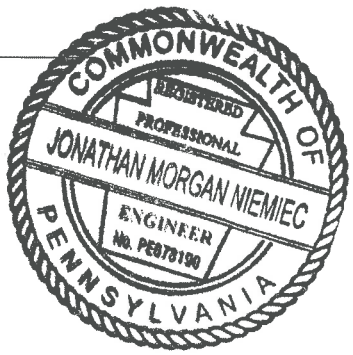
By affixing my seal to this, I do hereby certify to the best of my knowledge, information, and belief that the information contained in this report is true and correct. I further certify I am licensed to practice in the Commonwealth of Pennsylvania and that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Jonathan M. Niemiec, P.E.

P.E. License Number: PE078190

Signature: _____

Date: 10/13/16



ATTACHMENT A

SUMMARY TABLES

Table 1
Test Boring Summary

Test Boring	Existing Ground Surface Elevation (ft)	Approximate Thickness of Topsoil (ft)	Approximate Thickness of Fill (ft)	Approximate Thickness of Glacial Till (ft)	Approximate Thickness of Residual Soil (ft)	Total Depth Sampled (ft)	Approximate Top of Bedrock Elevation (ft)	Water Level at Drilling Completion (ft bgs)	Water Level at Least 24 hrs After Drilling Completion (ft bgs)
B-101	520.0	0.4	--	8.1	0.9	9.4	510.6	Dry	Grouted Immediately
B-102	540.0	0.3	13.2	11.0	0.8	25.3	514.7	14.2	13.1
B-103	564.0	--	36.0	12.5	0.9	49.4	514.6	39.9	37.8
B-201	538.0	0.3	--	13.7	1.2	15.2	522.8	7.4	Grouted Immediately
B-202	564.0	0.3	25.7	17.0	1.3	44.3	519.7	35.1	35.2
B-301	564.0	0.5	31.5	--	1.9	33.9	530.1	27.4	24.8
B-302	538.0	0.3	5.7	--	3.4	9.4	528.6	Dry	2.7
Total						**186.9**			

Table 2
Laboratory Test Results Summary

Test Boring	Sample Type	Sample Origin	Depth (ft)	USCS (or Visual) Description	USCS Group	Natural Moisture Content (%)	Fines Content (%)	Liquid Limit [(1)]	Plastic Limit [(1)]	Plasticity Index[(1)]	Effective Stress		Total Stress		In-Place Density[(2)] (pcf)
											Angle of Friction (degrees)	Cohesion (psf)	Angle of Friction (degrees)	Cohesion (psf)	
B-102	Shelby Tube	Fill	8.0 - 10.5	Lean Clay with Sand	CL	21.6	70.6	42	23	19	25	481	16	338	124.0
B-102	Split Spoon	Glacial Till	20.0 - 24.0	Sandy Lean Clay	CL	15.3	69.2	34	18	16	--	--	--	--	--
B-103	Shelby Tube	Fill	6.0 - 8.5	Clayey Sand with Gravel	SC	12.9	15.9	33	19	14	31	616	16	599	127.3
B-103	Split Spoon	Glacial Till	44.0 - 48.0	Sandy Lean Clay	CL	13.0	66.7	30	16	14	--	--	--	--	--
B-201	Split Spoon	Glacial Till	6.0 - 12.0	Clayey Sand	SC	12.5	37.3	33	18	15	--	--	--	--	--
B-301	Split Spoon	Fill	8.0 - 14.0	Clayey Sand	SC	13.8	36.1	36	20	16	--	--	--	--	--
B-302	Split Spoon	Residual Soil	4.0 - 6.0	Fat Clay	CH	33.1	97.7	57	29	28	--	--	--	--	--
Highest Value						33.1	97.7	57	29	28	31	616	16	599	127.3
Lowest Value						12.5	15.9	30	16	14	25	481	16	338	124.0
Average Value						17.5	56.2	38	20	17	28	549	16	469	125.7

Notes:

(1) Performed on Portion of the Sample Passing the No. 40 Sieve Only

(2) The reported in-place density is the average from the CU Triaxial results.

-- Test Not Performed

Table 3
Summary of Piezometer Measurements

Piezometer	Ground Surface Elevation	Top of PVC Elevation	Date of Measurement and Water Level Measurement[1] (ft)							Maximum Water Elevation[2]
			6/14/2015	11/13/2015	12/11/2015	1/11/2016	2/9/2016	3/8/2016	4/7/2016	
B-102	539.5	542.4	16.2	15.8	16.0	16.1	15.9	16.0	16.2	526.6
B-103	564.3	566.9	40.4	40.1	40.2	40.2	40.0	40.1	40.4	526.9
B-202	565.1	567.5	38.4	37.1	37.7	38.0	37.0	37.6	38.9	530.5
B-301	564.3	566.7	28.1	27.7	27.6	27.4	27.2	27.2	27.6	539.5
PZ-205A	562.5	565.4	--	--	--	--	--	--	5.8	559.6
PZ-107D	549.6	550.8	4.7	4.5	4.6	4.5	4.3	4.3	4.6	546.5
MPZ-7	565.7	569.7	10.6	10.2	10.3	10.1	9.9	9.8	10.3	559.9
MPZ-11	567.8	570.1	10.7	10.2	10.2	9.9	9.7	10.2	10.0	560.4
MW1-3	523.9	525.0	7.3	7.1	7.3	7.2	6.8	6.8	7.7	518.2
MW1-5	537.6	539.3	2.6	2.4	2.4	2.7	2.3	3.5	2.9	537.0

Notes:

1. Piezometer measurements based on depth below top of PVC riser.
2. Maximum Water Elevation is based on the minimum water level measurement recorded between 6/14/15 and 4/7/16.
3. All elevations reported are based on NGVD 1929.

Table 4
Summary of Basin Pool Measurements

	Date of Measurement and Pool Elevation[1]							Maximum Water Elevation[2]
	6/14/2015	11/13/2015	12/11/2015	1/11/2016	2/9/2016	3/8/2016	4/7/2016	
Sub-basin B	557.5	558.5	559.0	558.8	558.5	558.3	558.5	559.0
Sub-basin C	552.5	552.8	553.0	552.8	553.0	552.5	552.8	553.0

Notes:

1. Pool elevation measurements are obtained from existing staff gauges in Sub-basins B and C.
2. Maximum water elevation refers to the maximum measured pool elevation between 6/14/16 and 4/7/15.
3. All elevations reported are based on NGVD 1929.

ATTACHMENT B

TEST BORING AND CROSS SECTION LOCATION PLAN

NORTH
(PLANT)

LEGEND

- PROPERTY LINE
- LIMITS OF BASIN 1 PERMIT AREA
- APPROXIMATE TOP OF DIKE/LIMIT OF CCR'S
- 570 EXISTING CONTOUR
- 570 PROPOSED CONTOUR (TOP OF FINAL GRADE)
- 550 DIKE CONTOUR
- 550 TOP OF BEDROCK CONTOUR
- ACCESS ROAD
- EXISTING PIEZOMETER/MONITORING WELL
- SLOPE STABILITY CROSS SECTION LOCATION
- B-101 TEST BORING (MAY 2015)
- APPROXIMATE SLURRY WALL LOCATION
- APPROXIMATE SEEPAGE INTERCEPTOR TRENCH

REFERENCE

1. EXISTING TOPOGRAPHY BASED ON 2016 TOPOGRAPHIC MAPPING FOR 2015 OPERATION REPORT, DRAWING NO. E376172 BY CDI L.R. KIMBALL.
2. A SITE SPECIFIC COORDINATE SYSTEM IS SHOWN. MONTOUR S.E.S. USES A NGVD 1929 VERTICAL DATUM INSIDE BASIN 1.
3. THE LIMITS OF THE PERMIT AREA IS FROM PPL DRAWING E244381, DATED 9/2007.
4. EXISTING CONTOURS TO SOUTH OF BASIN 1 WERE DERIVED FROM THE PAMAP PROGRAM 3.2 FT DIGITAL ELEVATION MODEL OF PENNSYLVANIA; DEVELOPED BY PAMAP PROGRAM, PA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY; DATED 2008.
5. PIPE BRIDGE AND SLUICE PIPE LOCATIONS WERE TAKEN FROM PPL MONTOUR, LLC DWG. NO. D324541 SHEET 1 OF 3, DATED 9/19/08.
6. THE APPROXIMATE TOP OF DIKE/LIMIT OF CCR'S SHOWN IS AN ESTIMATED LOCATION BASED ON REFERENCES FROM PPL DRAWINGS.
7. PROPERTY BOUNDARIES AND OWNERS HAVE BEEN PROVIDED BY PPL THROUGH A GIS DATA RELEASE AGREEMENT, DATED SEPTEMBER 4, 2014.

SCALE IN FEET
0 200 400

ACCT– 103650	MONTOUR S.E.S.
SCALE– 1"=200'	ASH BASIN #1
BY– MJI	INITIAL SAFETY FACTOR ASSESSMENT
REVIEWED JMN	TEST BORINGS AND CROSS SECTIONS
APPROVED *DMC DATE	LOCATION PLAN
PPL DRAWING NO.	PPL MONTOUR, LLC
SHEET NO. FIGURE 1	REV. 0

REFERENCE TITLE	NUMBER	REFERENCE TITLE	NUMBER

NO.	DATE	ACCT.	REVISION	BY	REVIEWED	APPROVED

FRACTIONAL DECIMAL LOCATION CODES SORTS

PPL CORP. FORM 41630 (4/00) Oct. 11, 2016 – 1:31 PM

132-065-GT02-001 – PERIMETRE DIKE STABILITY.dwg

PC CAD

ATTACHMENT C

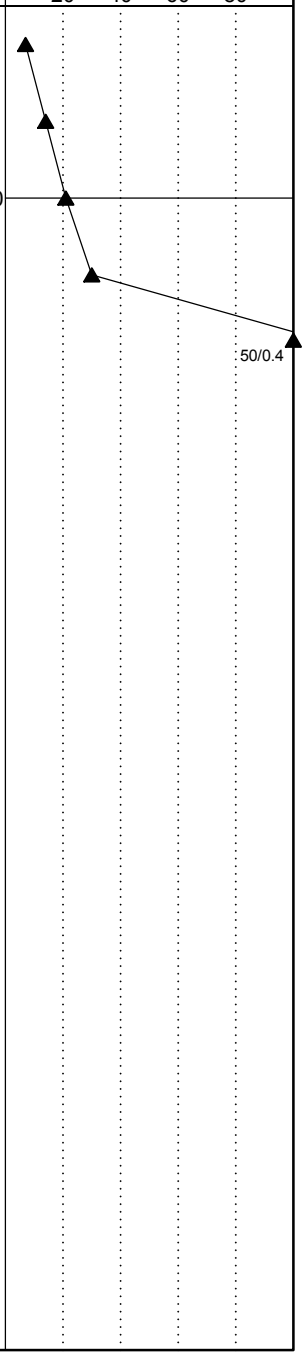
2015 TEST BORING LOGS

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-101

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/7/15 **COMPLETED** 5/7/15
GROUND ELEVATION 522.5 ft **BACKFILL** Cement Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING --- Dry
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES
24hrs AFTER DRILLING --- Grouted Immediately

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		Topsoil - 0.4 ft	0				
520		Brown CLAY, some silt, some shale fragments, moist, medium stiff, **(GLACIAL TILL)**		SS 1	80	5-4-3-5 (7)	3.50
				SS 2	100	5-6-8-10 (14)	4.00
		Brown CLAY, some shale and sandstone fragments, trace silt, moist, very stiff, **(GLACIAL TILL)**	5	SS 3	100	6-10-11-14 (21)	>4.50
515		Brown CLAY, some shale and sandstone fragments, trace sand, moist, hard, **(GLACIAL TILL)**		SS 4	35	5-13-17-20 (30)	2.50
		Black DECOMPOSED SHALE, dry, hard, **(RESIDUAL SOIL)**		SS 5	100	10-50-50/0.4	
		Bottom of boring at 9.4 feet.					



Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-102

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/6/15 **COMPLETED** 5/6/15
GROUND ELEVATION 539.5 ft **BACKFILL** Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING 14.2 ft / Elev 525.3 ft
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES Top of steel casing at Elevation 542.6
48hrs AFTER DRILLING 13.1 ft / Elev 526.4 ft

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
	0	Topsoil - 0.3 ft				
		Brown CLAY, some shale fragments, moist, medium stiff, **(FILL)** *Trace roots erncountered between approximately 0.0 to 2.0 ft. bgs.*	SS 1	50	3-4-3-3 (7)	2.75
			SS 2	70	4-3-2-5 (5)	3.50
535		Orangish brown CLAY, some shale fragments, moist, medium stiff, **(FILL)**	SS 3	55	2-2-3-4 (5)	2.00
	5	Grayish brown FAT CLAY, some shale fragments, moist, medium stiff, **(FILL)**	SS 4	85	3-2-3-7 (5)	2.00
530		**Shelby tube obtained between approximately 8.0 to 10.5 ft. bgs. Recovery 1.5 ft.**	ST 1	60		
	10	*Free water encountered between approximately 10.5 to 12.0 ft. bgs.*	SS 5	67	2-3-4 (7)	2.75
			SS 6	100	1-3-9-11 (12)	
525		Brown CLAY, some sandstone fragments, trace sand, moist, stiff, **(GLACIAL TILL)**	SS 7	100	4-4-8-8 (12)	2.75
	15	Brownish gray CLAY, trace sandstone fragments, trace organics, moist, stiff, **(GLACIAL TILL)**	SS 8	100	0-3-6-7 (9)	4.00
520		Brownish gray to brown CLAY, some shale fragments, some sandstone fragments, moist, very stiff, **(GLACIAL TILL)**	SS 9	100	8-10-17-16 (27)	>4.50
	20	Orange and gray CLAY, some sand, some sandstone fragments, moist, very stiff to hard, **(GLACIAL TILL)**	SS 10	100	5-13-10-16 (23)	4.00
			SS 11	100	8-13-18-19 (31)	>4.50
515	25	Black DECOMPOSED SHALE, moist to dry, hard, **(RESIDUAL SOIL)**	SS 12	77	6-29-50/0.3	
		Bottom of boring at 25.3 feet.				

SPT N VALUE
20 40 60 80
PL MC LL
20 40 60 80
FINES CONTENT (%)
20 40 60 80

50/0.3

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-103

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/5/15 **COMPLETED** 5/5/15
GROUND ELEVATION 564.3 ft **BACKFILL** Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING 39.9 ft / Elev 524.4 ft
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES Top of steel casing at Elevation 567.3
72hrs AFTER DRILLING 37.8 ft / Elev 526.5 ft

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
	Sand and Gravel - 0.3 ft	0				
	Brown and gray CLAY, some silt, some siltstone fragments, dry, stiff, **(FILL)**		SS 1	60	1-4-5-3 (9)	0.75
	Grayish brown CLAY, some shale fragments, trace sand, moist, medium stiff to stiff, **(FILL)**		SS 2	95	3-2-3-4 (5)	2.00
560		5	SS 3	55	10-5-5-6 (10)	3.00
	Brown CLAY, some shale fragments, trace sand, moist, soft to stiff, **(FILL)** **Shelby tube obtained in offset boring between approximately 6.0 to 8.5 ft. bgs. Recovery 2.2 ft.**		SS 4	100	2-2-2-3 (4)	3.00
555		10	SS 5	100	2-4-5-6 (9)	2.75
	Brown and dark gray FAT CLAY AND SHALE FRAGMENTS, moist, stiff, **(FILL)**		SS 6	100	3-5-7-9 (12)	2.75
	Brown and gray CLAY, some silty shale fragments, trace sand, moist, stiff, **(FILL)**		SS 7	100	3-7-7-9 (14)	4.00
550		15	SS 8	100	2-6-8-9 (14)	3.00
			SS 9	100	5-6-8-10 (14)	
	Grayish brown CLAY, some shale fragments, trace sand, moist, very stiff, **(FILL)**		SS 10	100	4-8-8-12 (16)	4.00
545		20				
	Brown and gray CLAY, some sandstone fragments, trace shale fragments, moist, stiff, **(FILL)**		SS 11	80	3-6-8-8 (14)	3.50
	Brown and dark gray FAT CLAY, some shale fragments, moist, very stiff, **(FILL)**		SS 12	100	6-7-10-10 (17)	4.25
540	Brown and gray CLAY, some shale fragments, trace sand, moist, stiff, **(FILL)**	25	SS 13	100	3-6-9-14 (15)	3.00
	Very stiff between approximately 26.0 to 28.0 ft. bgs.		SS 14	100	5-11-12-11 (23)	4.00
535		30	SS 15	100	1-6-8-8 (14)	3.50
	Brownish gray CLAY, trace sand, trace shale fragments, moist, medium stiff, **(FILL)**		SS 16	70	1-3-5-9 (8)	3.00
	Brown and gray CLAY, trace shale fragments, trace organics, moist, stiff to very stiff, **(FILL)**		SS 17	100	3-6-8-11 (14)	4.25
530		35	SS		4-7-11-13	

SPT N VALUE
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

CEC CUSTOM LOG 150-989.0003 MONTOUR ASH DISPOSAL AREA NO. 1_BORING LOGS.GPJ CEC.GDT 8/8/16

(Continued Next Page)

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-103

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		35	18	100	(18)	2.75
	Brown CLAY, some sandstone fragments, trace sand, moist, stiff, **(GLACIAL TILL)**		SS 19	90	5-7-8-9 (15)	4.00
525			SS 20	95	2-5-6-8 (11)	3.00
	Brown and gray CLAY, trace sandstone fragments, moist, stiff to very stiff, **(GLACIAL TILL)**	40	SS 21	95	1-4-9-11 (13)	2.50
	Free water encountered below approximately 42.0 ft. bgs. due to adding water from surface to lubricate augers.		SS 22	95	3-7-9-12 (16)	3.00
520	Brown CLAY, some sandstone fragments, moist to dry, very stiff to hard, **(GLACIAL TILL)**	45	SS 23	75	0-3-15-20 (18)	>4.50
			SS 24	100	11-18-23-32 (41)	>4.50
515	Brownish dark gray DECOMPOSED SHALE, dry, hard, **(RESIDUAL SOIL)**		SS 25	71	6-16-50/0.4	
	Bottom of boring at 49.4 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

50/0.4

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-201

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/7/15 **COMPLETED** 5/7/15
GROUND ELEVATION 536.1 ft **BACKFILL** Cement Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
▽ **AT END OF SOIL SAMPLING** 7.4 ft / Elev 528.7 ft
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES
24hrs AFTER DRILLING --- Grouted Immediately

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
535	Topsoil - 0.3 ft	0				
	Brown CLAY, some shale fragments, trace sand, dry, hard to very stiff, **(GLACIAL TILL)** *Trace roots encountered between approximately 0.0 to 2.0 ft. bgs.* *Sandstone boulder encountered between 0.5 to 0.8 ft. bgs.*		SS 1	40	3-24-9-5 (33)	
			SS 2	100	4-4-8-11 (12)	3.25
		5	SS 3	100	6-10-14-14 (24)	>4.50
530	Brown CLAY, some sand, some shale and sandstone fragments, moist, very stiff, **(GLACIAL TILL)**		SS 4	100	6-10-15-18 (25)	>4.50
			SS 5	85	10-8-10-11 (18)	>4.50
	Free water encountered below approximately 10.0 ft. bgs.	10				
525			SS 6	100	3-7-10-10 (17)	>4.50
	Orange CLAY, some sand, some shale and sandstone fragments, moist, stiff, **(GLACIAL TILL)**		SS 7	60	4-7-4-5 (11)	2.50
	Black DECOMPOSED SHALE, dry, hard, **(RESIDUAL SOIL)**	15	SS 8	67	6-24-50/0.2	
	Bottom of boring at 15.2 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

50/0.2

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-202

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/6/15 **COMPLETED** 5/7/15
GROUND ELEVATION 565 ft **BACKFILL** Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING 35.1 ft / Elev 529.9 ft Dry
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES Top of steel casing at Elevation 568.0
24hrs AFTER DRILLING 35.2 ft / Elev 529.8 ft

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
565		Topsoil - 0.3 ft	0				
		Brown CLAY, some shale fragments, moist, very stiff, **(FILL)**		SS 1	85	2-10-11-15 (21)	3.00
		Black clayey SHALE FRAGMENTS, trace sand, moist, medium dense, **(FILL)**		SS 2	75	7-5-8-15 (13)	
560		Black SHALE FRAGMENTS, some silt, trace clay, moist to wet, medium dense, **(FILL)**	5	SS 3	100	7-9-12-15 (21)	
				SS 4	95	3-13-13-16 (26)	
		Brown and gray CLAY, some shale fragments, moist, medium stiff, **(FILL)**		SS 5	80	3-2-4-7 (6)	
555			10				
		Black SHALE FRAGMENTS, some clay, some silt, moist, medium dense, **(FILL)**		SS 6	95	4-5-6-9 (11)	
				SS 7	90	2-5-10-15 (15)	
550		Black SHALE FRAGMENTS, some clay, some silt, moist to wet, medium dense, **(FILL)**	15	SS 8	85	3-9-5-11 (14)	
		Clayey SHALE FRAGMENTS, trace sand, moist, medium dense, **(FILL)**		SS 9	90	2-4-7-11 (11)	
		Obstruction encountered between approximately 18.8 to 19.5 ft. bgs.		SS 10	100	5-50/0.3	
545			20				
		Gray SHALE FRAGMENTS, trace clay, dry, medium dense, **(FILL)**		SS 11	5	18-12-11-20 (23)	
				SS 12	100	4-5-7-9 (12)	4.00
540		Brownish gray CLAY, some shale fragments, moist, stiff, **(FILL)** **Shelby tube obtained between approximately 24.0 to 25.7 ft. bgs. Recovery 0.0 ft.**	25	ST 1	0		
		Orangish brown and gray CLAY, some shale fragments, moist, very stiff, **(GLACIAL TILL)**		SS 13	100	4-10-9-15 (19)	4.00
		Brown and gray CLAY, trace shale fragments, moist, very stiff, **(GLACIAL TILL)**		SS 14	100	3-8-10-14 (18)	>4.50
535			30				
		Brown CLAY, some shale fragments, trace sand, moist to dry, very stiff to hard, **(GLACIAL TILL)**		SS 15	100	2-11-15-23 (26)	>4.50
				SS 16	100	12-14-19-20 (33)	>4.50
530			35	SS		9-13-15-17	

SPT N VALUE
20 40 60 80
PL MC LL
20 40 60 80
FINES CONTENT (%)
20 40 60 80

50/0.3

(Continued Next Page)

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-202

CLIENT PPL Montour, LLC **PROJECT NAME** Montour Ash Disposal Area No. 1

PROJECT NUMBER 150-989.0003 **PROJECT LOCATION** Perry Township, Montour County, PA

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
530	Brown CLAY, some shale fragments, some sandstone fragments, moist, very stiff, **(GLACIAL TILL)** *(continued)*	35	17	100	(28)	>4.50
	Brown CLAY, some shale fragments, trace sand, moist, hard, **(GLACIAL TILL)**		SS 18	100	11-13-17-18 (30)	4.50
	Orange and brown CLAY, some shale fragments, some sand, moist, hard to very stiff, **(GLACIAL TILL)**		SS 19	100	7-11-23-40 (34)	
525	*Free water encountered below approximately 40.0 ft. bgs.*	40	SS 20	95	21-16-9-11 (25)	
	Brown and gray CLAY, some sand, trace shale fragments, moist, very stiff, **(RESIDUAL SOIL)**		SS 21	50	3-7-14-16 (21)	2.75
	Black decomposed SHALE, dry, hard, **(RESIDUAL SOIL)**		SS 22	100	50/0.3	
	Bottom of boring at 44.3 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

50/0.3

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-301

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/4/15 **COMPLETED** 5/4/15
GROUND ELEVATION 564.3 ft **BACKFILL** Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING 27.4 ft / Elev 536.9 ft
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES Top of steel casing at Elevation 567.5
96hrs AFTER DRILLING 24.8 ft / Elev 539.5 ft

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
	Topsoil - 0.5 ft	0				
	Brown CLAY, some shale fragments, trace sand, moist, very soft to medium stiff, **(FILL)**		SS 1	20	1-1-1-2 (2)	
560			SS 2	55	2-2-3-4 (5)	2.50
		5	SS 3	55	2-3-4-4 (7)	2.75
	Light brown and gray FAT CLAY, trace shale fragments, moist, stiff, **(FILL)**		SS 4	50	2-4-7-9 (11)	4.50
	Brown and dark gray SHALE FRAGMENTS, some clay, trace sand, dry to moist, loose to medium dense, **(FILL)**		SS 5	60	4-5-3-6 (8)	
555		10	SS 6	50	5-3-3-8 (6)	
	Water staining encountered sporadically on rock fragments throughout stratum.		SS 7	90	7-9-13-12 (22)	3.75
	Brown and dark gray clayey SHALE FRAGMENTS, dry to moist, loose to medium dense, **(FILL)**	15	SS 8	70	6-5-3-5 (8)	3.75
			SS 9	60	5-5-9-18 (14)	
550	Brown and gray CLAY, some shale fragments, trace sand, dry to moist, stiff, **(FILL)**		SS 10	60	5-4-6-7 (10)	3.25
		20	SS 11	65	3-3-5-6 (8)	2.25
	Medium stiff between approximately 20.0 to 22.0 ft. bgs.		SS 12	70	2-7-6-7 (13)	4.50
545			SS 13	100	2-4-9-10 (13)	2.50
		25	SS 14	100	3-5-4-10 (9)	3.50
	Light brown CLAY, moist, very stiff, **(FILL)**		SS 15	95	3-6-10-10 (16)	4.00
540		30	SS 16	100	6-6-7-8 (13)	
	Brown and gray clayey SHALE FRAGMENTS, moist, medium dense, **(FILL)**		SS 17	95	4-16-31-50 (47)	
	Dark gray DECOMPOSED SHALE, moist to dry, hard, **(RESIDUAL SOIL)**					
535	*Free water encountered between approximately 32.0 to 33.9 ft. bgs.*					
	Water staining encountered sporadically throughout stratum.					

SPT N VALUE: 20 40 60 80
PL MC LL: 20 40 60 80
FINES CONTENT (%): 20 40 60 80

(Continued Next Page)

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-301

CLIENT PPL Montour, LLC **PROJECT NAME** Montour Ash Disposal Area No. 1

PROJECT NUMBER 150-989.0003 **PROJECT LOCATION** Perry Township, Montour County, PA

ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
		Bottom of boring at 33.9 feet.						

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

BORING NUMBER B-302

CLIENT PPL Montour, LLC
PROJECT NAME Montour Ash Disposal Area No. 1
PROJECT NUMBER 150-989.0003
PROJECT LOCATION Perry Township, Montour County, PA
DATE STARTED 5/4/15 **COMPLETED** 5/4/15
GROUND ELEVATION 540 ft **BACKFILL** Cement Bentonite Grout
SOIL SAMPLING CONTRACTOR Eichelbergers, Inc.
WATER LEVELS:
SOIL SAMPLING METHOD Hollow Stem Auger and SPT
AT END OF SOIL SAMPLING --- Dry
CEC REP RNB **CHECKED BY** JMN
AT END OF CORING --- Not Applicable
NOTES
72hrs AFTER DRILLING 2.7 ft / Elev 537.3 ft / Collapsed 4.1 ft. bgs.

ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
540	Topsoil - 0.3 ft Grayish brown CLAY, trace roots, moist, soft, **(FILL)**	0	SS 1	55	1-1-2-3 (3)	2.75
	Black and brown CLAY, some shale fragments, dry, medium stiff, **(FILL)**		SS 2	45	2-3-2-2 (5)	
535	Light brown and gray FAT CLAY, moist, medium stiff, **(RESIDUAL SOIL)**	5	SS 3	55	1-3-2-3 (5)	2.25
	Dark gray DECOMPOSED SHALE, dry, hard, **(RESIDUAL SOIL)** *Difficult augering between approximately 6.0 to 8.0 ft. bgs.*		SS 4	90	4-14-22-38 (36)	
			SS 5	64	11-24-50/0.4	
	Bottom of boring at 9.4 feet.					

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

50/0.4

ATTACHMENT D

LABORATORY TEST RESULTS

June 1, 2015

Project No. 2015-263-001

Jonathon Niemiec
Civil & Environmental Consultants
333 Baldwin Road
Pittsburgh, PA 15205-9702

Transmittal
Laboratory Test Results
Montour Ash Disposal Area No. 1 150-989

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

MOISTURE CONTENT

ASTM D 2216-10

Client: CEC
Client Reference: Montour Ash Disp. Area No. 1 150-989
Project No.: 2015-263-001

Lab ID:	001	002	003	004	005
Boring No.:	B-102	B-102	B-103	B-103	B-201
Depth (ft):	10.4-10.5	20.0-24.0	8.4-8.5	44.0-48.0	6.0-12.0
Sample No.:	ST-1	S-10+11	ST-1	S-23+24	S-4 to 6
Tare Number	888	29	573	46	32
Wt. of Tare & Wet Sample (g)	230.03	68.38	268.78	80.12	78.41
Wt. of Tare & Dry Sample (g)	208.77	60.23	247.41	71.70	70.45
Weight of Tare (g)	110.49	6.92	82.28	6.86	6.93
Weight of Water (g)	21.26	8.15	21.37	8.42	7.96
Weight of Dry Sample (g)	98.28	53.31	165.13	64.84	63.52
Water Content (%)	**21.6**	**15.3**	**12.9**	**13.0**	**12.5**

Lab ID	006	007	008
Boring No.	B-202	B-301	B-302
Depth (ft)	4.0-8.0	8.0-14.0	4.0-6.0
Sample No.	S-3+4	S-5 to 7	S-3
Tare Number	9	25	43
Wt. of Tare & Wet Sample (g)	65.12	78.51	39.92
Wt. of Tare & Dry Sample (g)	59.12	69.82	31.71
Weight of Tare (g)	6.86	6.95	6.94
Weight of Water (g)	6.00	8.69	8.21
Weight of Dry Sample (g)	52.26	62.87	24.77
Water Content (%)	**11.5**	**13.8**	**33.1**

Notes :

Tested By PC *Date* 5/14/15 *Checked By* KC *Date* 5/18/15

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

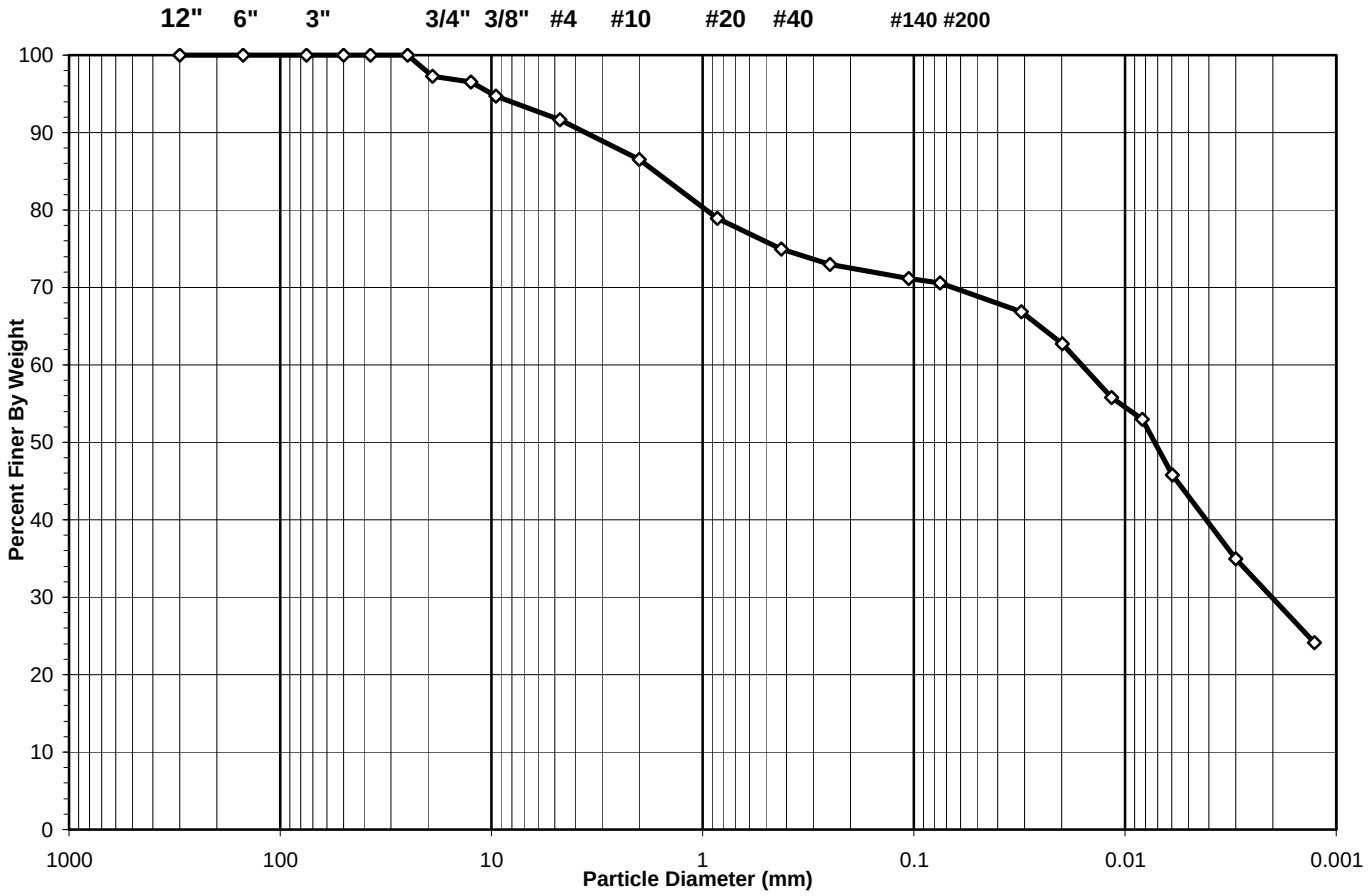
S:\Excel\Excel Qa\Spreadsheets\Water Content.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001	Soil Color:	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	8.33
#4 To #200	*Sand*	21.08
Finer Than #200	*Silt & Clay*	70.59

USCS Symbol:
CL, TESTED

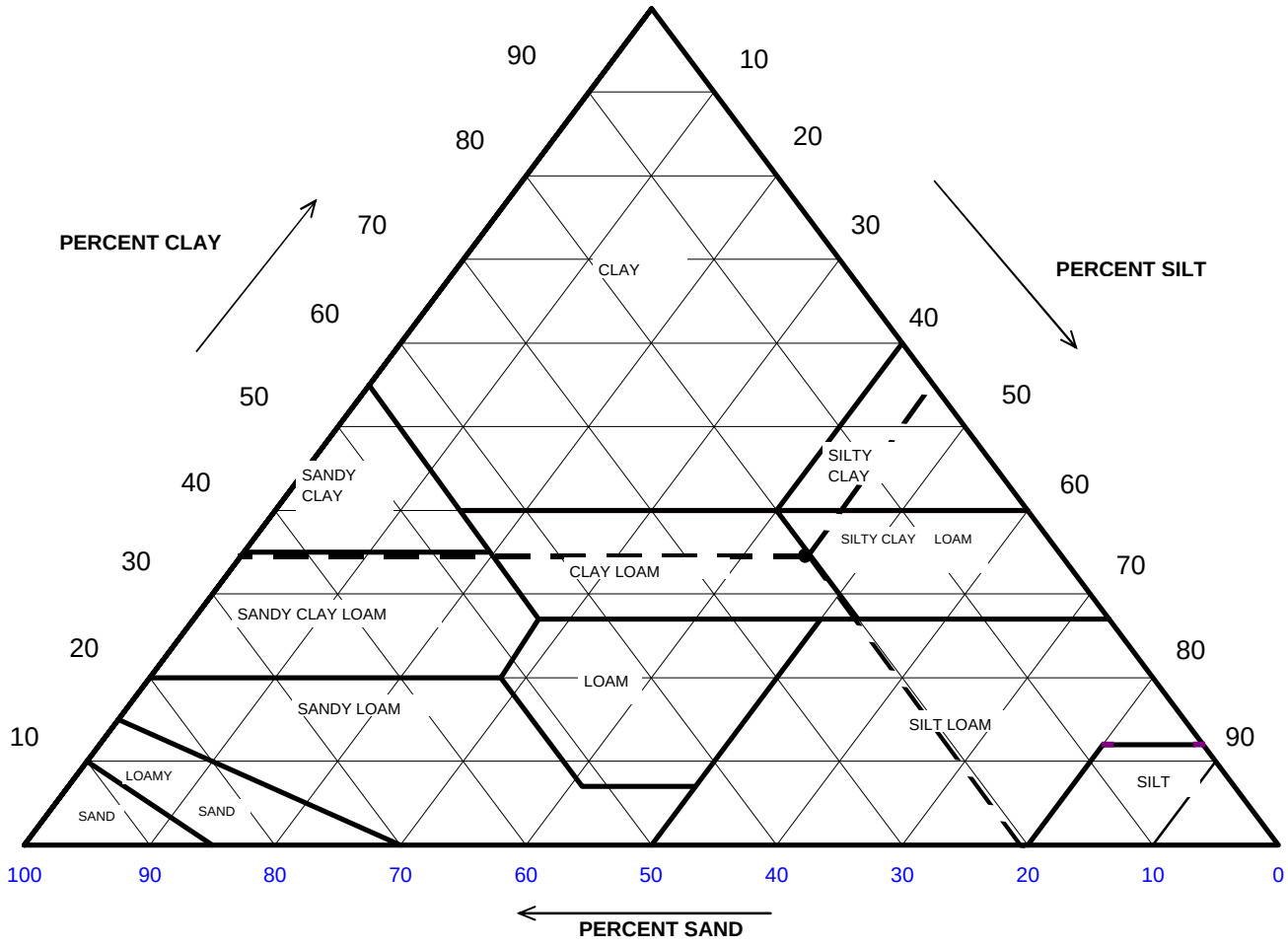
USCS Classification:
LEAN CLAY WITH SAND

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001	Soil Color:	BROWN



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	13.44	**0.00**
2	86.56	*Sand*	17.67	**20.42**
0.05	68.89	*Silt*	38.98	**45.03**
0.002	29.91	*Clay*	29.91	**34.55**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001	Soil Color:	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1439	Tare No.	NA
Weight of Tare & Wet Sample (g)	1068.78	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	905.71	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	145.03	Weight of Tare (g)	NA
Weight of Water (g)	163.07	Weight of Water (g)	NA
Weight of Dry Sample (g)	760.68	Weight of Dry Sample (g)	NA
Moisture Content (%)	**21.4**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	760.68
Dry Weight of -3/4" Sample (g)	203.08	Weight of - #200 Material (g)	536.96
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	223.72
Dry Weight of +3/4" Sample (g)	20.64		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	20.64	2.71	2.71		97.29	**97.29**
1/2"	12.5	5.82	0.77	3.48		96.52	**96.52**
3/8"	9.50	13.59	1.79	5.27		94.73	**94.73**
#4	4.75	23.29	3.06	8.33		91.67	**91.67**
#10	2.00	38.87	5.11	13.44		86.56	**86.56**
#20	0.85	58.40	7.68	21.11		78.89	**78.89**
#40	0.425	30.05	3.95	25.06		74.94	**74.94**
#60	0.250	14.79	1.94	27.01		72.99	**72.99**
#140	0.106	14.08	1.85	28.86		71.14	**71.14**
#200	0.075	4.19	0.55	29.41		70.59	**70.59**
Pan	-	536.96	70.59	100.00		-	**-**

Tested By JP Date 5/27/15 Checked By KC Date 6/1/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

geotechnics
geotechnical & geosynthetic testing

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001	Soil Color:	BROWN

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		30.0	23.1	5.89	24.1	94.7	0.01296	0.0309	**66.9**
5		28.5	23.1	5.89	22.6	88.8	0.01296	0.0198	**62.7**
15		26.0	23.1	5.89	20.1	79.0	0.01296	0.0116	**55.8**
30		25.0	23.1	5.89	19.1	75.1	0.01296	0.0083	**53.0**
60		22.5	22.8	6.00	16.5	64.9	0.01300	0.0060	**45.8**
250		18.5	23.1	5.89	12.6	49.5	0.01296	0.0030	**35.0**
1440		14.5	23.4	5.79	8.7	34.2	0.01291	0.0013	**24.2**

Soil Specimen Data		**Other Corrections**		
Tare No.	957			
Weight of Tare & Dry Material (g)	131.50	a - Factor	0.99	
Weight of Tare (g)	101.31			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	70.59	
Weight of Dry Material (g)	25.2			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By KC Date 6/1/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	367	386	466
Wt. of Tare & Wet Sample (g):	41.39	41.66	43.48
Wt. of Tare & Dry Sample (g):	35.27	35.41	37.10
Weight of Tare (g):	20.37	20.60	22.24
Weight of Water (g):	6.1	6.3	6.4
Weight of Dry Sample (g):	14.9	14.8	14.9
Moisture Content (%):	**41.1**	**42.2**	**42.9**
Number of Blows:	**32**	**26**	**21**

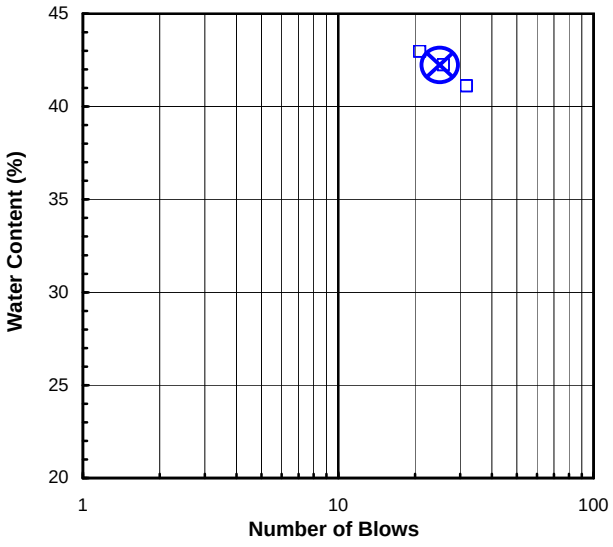
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	471	1260	
Wt. of Tare & Wet Sample (g):	21.42	17.02	
Wt. of Tare & Dry Sample (g):	20.29	15.84	
Weight of Tare (g):	15.25	10.66	
Weight of Water (g):	1.1	1.2	
Weight of Dry Sample (g):	5.0	5.2	
Moisture Content (%):	**22.4**	**22.8**	**-0.4**

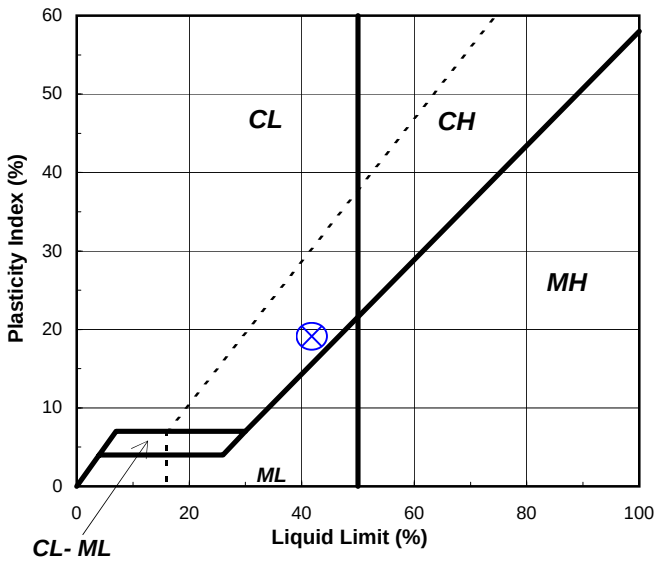
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**42**
Plastic Limit (%):	**23**
Plasticity Index (%):	**19**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/26/15 *Checked By* JAB *Date* 5/29/15

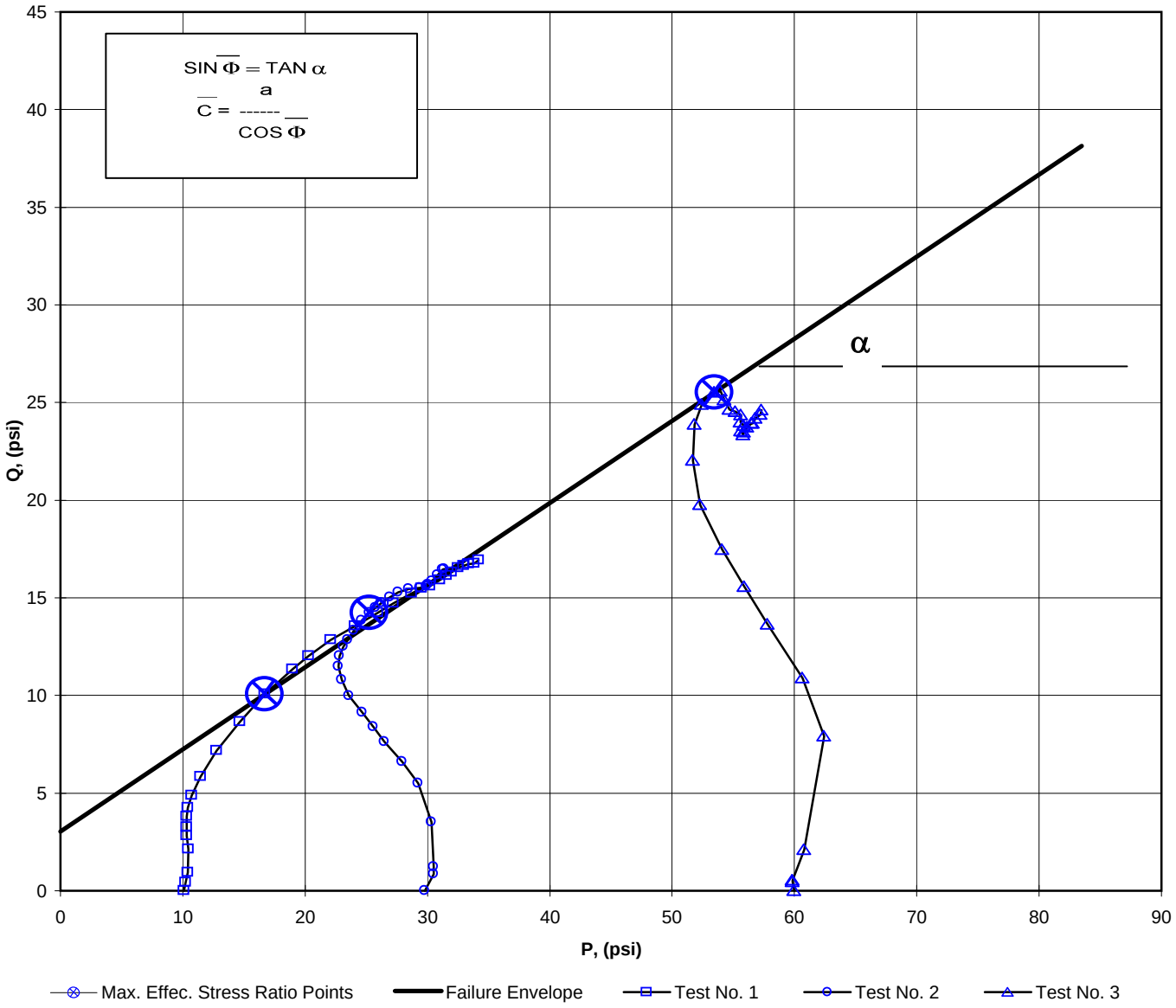
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	8.0-10.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Consolidated Undrained Triaxial Test with Pore Pressure



a	=	**3.03**	$\overline{C}$	=	**3.34**
α	=	**22.8**	$\overline{\Phi}$	=	**24.87**

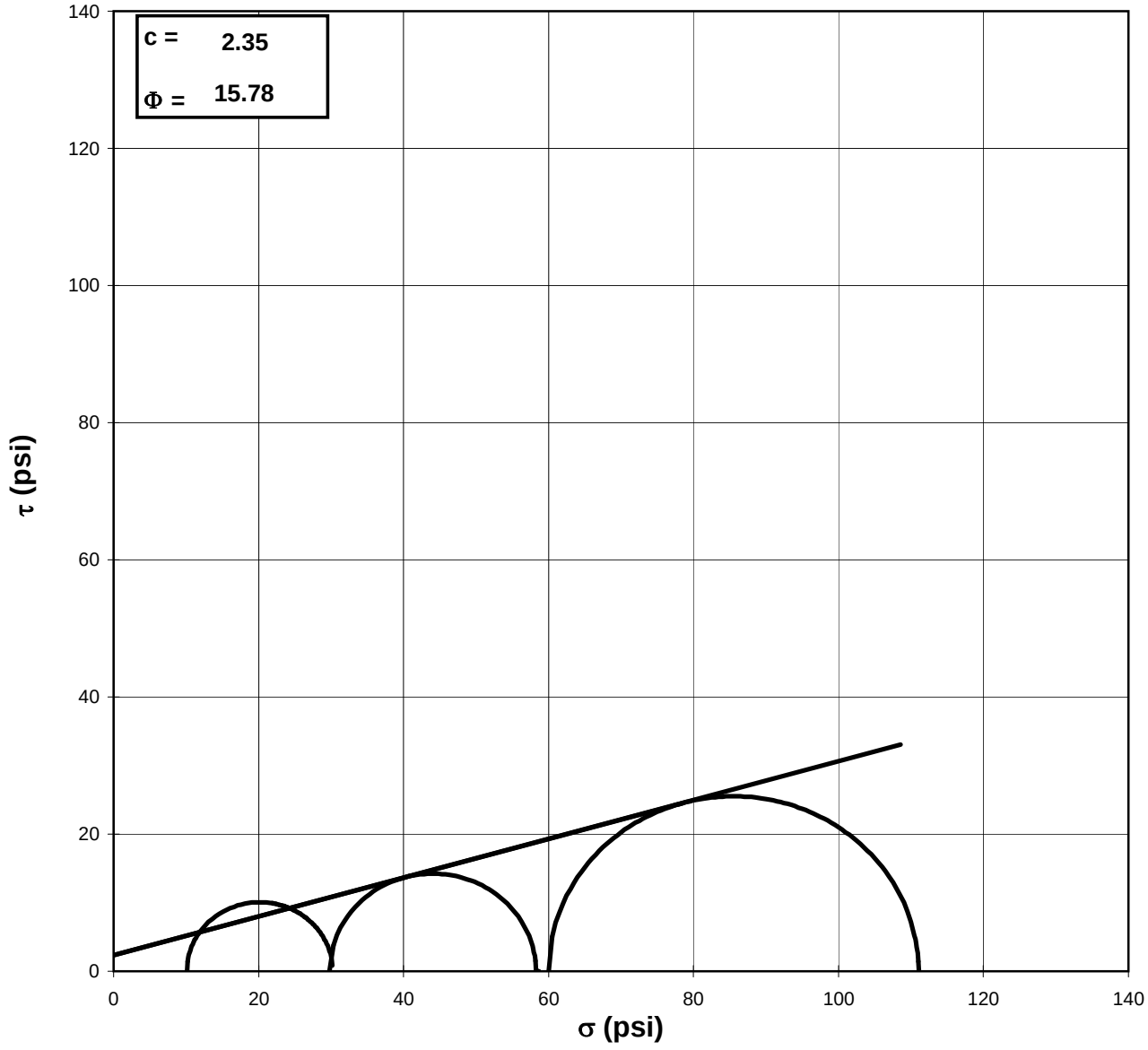
Tested By: JCM Date: 5/29/15 Approved By: DB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

MOHR TOTAL STRENGTH ENVELOPE

ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	8.0-10.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		
Visual Description:	Brown Sandy Clay and Rock (undisturbed)		



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: JCM *Date:* 5/29/15 *Approved By:* DB *Date:* 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

geotechnics
geotechnical & geosynthetic testing

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Stage No.	1
Test No.	1

PRESSURES (psi)

Cell Pressure (psi)	42.1
Back Pressure (psi)	32.0
Eff. Conf. Pressure (psi)	10.1
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	16.72
Q	=	10.07

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.778	Diameter 1:	2.888
Length 2:	5.812	Diameter 2:	2.883
Length 3:	5.796	Diameter 3:	2.888
Avg. Length:	5.795	*Avg. Diam.:*	2.886

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	32.1
Final Change (ml)	15.9
Initial Dial Reading (mil)	21
Dial Reading After Saturation (mil)	25
Dial Reading After Consolidation (mil)	68

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
7.9	0.000	32.0
13.5	0.001	32.3
19.9	0.002	32.6
35.3	0.005	33.8
44.2	0.011	34.6
50.0	0.017	35.0
57.0	0.025	35.6
62.9	0.034	35.9
71.1	0.046	36.2
83.5	0.066	36.5
101.3	0.094	36.5
121.5	0.128	36.1
140.8	0.162	35.4
158.8	0.202	34.5
168.8	0.231	33.8
180.9	0.272	32.9
192.2	0.327	31.6
203.5	0.383	30.4
211.9	0.426	29.6
221.4	0.484	28.7
226.5	0.529	28.1
230.1	0.572	27.5
236.3	0.615	27.0
240.9	0.643	26.7
244.6	0.673	26.4
249.3	0.702	26.1
252.6	0.731	25.8
255.8	0.775	25.4
258.8	0.819	25.1
262.5	0.847	24.9
266.1	0.876	24.6

Tested By: JCM Date: 5/29/15 Input Checked By: JAB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	9.9-10.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Effective Confining Pressure (psi)	10.1	*Stage No.*	1
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	5.80
Initial Sample Diameter (in)	2.89
Initial Sample Area (in^2)	6.54
Initial Sample Volume (in^3)	37.92

VOLUME CHANGE

Volume After Consolidation (in^3)	36.87
Length After Consolidation (in)	5.75
Area After Consolidation (in^2)	6.414

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.87	0.33	10.65	9.8	1.090	0.38	10.21	0.44
0.03	1.87	0.62	11.34	9.5	1.197	0.34	10.41	0.93
0.09	4.27	1.78	12.59	8.3	1.513	0.42	10.46	2.13
0.19	5.64	2.58	13.16	7.5	1.751	0.46	10.34	2.82
0.29	6.54	3.04	13.60	7.1	1.927	0.47	10.33	3.27
0.44	7.63	3.59	14.13	6.5	2.171	0.48	10.32	3.81
0.59	8.53	3.95	14.68	6.2	2.387	0.47	10.42	4.27
0.79	9.77	4.24	15.62	5.9	2.668	0.44	10.74	4.88
1.15	11.66	4.49	17.26	5.6	3.079	0.39	11.43	5.83
1.64	14.32	4.50	19.92	5.6	3.557	0.32	12.76	7.16
2.23	17.32	4.09	23.33	6.0	3.882	0.24	14.67	8.66
2.82	20.13	3.45	26.79	6.7	4.026	0.17	16.72	10.07
3.52	22.70	2.50	30.30	7.6	3.988	0.11	18.95	11.35
4.02	24.07	1.84	32.33	8.3	3.915	0.08	20.30	12.04
4.73	25.70	0.87	34.93	9.2	3.784	0.03	22.08	12.85
5.68	27.11	-0.44	37.64	10.5	3.573	-0.02	24.09	13.55
6.67	28.46	-1.61	40.17	11.7	3.431	-0.06	25.94	14.23
7.42	29.44	-2.37	41.91	12.5	3.362	-0.08	27.19	14.72
8.42	30.48	-3.34	43.92	13.4	3.267	-0.11	28.68	15.24
9.20	30.95	-3.93	44.98	14.0	3.206	-0.13	29.50	15.47
9.95	31.19	-4.50	45.79	14.6	3.137	-0.15	30.19	15.60
10.69	31.80	-5.01	46.90	15.1	3.105	-0.16	31.00	15.90
11.19	32.27	-5.33	47.70	15.4	3.091	-0.17	31.56	16.13
11.70	32.59	-5.58	48.27	15.7	3.078	-0.17	31.98	16.29
12.21	33.04	-5.89	49.02	16.0	3.067	-0.18	32.50	16.52
12.72	33.29	-6.19	49.58	16.3	3.043	-0.19	32.94	16.65
13.49	33.43	-6.56	50.10	16.7	3.006	-0.20	33.38	16.72
14.25	33.54	-6.94	50.57	17.0	2.969	-0.21	33.80	16.77
14.74	33.85	-7.13	51.08	17.2	2.964	-0.21	34.16	16.92
15.24	34.13	-7.40	51.62	17.5	2.950	-0.22	34.56	17.06

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

geotechnics
geotechnical & geosynthetic testing

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	8.9-9.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Stage No.	1
Test No.	2

PRESSURES (psi)

Cell Pressure (psi)	62.3
Back Pressure (psi)	32.5
Eff. Conf. Pressure (psi)	29.8
Pore Pressure Response (%)	98

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	25.25
Q	=	14.24

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.758	Diameter 1:	2.889
Length 2:	5.750	Diameter 2:	2.884
Length 3:	5.748	Diameter 3:	2.878
Avg. Length	5.752	*Avg. Diam.:*	2.884

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	18.8
Final Change (ml)	29.2
Initial Dial Reading (mil)	63
Dial Reading After Saturation (mil	73
Dial Reading After Consolidation(mil)	202

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
9.7	0.000	32.5
20.5	0.001	32.7
25.0	0.003	33.0
54.5	0.009	35.5
79.5	0.014	38.6
93.8	0.019	41.0
107.0	0.028	43.5
116.8	0.036	45.1
126.3	0.048	46.8
137.7	0.068	48.7
149.2	0.097	50.1
159.0	0.133	51.1
166.9	0.168	51.5
174.2	0.206	51.7
179.7	0.234	51.6
187.3	0.274	51.6
196.0	0.331	51.5
203.8	0.391	51.3
208.8	0.435	51.0
214.6	0.492	50.8
220.4	0.535	50.4
226.0	0.580	50.0
230.3	0.623	49.3
232.2	0.651	48.4
234.6	0.680	48.0
237.2	0.709	47.9
241.0	0.737	47.8
248.0	0.781	47.6
254.3	0.825	47.5
256.0	0.855	47.4
258.1	0.885	47.4

Tested By: JCM Date: 5/29/15 Input Checked By: JAB Date: 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	8.9-9.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Effective Confining Pressure (psi)	29.8	*Stage No.*	1
		Test No	2

INITIAL DIMENSIONS

Initial Sample Length (in)	5.75
Initial Sample Diameter (in)	2.88
Initial Sample Area (in^2)	6.53
Initial Sample Volume (in^3)	37.57

VOLUME CHANGE

Volume After Consolidation (in^3)	35.59
Length After Consolidation (in)	5.61
Area After Consolidation (in^2)	6.340

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.03	1.71	0.16	31.35	29.6	1.058	0.10	30.49	0.85
0.06	2.41	0.48	31.73	29.3	1.082	0.20	30.52	1.21
0.16	7.06	2.98	33.88	26.8	1.263	0.43	30.35	3.53
0.25	10.98	6.06	34.72	23.7	1.463	0.56	29.23	5.49
0.35	13.22	8.46	34.56	21.3	1.619	0.65	27.95	6.61
0.50	15.26	10.97	34.10	18.8	1.810	0.73	26.46	7.63
0.65	16.78	12.60	33.98	17.2	1.975	0.77	25.59	8.39
0.85	18.24	14.26	33.78	15.5	2.174	0.80	24.66	9.12
1.21	19.94	16.20	33.53	13.6	2.466	0.83	23.57	9.97
1.73	21.63	17.62	33.81	12.2	2.776	0.83	22.99	10.81
2.36	22.99	18.56	34.23	11.2	3.045	0.82	22.73	11.49
2.99	24.05	19.02	34.82	10.8	3.232	0.81	22.80	12.02
3.67	25.00	19.17	35.63	10.6	3.352	0.78	23.13	12.50
4.17	25.69	19.15	36.34	10.7	3.412	0.76	23.50	12.85
4.88	26.64	19.12	37.32	10.7	3.495	0.73	24.00	13.32
5.89	27.65	18.99	38.47	10.8	3.557	0.70	24.64	13.83
6.96	28.48	18.79	39.48	11.0	3.587	0.67	25.25	14.24
7.75	28.97	18.52	40.25	11.3	3.567	0.65	25.77	14.48
8.76	29.49	18.28	41.01	11.5	3.559	0.63	26.27	14.74
9.54	30.06	17.90	41.97	11.9	3.525	0.61	26.94	15.03
10.33	30.59	17.50	42.89	12.3	3.487	0.58	27.60	15.30
11.10	30.93	16.80	43.93	13.0	3.379	0.55	28.46	15.46
11.60	31.02	15.92	44.90	13.9	3.235	0.52	29.39	15.51
12.12	31.17	15.45	45.52	14.3	3.173	0.51	29.93	15.59
12.63	31.34	15.43	45.71	14.4	3.181	0.50	30.04	15.67
13.14	31.69	15.28	46.20	14.5	3.183	0.49	30.36	15.84
13.92	32.35	15.14	47.01	14.7	3.206	0.48	30.83	16.17
14.70	32.91	14.99	47.71	14.8	3.223	0.46	31.26	16.45
15.24	32.93	14.91	47.82	14.9	3.212	0.46	31.36	16.47
15.76	33.01	14.91	47.90	14.9	3.217	0.46	31.39	16.51

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	9.4-9.9
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Stage No.	1
Test No.	3

PRESSURES (psi)

Cell Pressure (psi)	92.5
Back Pressure (psi)	32.5
Eff. Conf. Pressure (psi)	60.0
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	53.46
Q	=	25.52

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.763	Diameter 1:	2.890
Length 2:	5.760	Diameter 2:	2.888
Length 3:	5.788	Diameter 3:	2.879
Avg. Length:	5.770	*Avg. Diam.:*	2.886

VOLUME CHANGE

Initial Burette Reading (ml)	96.0
Final Burette Reading (ml)	40.2
Final Change (ml)	55.8
Initial Dial Reading (mil)	65
Dial Reading After Saturation (mil	67
Dial Reading After Consolidation(mil)	248

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
13.4	0.000	32.5
19.1	0.001	33.1
20.1	0.003	33.2
39.3	0.008	33.8
110.7	0.012	38.0
147.4	0.018	42.7
181.7	0.027	48.3
205.8	0.036	52.2
229.5	0.048	55.8
259.1	0.067	60.0
288.6	0.096	62.9
313.3	0.130	64.5
328.4	0.164	65.0
338.6	0.205	64.6
340.9	0.234	64.1
337.9	0.275	63.4
335.1	0.332	62.5
337.0	0.389	61.9
337.7	0.432	61.2
336.4	0.492	60.9
336.7	0.536	60.4
335.6	0.579	60.4
335.7	0.622	60.0
339.6	0.651	60.1
345.0	0.680	60.1
349.7	0.709	59.9
352.0	0.739	59.9
358.6	0.784	59.9
364.9	0.827	59.7
370.0	0.855	59.8
374.4	0.884	59.7

Tested By: JCM Date: 5/29/15 Input Checked By: JAB Date: 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	9.4-9.9
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		

Visual Description: Brown Sandy Clay and Rock (undisturbed)

Effective Confining Pressure (psi)	60.0	*Stage No.*	1
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in)	5.77
Initial Sample Diameter (in)	2.89
Initial Sample Area (in^2)	6.54
Initial Sample Volume (in^3)	37.74

VOLUME CHANGE

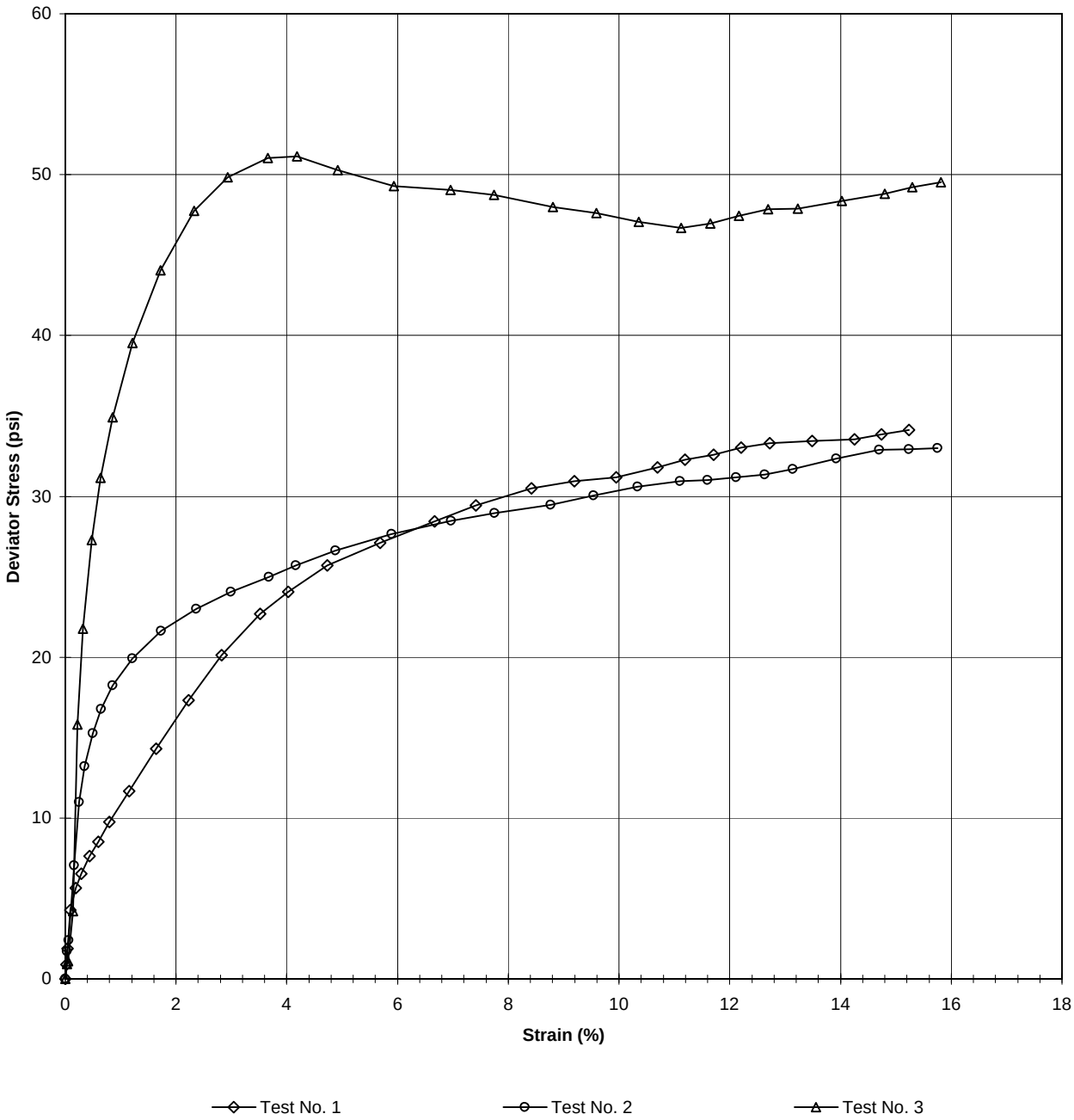
Volume After Consolidation (in^3)	34.29
Length After Consolidation (in)	5.59
Area After Consolidation (in^2)	6.138

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.03	0.93	0.63	60.30	59.4	1.016	0.68	59.83	0.47
0.05	1.10	0.70	60.40	59.3	1.018	0.64	59.85	0.55
0.14	4.21	1.32	62.88	58.7	1.072	0.32	60.78	2.10
0.22	15.81	5.48	70.33	54.5	1.290	0.35	62.43	7.91
0.32	21.77	10.22	71.54	49.8	1.437	0.47	60.66	10.88
0.48	27.29	15.82	71.47	44.2	1.618	0.59	57.83	13.64
0.64	31.15	19.68	71.47	40.3	1.773	0.64	55.90	15.58
0.85	34.91	23.35	71.56	36.7	1.952	0.68	54.11	17.45
1.21	39.55	27.48	72.07	32.5	2.216	0.70	52.29	19.77
1.72	44.07	30.35	73.71	29.6	2.486	0.70	51.68	22.03
2.32	47.73	32.03	75.70	28.0	2.706	0.68	51.84	23.86
2.93	49.82	32.49	77.33	27.5	2.811	0.66	52.42	24.91
3.66	51.04	32.06	78.98	27.9	2.827	0.63	53.46	25.52
4.18	51.13	31.58	79.55	28.4	2.800	0.62	53.98	25.57
4.92	50.27	30.85	79.42	29.1	2.725	0.62	54.28	25.13
5.94	49.30	29.95	79.35	30.0	2.641	0.61	54.70	24.65
6.96	49.05	29.36	79.69	30.6	2.601	0.60	55.17	24.53
7.74	48.74	28.74	80.00	31.3	2.559	0.60	55.63	24.37
8.81	47.99	28.41	79.58	31.6	2.519	0.60	55.58	24.00
9.59	47.63	27.95	79.68	32.1	2.486	0.59	55.86	23.81
10.35	47.06	27.91	79.15	32.1	2.466	0.60	55.62	23.53
11.13	46.67	27.54	79.13	32.5	2.438	0.60	55.80	23.33
11.65	46.96	27.63	79.33	32.4	2.451	0.59	55.85	23.48
12.16	47.45	27.57	79.88	32.4	2.463	0.59	56.16	23.72
12.69	47.84	27.42	80.42	32.6	2.468	0.58	56.50	23.92
13.23	47.87	27.36	80.51	32.6	2.467	0.58	56.58	23.94
14.03	48.36	27.36	81.00	32.6	2.482	0.57	56.82	24.18
14.79	48.80	27.19	81.61	32.8	2.487	0.56	57.21	24.40
15.30	49.21	27.30	81.92	32.7	2.505	0.56	57.31	24.61
15.81	49.51	27.20	82.31	32.8	2.509	0.55	57.56	24.76

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	8.0-10.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-001		
Visual Description:	Brown Sandy Clay and Rock (undisturbed)		



Tested By: JCM Date: 5/29/15 Approved By: DB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC		
Client Reference:	Montour Ash Disp. Area #1 150-989		
Project No.:	2015-263-001		
Lab ID:	2015-263-001-001	Specific Gravity (assumed)	2.7

Visual Description: Brown Sandy Clay and Rock (undisturbed)

SAMPLE CONDITION SUMMARY

Boring No.:	B-102	B-102	B-102
Depth (ft):	9.9-10.4	8.9-9.4	9.4-9.9
Sample No.:	ST-1	ST-1	ST-1
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.002	0.002	0.002
Back Pressure (psi)	32.0	32.5	32.5
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	21.6	21.6	21.6
Total Unit Weight (pcf)	130.0	116.1	126.0
Dry Unit Weight (pcf)	106.9	95.5	103.6
Moisture Content (%) (FINAL)	21.4	20.6	21.0
Initial State Void Ratio,e	0.577	0.766	0.627
Void Ratio at Shear, e	0.533	0.673	0.479

Tested By: JCM Date: 5/29/15 Input Checked By: JAB Date: 5/29/15

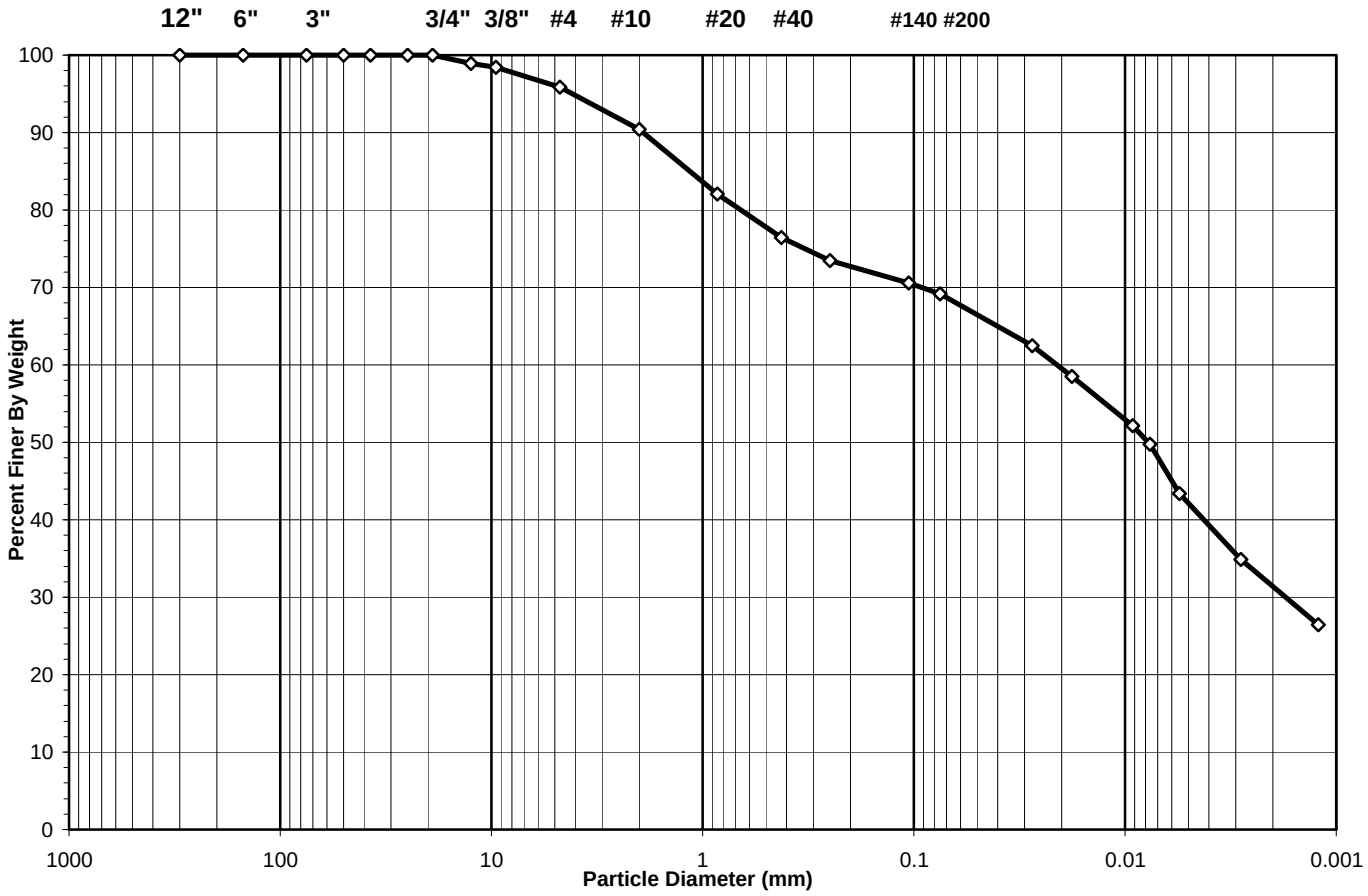
DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	20.0-24.0
Project No.:	2015-263-001	Sample No.:	S-10 + S-11
Lab ID:	2015-263-001-002	Soil Color:	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	4.15
#4 To #200	*Sand*	26.64
Finer Than #200	*Silt & Clay*	69.21

USCS Symbol:
CL, TESTED

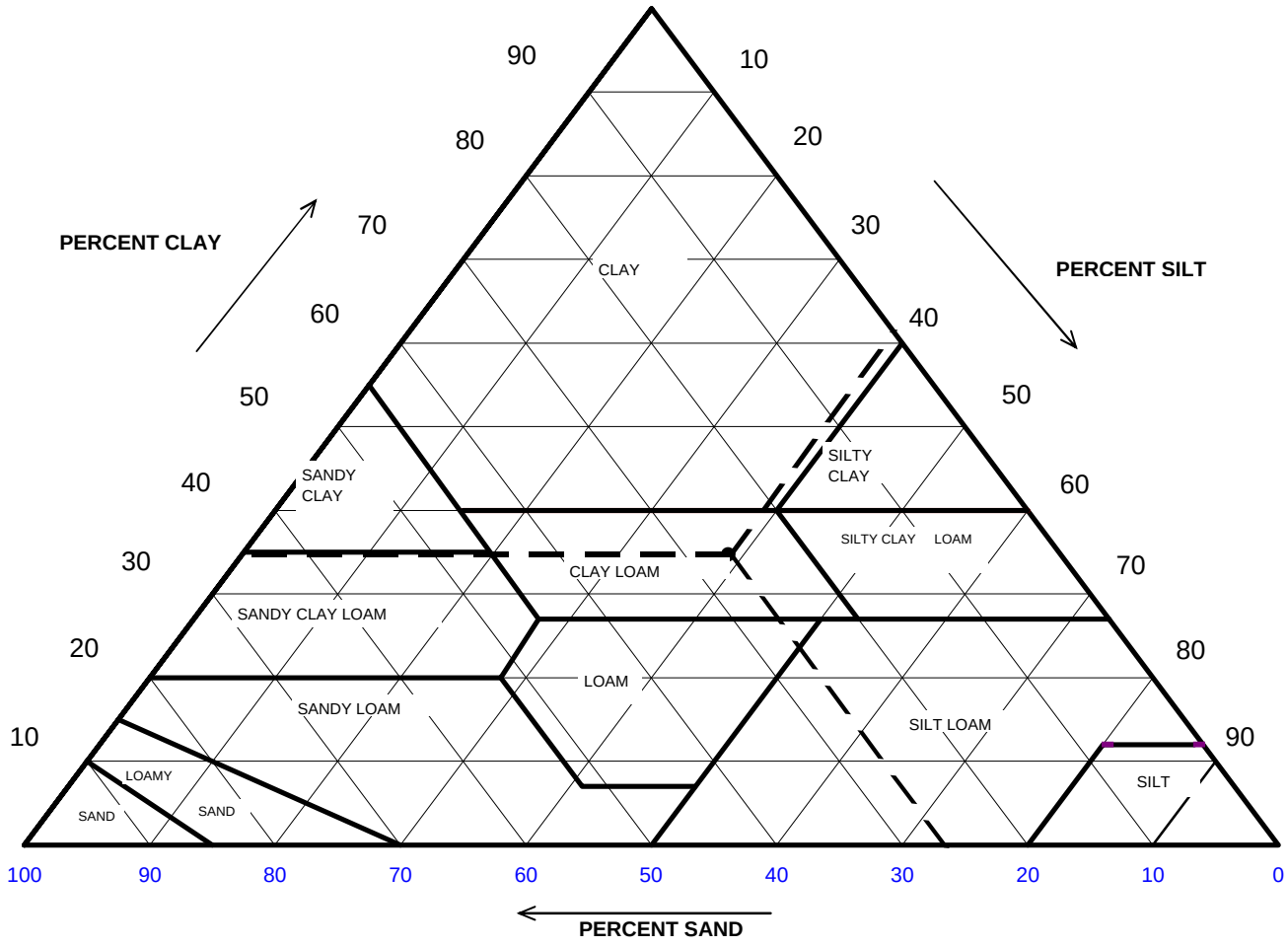
USCS Classification:
SANDY LEAN CLAY

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	20.0-24.0
Project No.:	2015-263-001	Sample No.:	S-10 + S-11
Lab ID:	2015-263-001-002	Soil Color:	BROWN



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	9.56	**0.00**
2	90.44	*Sand*	23.94	**26.47**
0.05	66.50	*Silt*	35.07	**38.78**
0.002	31.43	*Clay*	31.43	**34.75**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	20.0-24.0
Project No.:	2015-263-001	Sample No.:	S-10 + S-11
Lab ID:	2015-263-001-002	Soil Color:	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	45	Tare No.	NA
Weight of Tare & Wet Sample (g)	568.06	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	568.06	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	203.39	Weight of Tare (g)	NA
Weight of Water (g)	0.00	Weight of Water (g)	NA
Weight of Dry Sample (g)	364.67	Weight of Dry Sample (g)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	364.67
Dry Weight of -3/4" Sample (g)	112.27	Weight of - #200 Material (g)	252.40
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	112.27
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	4.02	1.10	1.10		98.90	**98.90**
3/8"	9.50	1.69	0.46	1.57		98.43	**98.43**
#4	4.75	9.43	2.59	4.15		95.85	**95.85**
#10	2.00	19.74	5.41	9.56		90.44	**90.44**
#20	0.85	30.67	8.41	17.98		82.02	**82.02**
#40	0.425	20.34	5.58	23.55		76.45	**76.45**
#60	0.250	10.89	2.99	26.54		73.46	**73.46**
#140	0.106	10.66	2.92	29.46		70.54	**70.54**
#200	0.075	4.83	1.32	30.79		69.21	**69.21**
Pan	-	252.40	69.21	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	20.0-24.0
Project No.:	2015-263-001	Sample No.:	S-10 + S-11
Lab ID:	2015-263-001-002	Soil Color:	BROWN

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		45.5	22.1	6.24	39.3	90.3	0.01311	0.0276	**62.5**
5		43.0	22.1	6.24	36.8	84.6	0.01311	0.0178	**58.5**
20		39.0	22.1	6.24	32.8	75.4	0.01311	0.0092	**52.2**
30		37.5	22.1	6.24	31.3	71.9	0.01311	0.0076	**49.8**
61		33.5	22.1	6.24	27.3	62.7	0.01311	0.0055	**43.4**
250		28.0	22.5	6.10	21.9	50.4	0.01305	0.0028	**34.9**
1440		22.5	23.1	5.89	16.6	38.2	0.01296	0.0012	**26.4**

Soil Specimen Data		**Other Corrections**		
Tare No.	649			
Weight of Tare & Dry Material (g)	143.18	a - Factor	0.99	
Weight of Tare (g)	95.14			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	69.21	
Weight of Dry Material (g)	43.0			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-102
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	20.0-24.0
Project No.:	2015-263-001	Sample No.:	S-10 + S-11
Lab ID:	2015-263-001-002	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	1287	396	3166
Wt. of Tare & Wet Sample (g):	36.54	37.87	38.84
Wt. of Tare & Dry Sample (g):	31.24	32.74	33.72
Weight of Tare (g):	15.97	17.69	18.11
Weight of Water (g):	5.3	5.1	5.1
Weight of Dry Sample (g):	15.3	15.1	15.6
Moisture Content (%):	**34.7**	**34.1**	**32.8**
Number of Blows:	**19**	**24**	**32**

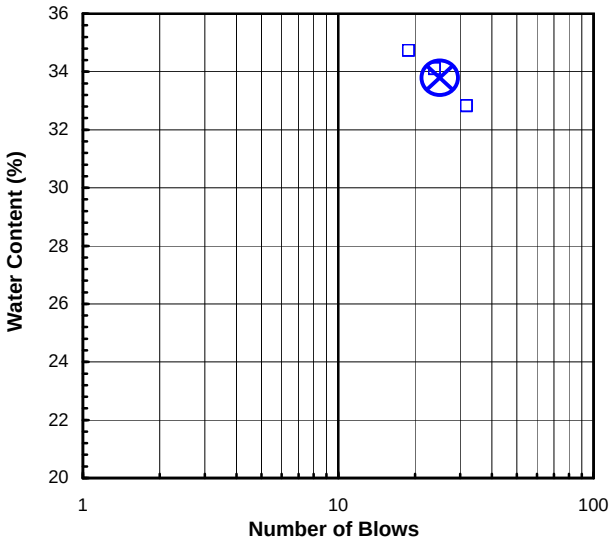
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	129	222	
Wt. of Tare & Wet Sample (g):	24.99	26.96	
Wt. of Tare & Dry Sample (g):	24.05	26.05	
Weight of Tare (g):	18.81	20.88	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.2	5.2	
Moisture Content (%):	**17.9**	**17.6**	**0.3**

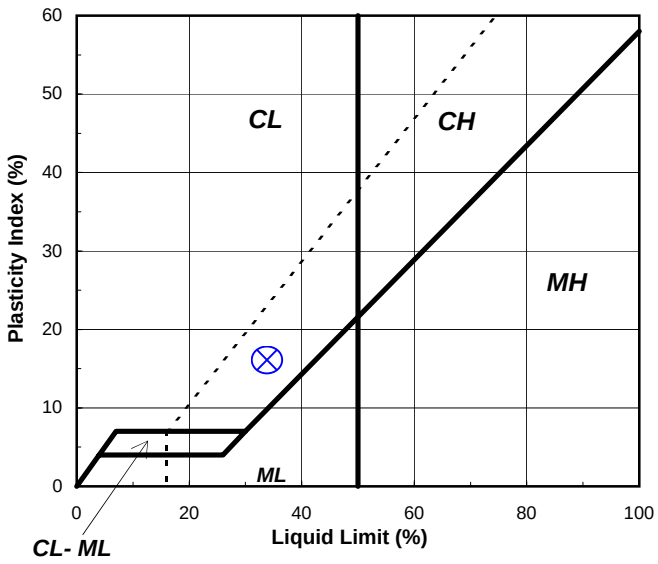
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**34**
Plastic Limit (%):	**18**
Plasticity Index (%):	**16**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

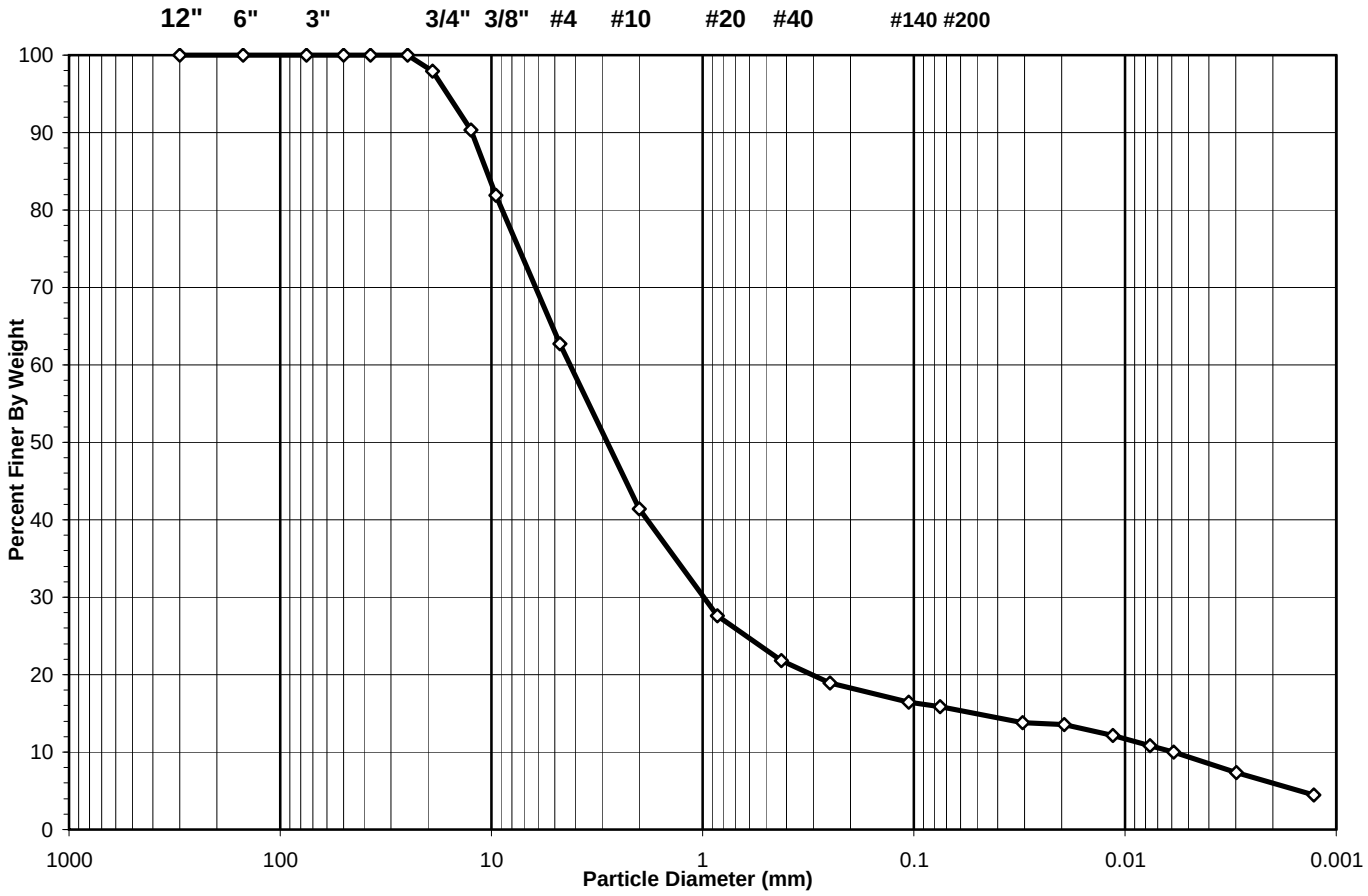
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003	Soil Color:	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	37.29
#4 To #200	*Sand*	46.84
Finer Than #200	*Silt & Clay*	15.87

USCS Symbol:
SC, TESTED

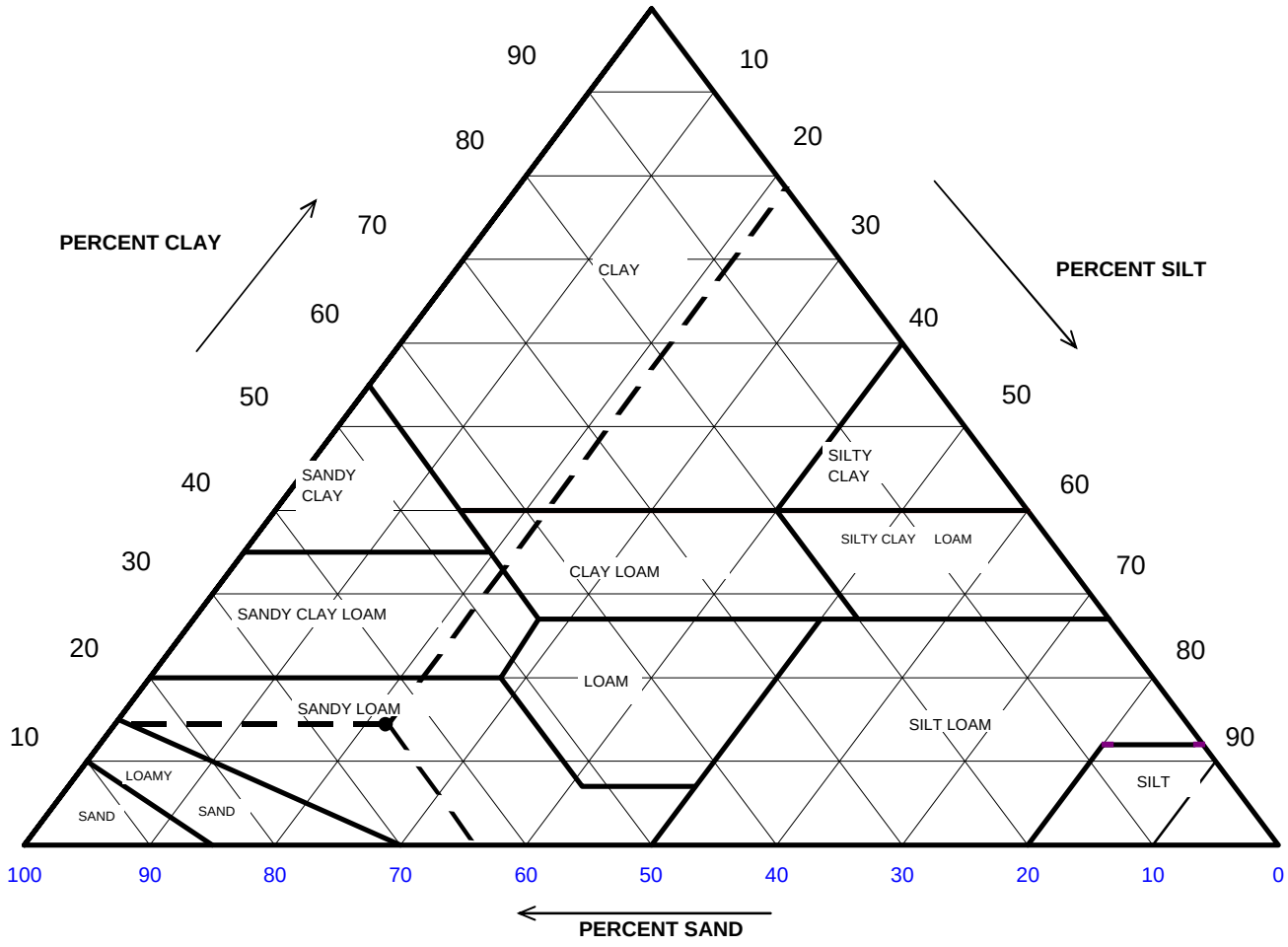
USCS Classification:
CLAYEY SAND WITH GRAVEL

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003	Soil Color:	BROWN



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	58.59	**0.00**
2	41.41	*Sand*	26.48	**63.93**
0.05	14.94	*Silt*	8.96	**21.63**
0.002	5.98	*Clay*	5.98	**14.44**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003	Soil Color:	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1445	Tare No.	NA
Weight of Tare & Wet Sample (g)	1179.35	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	1042.10	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	146.18	Weight of Tare (g)	NA
Weight of Water (g)	137.25	Weight of Water (g)	NA
Weight of Dry Sample (g)	895.92	Weight of Dry Sample (g)	NA
Moisture Content (%)	**15.3**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	895.92
Dry Weight of -3/4" Sample (g)	735.01	Weight of - #200 Material (g)	142.20
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	753.72
Dry Weight of +3/4" Sample (g)	18.71		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	18.71	2.09	2.09		97.91	**97.91**
1/2"	12.5	67.83	7.57	9.66		90.34	**90.34**
3/8"	9.50	75.56	8.43	18.09		81.91	**81.91**
#4	4.75	171.98	19.20	37.29		62.71	**62.71**
#10	2.00	190.82	21.30	58.59		41.41	**41.41**
#20	0.85	123.57	13.79	72.38		27.62	**27.62**
#40	0.425	52.14	5.82	78.20		21.80	**21.80**
#60	0.250	25.69	2.87	81.07		18.93	**18.93**
#140	0.106	21.96	2.45	83.52		16.48	**16.48**
#200	0.075	5.46	0.61	84.13		15.87	**15.87**
Pan	-	142.20	15.87	100.00		-	**-**

Tested By JP Date 5/27/15 Checked By KC Date 6/1/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003	Soil Color:	BROWN

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		31.5	23.1	5.89	25.6	87.0	0.01296	0.0306	**13.8**
5		31.0	23.1	5.89	25.1	85.3	0.01296	0.0194	**13.5**
15		28.5	23.1	5.89	22.6	76.8	0.01296	0.0114	**12.2**
35		26.0	23.1	5.89	20.1	68.3	0.01296	0.0076	**10.8**
60		24.5	22.8	6.00	18.5	62.8	0.01300	0.0059	**10.0**
250		19.5	23.1	5.89	13.6	46.2	0.01296	0.0030	**7.3**
1440		14.0	23.4	5.79	8.2	27.9	0.01291	0.0013	**4.4**

Soil Specimen Data		**Other Corrections**		
Tare No.	964			
Weight of Tare & Dry Material (g)	133.72	a - Factor	0.99	
Weight of Tare (g)	99.57			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	15.87	
Weight of Dry Material (g)	29.2			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By KC Date 6/1/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	106	142	144
Wt. of Tare & Wet Sample (g):	39.69	40.31	38.74
Wt. of Tare & Dry Sample (g):	34.83	35.02	33.47
Weight of Tare (g):	19.26	18.68	17.98
Weight of Water (g):	4.9	5.3	5.3
Weight of Dry Sample (g):	15.6	16.3	15.5
Moisture Content (%):	**31.2**	**32.4**	**34.0**
Number of Blows:	**34**	**28**	**21**

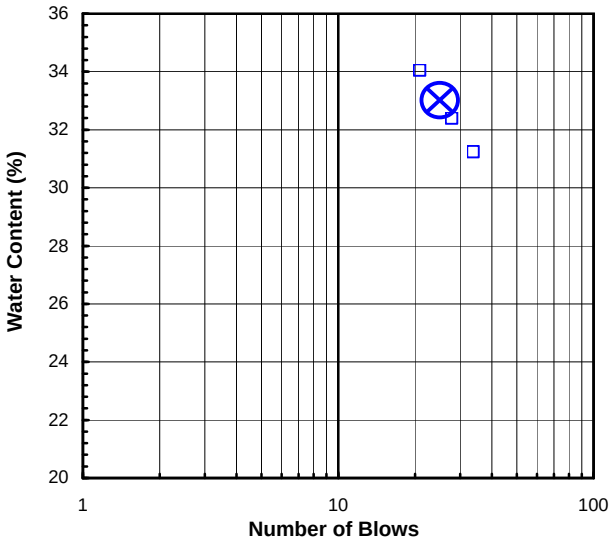
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	412	443	
Wt. of Tare & Wet Sample (g):	25.80	21.51	
Wt. of Tare & Dry Sample (g):	24.77	20.53	
Weight of Tare (g):	19.41	15.48	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.4	5.1	
Moisture Content (%):	**19.2**	**19.4**	**-0.2**

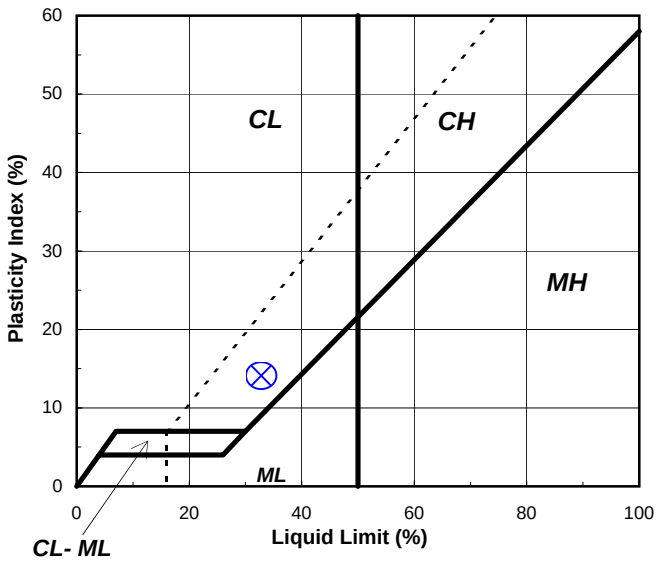
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**33**
Plastic Limit (%):	**19**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/26/15 *Checked By* JCM *Date* 5/27/15

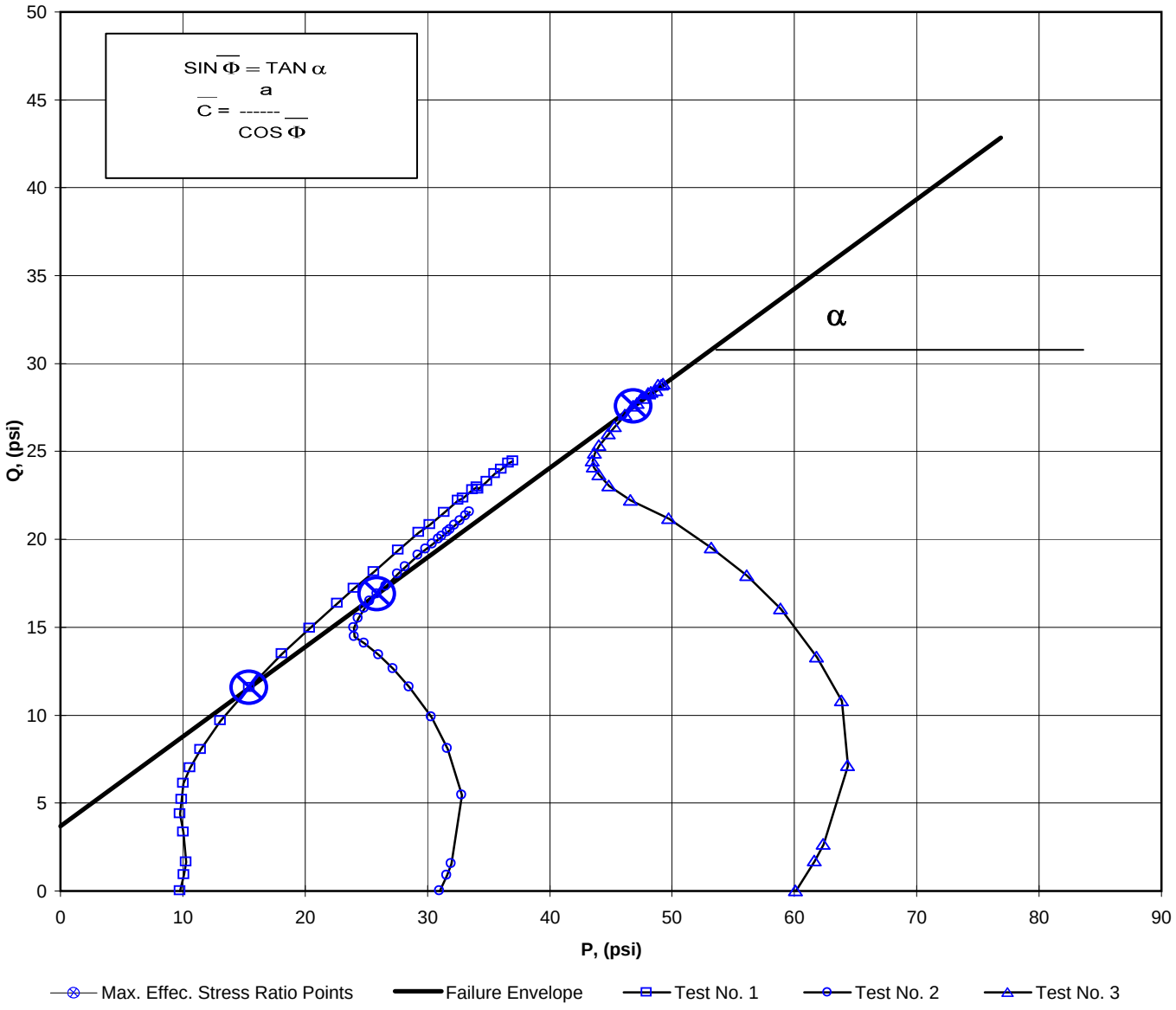
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	6.0-8.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Consolidated Undrained Triaxial Test with Pore Pressure



a =	**3.69**	$\bar{C}$ =	**4.28**
α =	**27.0**	$\bar{\Phi}$ =	**30.64**

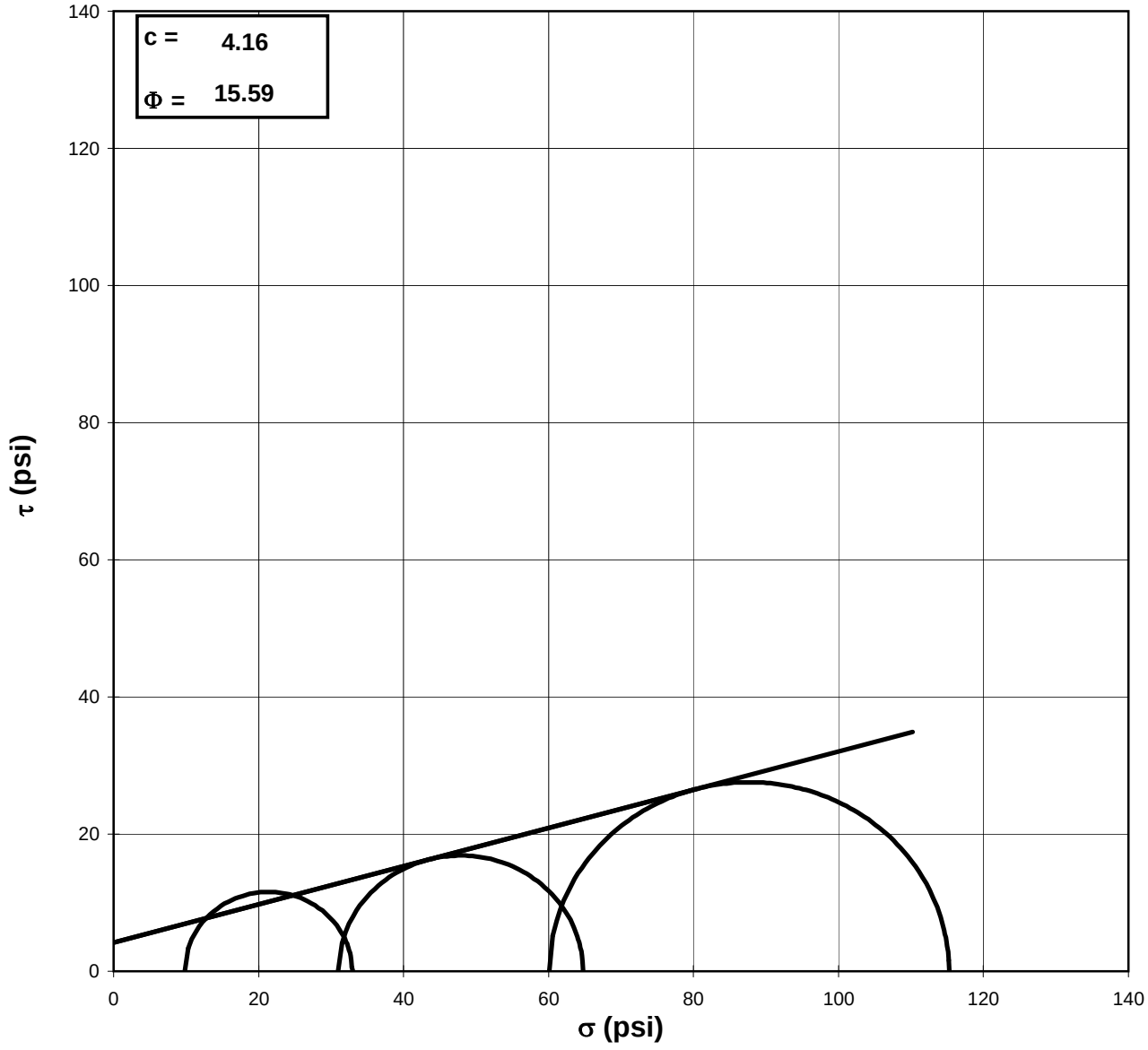
Tested By: JCM Date: 5/20/15 Approved By: DB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

MOHR TOTAL STRENGTH ENVELOPE

ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	6.0-8.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		
Visual Description:	Brown Sandy Clay & Rock (undisturbed)		



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: JCM *Date:* 5/20/15 *Approved By:* DB *Date:* 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

geotechnics
geotechnical & geosynthetic testing

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Stage No.	1
Test No.	1

PRESSURES (psi)

Cell Pressure (psi)	42.3
Back Pressure (psi)	32.5
Eff. Conf. Pressure (psi)	9.8
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	15.45
Q	=	11.56

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.820	Diameter 1:	2.883
Length 2:	5.804	Diameter 2:	2.873
Length 3:	5.800	Diameter 3:	2.885
Avg. Length:	5.808	*Avg. Diam.:*	2.880

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	16.2
Final Change (ml)	7.8

Initial Dial Reading (mil)	42
Dial Reading After Saturation (mil)	58
Dial Reading After Consolidation (mil)	81

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
9.7	0.000	32.5
21.4	0.001	33.1
30.7	0.002	33.7
52.6	0.008	35.6
66.0	0.013	36.9
76.6	0.019	37.6
88.4	0.027	38.3
99.9	0.035	38.7
113.9	0.047	38.9
135.3	0.066	38.9
160.6	0.094	38.4
186.8	0.129	37.7
207.4	0.166	36.9
227.6	0.208	36.0
240.1	0.236	35.5
254.8	0.276	34.8
273.7	0.332	34.1
290.4	0.390	33.4
299.1	0.434	32.9
311.8	0.490	32.4
324.2	0.532	32.0
328.4	0.576	31.7
338.2	0.620	31.4
342.1	0.650	31.2
342.2	0.679	31.0
350.9	0.708	30.7
359.4	0.738	30.6
366.2	0.782	30.2
374.5	0.825	30.0
378.5	0.854	29.8
385.3	0.883	29.6

Tested By: JCM Date: 5/20/15 Input Checked By: JAB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	7.9-8.4
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Effective Confining Pressure (psi)	9.8	*Stage No.*	1
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	5.81
Initial Sample Diameter (in)	2.88
Initial Sample Area (in^2)	6.52
Initial Sample Volume (in^3)	37.84

VOLUME CHANGE

Volume After Consolidation (in^3)	37.06
Length After Consolidation (in)	5.77
Area After Consolidation (in^2)	6.423

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	1.81	0.61	11.00	9.2	1.197	0.34	10.10	0.91
0.04	3.27	1.17	11.90	8.6	1.379	0.36	10.26	1.63
0.13	6.66	3.06	13.40	6.7	1.988	0.46	10.07	3.33
0.23	8.74	4.37	14.17	5.4	2.611	0.51	9.80	4.37
0.33	10.38	5.08	15.09	4.7	3.200	0.49	9.90	5.19
0.47	12.20	5.84	16.16	4.0	4.078	0.48	10.06	6.10
0.61	13.96	6.21	17.55	3.6	4.884	0.45	10.57	6.98
0.81	16.09	6.41	19.48	3.4	5.744	0.40	11.43	8.04
1.14	19.33	6.37	22.77	3.4	6.629	0.33	13.10	9.67
1.62	23.12	5.91	27.01	3.9	6.942	0.26	15.45	11.56
2.24	26.95	5.16	31.59	4.6	6.801	0.19	18.12	13.47
2.87	29.88	4.37	35.31	5.4	6.508	0.15	20.37	14.94
3.60	32.69	3.50	38.99	6.3	6.188	0.11	22.65	16.35
4.10	34.39	2.99	41.20	6.8	6.050	0.09	24.01	17.20
4.79	36.32	2.34	43.78	7.5	5.868	0.07	25.62	18.16
5.75	38.74	1.56	46.98	8.2	5.700	0.04	27.61	19.37
6.76	40.75	0.89	49.66	8.9	5.571	0.02	29.29	20.37
7.53	41.66	0.43	51.02	9.4	5.447	0.01	30.19	20.83
8.50	43.04	-0.07	52.91	9.9	5.362	0.00	31.39	21.52
9.22	44.44	-0.48	54.72	10.3	5.325	-0.01	32.50	22.22
9.98	44.66	-0.79	55.25	10.6	5.217	-0.02	32.92	22.33
10.76	45.64	-1.05	56.49	10.9	5.206	-0.02	33.67	22.82
11.27	45.91	-1.30	57.00	11.1	5.138	-0.03	34.05	22.95
11.78	45.67	-1.51	56.98	11.3	5.037	-0.03	34.15	22.83
12.28	46.59	-1.76	58.15	11.6	5.032	-0.04	34.85	23.30
12.80	47.48	-1.94	59.22	11.7	5.044	-0.04	35.48	23.74
13.55	47.98	-2.27	60.04	12.1	4.976	-0.05	36.05	23.99
14.30	48.66	-2.48	60.94	12.3	4.964	-0.05	36.61	24.33
14.80	48.92	-2.73	61.45	12.5	4.905	-0.06	36.99	24.46
15.31	49.52	-2.86	62.18	12.7	4.911	-0.06	37.42	24.76

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

geotechnics
geotechnical & geosynthetic testing

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	7.4-7.9
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Stage No.	1
Test No.	2

PRESSURES (psi)

Cell Pressure (psi)	62.9
Back Pressure (psi)	31.9
Eff. Conf. Pressure (psi)	31.0
Pore Pressure Response (%)	98

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	25.88
Q	=	16.88

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.900	Diameter 1:	2.873
Length 2:	5.896	Diameter 2:	2.864
Length 3:	5.910	Diameter 3:	2.886
Avg. Length	5.902	*Avg. Diam.:*	2.874

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	27.7
Final Change (ml)	20.3

Initial Dial Reading (mil)	64
Dial Reading After Saturation (mil	108
Dial Reading After Consolidation(mil)	181

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
10.9	0.000	31.9
22.1	0.001	32.2
30.3	0.002	32.5
79.3	0.005	35.6
112.4	0.010	39.3
135.2	0.015	42.5
156.5	0.024	46.0
169.8	0.032	48.3
180.3	0.044	50.3
189.1	0.065	52.1
194.9	0.095	53.3
202.4	0.130	53.9
210.5	0.164	54.1
219.5	0.205	54.1
225.8	0.235	54.1
232.7	0.275	53.9
241.2	0.332	53.6
252.6	0.392	53.3
260.2	0.434	53.1
272.0	0.494	52.7
279.1	0.538	52.5
285.6	0.583	52.2
291.5	0.626	52.0
295.3	0.656	51.8
300.6	0.685	51.7
304.4	0.715	51.6
309.4	0.744	51.4
316.0	0.789	51.3
322.8	0.834	51.1
327.9	0.863	51.0
326.2	0.892	51.1

Tested By: JCM Date: 5/20/15 Input Checked By: JAB Date: 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	7.4-7.9
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Effective Confining Pressure (psi)	31.0	*Stage No.*	1
		Test No	2

INITIAL DIMENSIONS

Initial Sample Length (in)	5.90
Initial Sample Diameter (in)	2.87
Initial Sample Area (in^2)	6.49
Initial Sample Volume (in^3)	38.30

VOLUME CHANGE

Volume After Consolidation (in^3)	36.20
Length After Consolidation (in)	5.79
Area After Consolidation (in^2)	6.258

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	1.79	0.30	32.48	30.7	1.058	0.17	31.59	0.89
0.03	3.10	0.59	33.52	30.4	1.102	0.19	31.97	1.55
0.08	10.93	3.66	38.27	27.3	1.400	0.34	32.81	5.46
0.17	16.20	7.43	39.77	23.6	1.687	0.47	31.67	8.10
0.26	19.80	10.58	40.22	20.4	1.970	0.55	30.32	9.90
0.41	23.17	14.06	40.11	16.9	2.368	0.62	28.53	11.58
0.56	25.24	16.40	39.85	14.6	2.728	0.66	27.23	12.62
0.77	26.86	18.39	39.47	12.6	3.130	0.70	26.04	13.43
1.13	28.15	20.21	38.93	10.8	3.609	0.73	24.86	14.07
1.65	28.92	21.43	38.49	9.6	4.023	0.76	24.03	14.46
2.25	29.92	21.97	38.95	9.0	4.312	0.75	23.99	14.96
2.84	30.99	22.16	39.83	8.8	4.506	0.73	24.33	15.49
3.55	32.16	22.22	40.94	8.8	4.662	0.70	24.86	16.08
4.06	32.95	22.19	41.76	8.8	4.738	0.69	25.29	16.47
4.76	33.76	22.00	42.76	9.0	4.749	0.66	25.88	16.88
5.75	34.69	21.72	43.96	9.3	4.740	0.64	26.62	17.34
6.77	36.01	21.44	45.57	9.6	4.769	0.61	27.56	18.01
7.51	36.85	21.20	46.65	9.8	4.761	0.59	28.22	18.43
8.53	38.16	20.84	48.32	10.2	4.756	0.56	29.24	19.08
9.30	38.87	20.57	49.30	10.4	4.727	0.54	29.87	19.44
10.07	39.47	20.33	50.15	10.7	4.698	0.53	30.41	19.74
10.83	39.98	20.07	50.91	10.9	4.658	0.51	30.92	19.99
11.34	40.30	19.94	51.36	11.1	4.643	0.50	31.21	20.15
11.85	40.80	19.75	52.05	11.2	4.628	0.49	31.65	20.40
12.35	41.11	19.69	52.42	11.3	4.633	0.49	31.87	20.55
12.86	41.56	19.54	53.03	11.5	4.625	0.48	32.25	20.78
13.63	42.11	19.37	53.75	11.6	4.620	0.47	32.69	21.06
14.41	42.66	19.18	54.48	11.8	4.610	0.46	33.15	21.33
14.91	43.10	19.09	55.01	11.9	4.618	0.45	33.46	21.55
15.41	42.62	19.24	54.38	11.8	4.625	0.46	33.07	21.31

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	6.8-7.3
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Stage No.	1
Test No.	3

PRESSURES (psi)

Cell Pressure (psi)	92.3
Back Pressure (psi)	32.2
Eff. Conf. Pressure (psi)	60.1
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	46.87
Q	=	27.57

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.805	Diameter 1:	2.883
Length 2:	5.798	Diameter 2:	2.885
Length 3:	5.807	Diameter 3:	2.877
Avg. Length:	5.803	*Avg. Diam.:*	2.882

VOLUME CHANGE

Initial Burette Reading (ml)	96.0
Final Burette Reading (ml)	47.4
Final Change (ml)	48.6

Initial Dial Reading (mil)	86
Dial Reading After Saturation (mil	120
Dial Reading After Consolidation(mil)	262

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
15.6	0.000	32.2
36.4	0.001	32.4
48.0	0.002	32.6
102.3	0.005	35.0
147.3	0.009	39.2
177.7	0.015	43.8
211.4	0.022	49.5
234.7	0.031	54.1
254.6	0.042	58.6
275.9	0.062	63.7
290.0	0.091	67.9
302.1	0.125	70.5
311.8	0.161	71.9
319.8	0.203	72.8
325.6	0.232	73.3
333.9	0.273	73.5
342.9	0.328	73.6
354.8	0.386	73.5
363.3	0.430	73.4
375.9	0.488	73.2
385.8	0.530	73.0
390.9	0.573	72.8
398.5	0.618	72.7
404.5	0.648	72.5
406.3	0.678	72.4
409.9	0.707	72.3
417.9	0.736	72.1
417.3	0.780	72.1
425.5	0.824	71.9
429.0	0.853	71.8
433.6	0.883	71.6

Tested By: JCM Date: 5/20/15 Input Checked By: JAB Date: 5/29/15

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	6.8-7.3
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		

Visual Description: Brown Sandy Clay & Rock (undisturbed)

Effective Confining Pressure (psi)	60.1	*Stage No.*	1
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in)	5.80
Initial Sample Diameter (in)	2.88
Initial Sample Area (in^2)	6.52
Initial Sample Volume (in^3)	37.85

VOLUME CHANGE

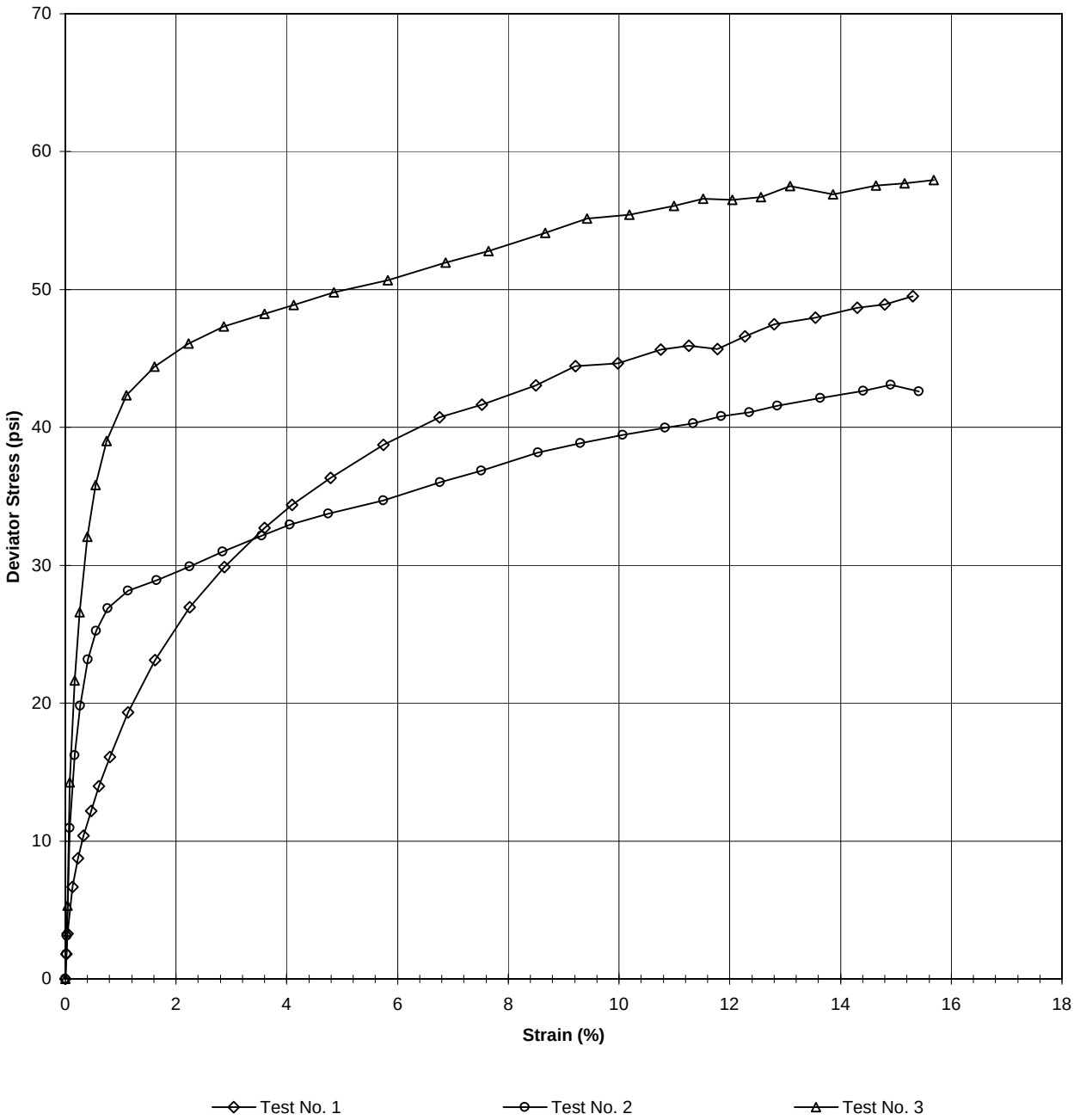
Volume After Consolidation (in^3)	34.22
Length After Consolidation (in)	5.63
Area After Consolidation (in^2)	6.081

Strain (%)	Deviation Stress	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principle Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	3.42	0.15	63.37	59.9	1.057	0.05	61.66	1.71
0.04	5.32	0.40	65.02	59.7	1.089	0.08	62.36	2.66
0.08	14.25	2.84	71.51	57.3	1.249	0.20	64.39	7.12
0.16	21.63	7.04	74.69	53.1	1.408	0.33	63.87	10.81
0.26	26.59	11.55	75.14	48.5	1.548	0.44	61.84	13.30
0.40	32.08	17.26	74.92	42.8	1.749	0.54	58.88	16.04
0.55	35.83	21.87	74.07	38.2	1.937	0.62	56.15	17.92
0.75	39.01	26.37	72.74	33.7	2.157	0.68	53.23	19.51
1.10	42.33	31.51	70.92	28.6	2.481	0.75	49.75	21.17
1.61	44.40	35.69	68.81	24.4	2.819	0.81	46.61	22.20
2.23	46.07	38.28	67.90	21.8	3.111	0.84	44.86	23.04
2.86	47.31	39.73	67.68	20.4	3.322	0.85	44.03	23.66
3.60	48.23	40.63	67.70	19.5	3.477	0.85	43.59	24.12
4.12	48.88	41.05	67.93	19.0	3.566	0.85	43.49	24.44
4.85	49.80	41.31	68.60	18.8	3.650	0.84	43.69	24.90
5.82	50.68	41.38	69.41	18.7	3.707	0.82	44.06	25.34
6.87	51.96	41.26	70.80	18.8	3.758	0.80	44.82	25.98
7.64	52.81	41.19	71.71	18.9	3.793	0.79	45.31	26.40
8.67	54.12	40.98	73.24	19.1	3.830	0.76	46.18	27.06
9.42	55.15	40.80	74.45	19.3	3.857	0.75	46.87	27.57
10.19	55.42	40.62	74.90	19.5	3.846	0.74	47.19	27.71
10.99	56.05	40.48	75.67	19.6	3.856	0.73	47.65	28.02
11.52	56.58	40.32	76.36	19.8	3.861	0.72	48.07	28.29
12.05	56.52	40.25	76.37	19.9	3.847	0.72	48.11	28.26
12.57	56.70	40.14	76.65	20.0	3.841	0.72	48.30	28.35
13.09	57.51	39.94	77.67	20.2	3.853	0.70	48.91	28.75
13.86	56.90	39.86	77.15	20.2	3.811	0.71	48.69	28.45
14.65	57.54	39.71	77.93	20.4	3.822	0.70	49.16	28.77
15.16	57.68	39.62	78.16	20.5	3.817	0.69	49.32	28.84
15.69	57.96	39.43	78.63	20.7	3.804	0.69	49.65	28.98

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp. Area #1 150-989	Depth (ft):	6.0-8.5
Project No.:	2015-263-001	Sample No.:	ST-1
Lab ID:	2015-263-001-003		
Visual Description:	Brown Sandy Clay & Rock (undisturbed)		



Tested By: JCM Date: 5/20/15 Approved By: DB Date: 5/29/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	CEC		
Client Reference:	Montour Ash Disp. Area #1 150-989		
Project No.:	2015-263-001		
Lab ID:	2015-263-001-003	Specific Gravity (assumed)	2.7

Visual Description: Brown Sandy Clay & Rock (undisturbed)

SAMPLE CONDITION SUMMARY

Boring No.:	B-103	B-103	B-103
Depth (ft):	7.9-8.4	7.4-7.9	6.8-7.3
Sample No.:	ST-1	ST-1	ST-1
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.002	0.002	0.002
Back Pressure (psi)	32.5	31.9	32.2
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	12.9	12.9	12.9
Total Unit Weight (pcf)	134.5	126.5	120.9
Dry Unit Weight (pcf)	119.1	112.0	107.0
Moisture Content (%) (FINAL)	15.3	17.0	19.7
Initial State Void Ratio,e	0.415	0.505	0.575
Void Ratio at Shear, e	0.386	0.423	0.424

no photo

Tested By: JCM Date: 5/20/15 Input Checked By: JAB Date: 5/29/15

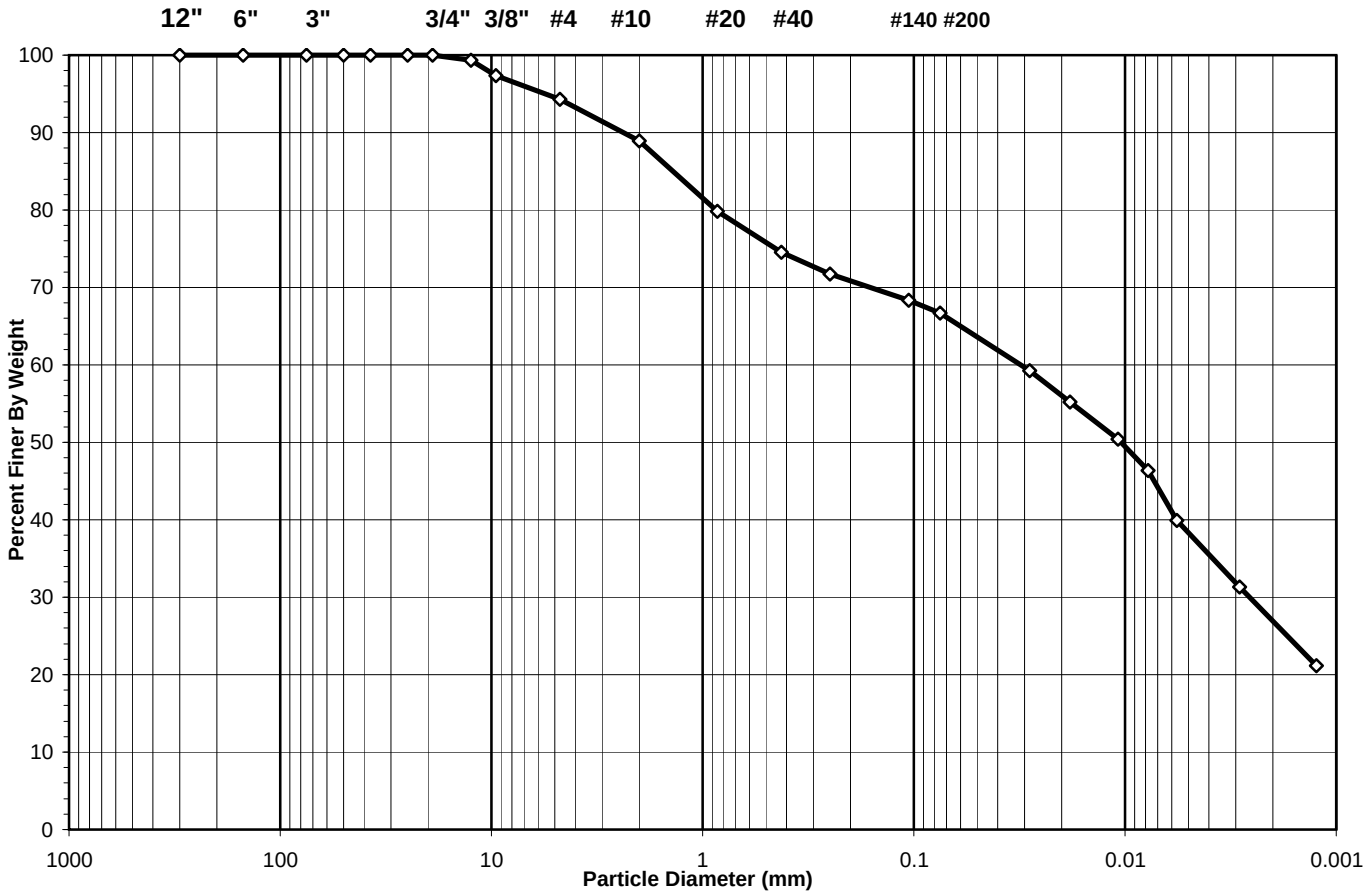
DCN: CT-S28 DATE: 4/12/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	44.0-48.0
Project No.:	2015-263-001	Sample No.:	S-23 + S-24
Lab ID:	2015-263-001-004	Soil Color:	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	5.70
#4 To #200	*Sand*	27.57
Finer Than #200	*Silt & Clay*	66.73

USCS Symbol:
CL, TESTED

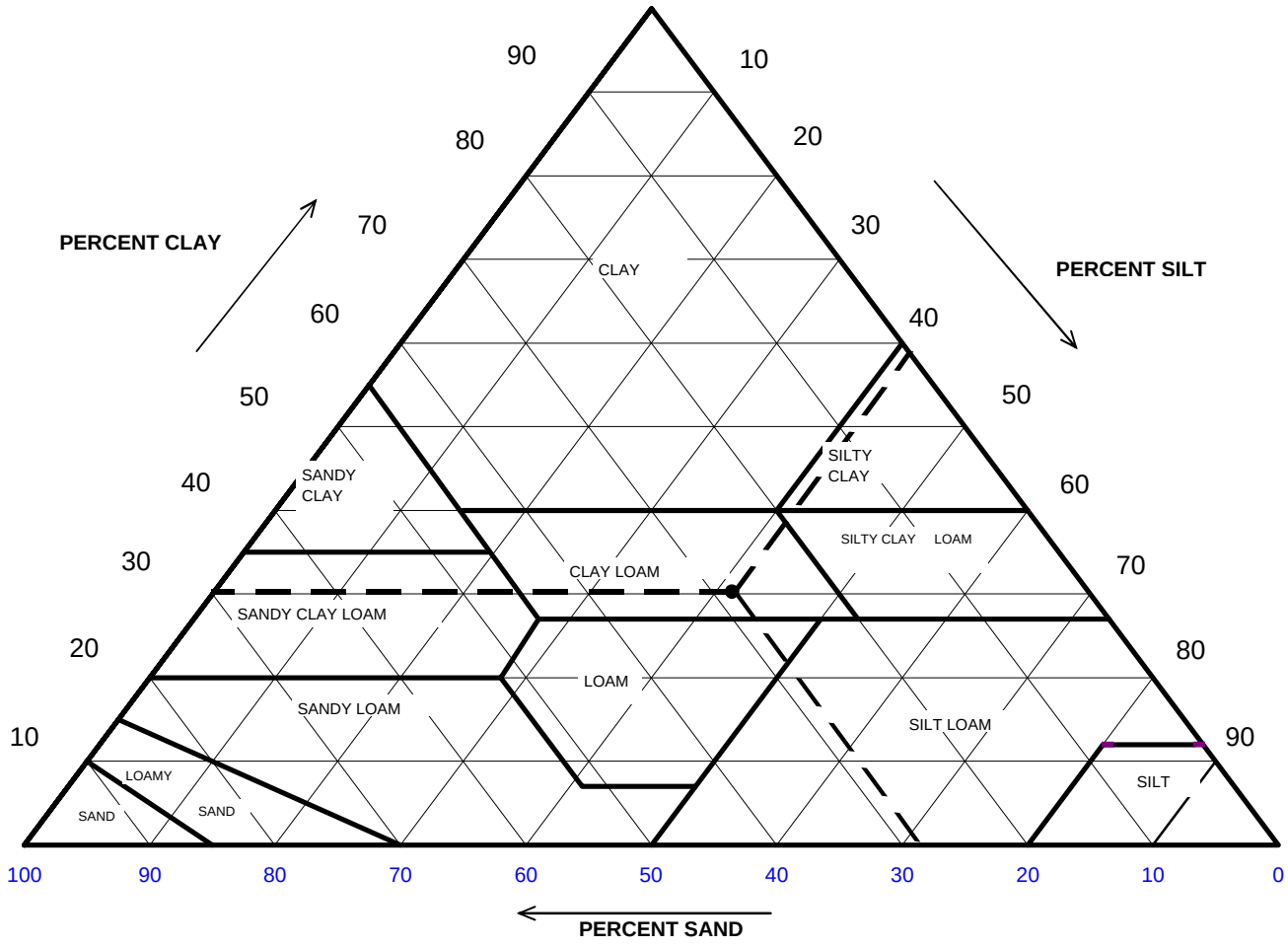
USCS Classification:
SANDY LEAN CLAY

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	44.0-48.0
Project No.:	2015-263-001	Sample No.:	S-23 + S-24
Lab ID:	2015-263-001-004	Soil Color:	BROWN



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	11.11	**0.00**
2	88.89	*Sand*	25.25	**28.41**
0.05	63.64	*Silt*	36.74	**41.32**
0.002	26.91	*Clay*	26.91	**30.27**

USDA Classification: ***CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	44.0-48.0
Project No.:	2015-263-001	Sample No.:	S-23 + S-24
Lab ID:	2015-263-001-004	Soil Color:	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	15	Tare No.	NA
Weight of Tare & Wet Sample (g)	598.02	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	598.02	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	201.36	Weight of Tare (g)	NA
Weight of Water (g)	0.00	Weight of Water (g)	NA
Weight of Dry Sample (g)	396.66	Weight of Dry Sample (g)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	396.66
Dry Weight of -3/4" Sample (g)	131.96	Weight of - #200 Material (g)	264.70
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	131.96
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	2.70	0.68	0.68		99.32	**99.32**
3/8"	9.50	7.80	1.97	2.65		97.35	**97.35**
#4	4.75	12.09	3.05	5.70		94.30	**94.30**
#10	2.00	21.46	5.41	11.11		88.89	**88.89**
#20	0.85	35.89	9.05	20.15		79.85	**79.85**
#40	0.425	20.88	5.26	25.42		74.58	**74.58**
#60	0.250	11.36	2.86	28.28		71.72	**71.72**
#140	0.106	13.30	3.35	31.63		68.37	**68.37**
#200	0.075	6.48	1.63	33.27		66.73	**66.73**
Pan	-	264.70	66.73	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	44.0-48.0
Project No.:	2015-263-001	Sample No.:	S-23 + S-24
Lab ID:	2015-263-001-004	Soil Color:	BROWN

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		43.0	22.1	6.24	36.8	88.8	0.01311	0.0282	**59.3**
5		40.5	22.1	6.24	34.3	82.8	0.01311	0.0182	**55.2**
15		37.5	22.1	6.24	31.3	75.5	0.01311	0.0108	**50.4**
30		35.0	22.1	6.24	28.8	69.5	0.01311	0.0078	**46.4**
60		31.0	22.1	6.24	24.8	59.8	0.01311	0.0057	**39.9**
250		25.5	22.5	6.10	19.4	46.9	0.01305	0.0029	**31.3**
1440		19.0	23.1	5.89	13.1	31.7	0.01296	0.0012	**21.1**

Soil Specimen Data		**Other Corrections**		
Tare No.	924			
Weight of Tare & Dry Material (g)	146.00	a - Factor	0.99	
Weight of Tare (g)	100.03			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	66.73	
Weight of Dry Material (g)	41.0			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-103
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	44.0-48.0
Project No.:	2015-263-001	Sample No.:	S-23 + S-24
Lab ID:	2015-263-001-004	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	145	1269	375
Wt. of Tare & Wet Sample (g):	37.52	35.53	33.52
Wt. of Tare & Dry Sample (g):	32.68	30.92	29.02
Weight of Tare (g):	17.34	15.36	13.14
Weight of Water (g):	4.8	4.6	4.5
Weight of Dry Sample (g):	15.3	15.6	15.9
Moisture Content (%):	**31.6**	**29.6**	**28.3**
Number of Blows:	**15**	**27**	**33**

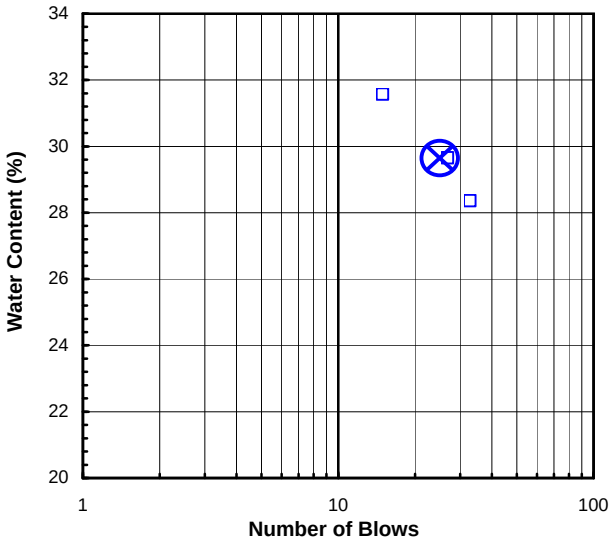
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	213	1238	
Wt. of Tare & Wet Sample (g):	25.36	18.15	
Wt. of Tare & Dry Sample (g):	24.45	17.27	
Weight of Tare (g):	18.87	11.88	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.6	5.4	
Moisture Content (%):	**16.3**	**16.3**	**0.0**

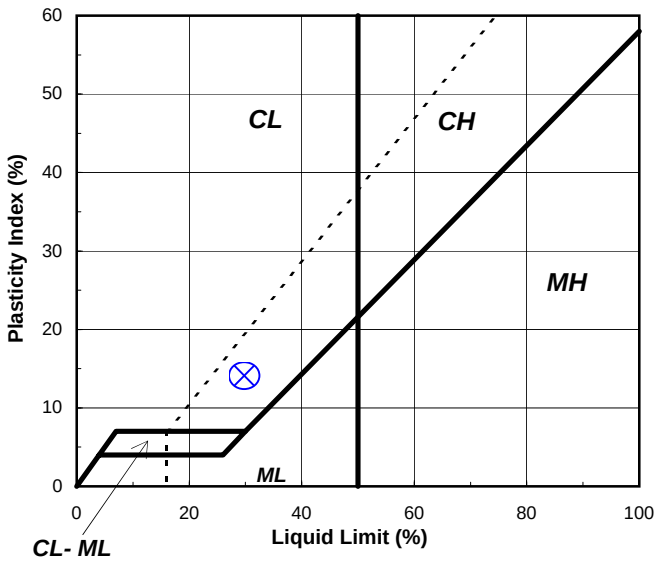
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**30**
Plastic Limit (%):	**16**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

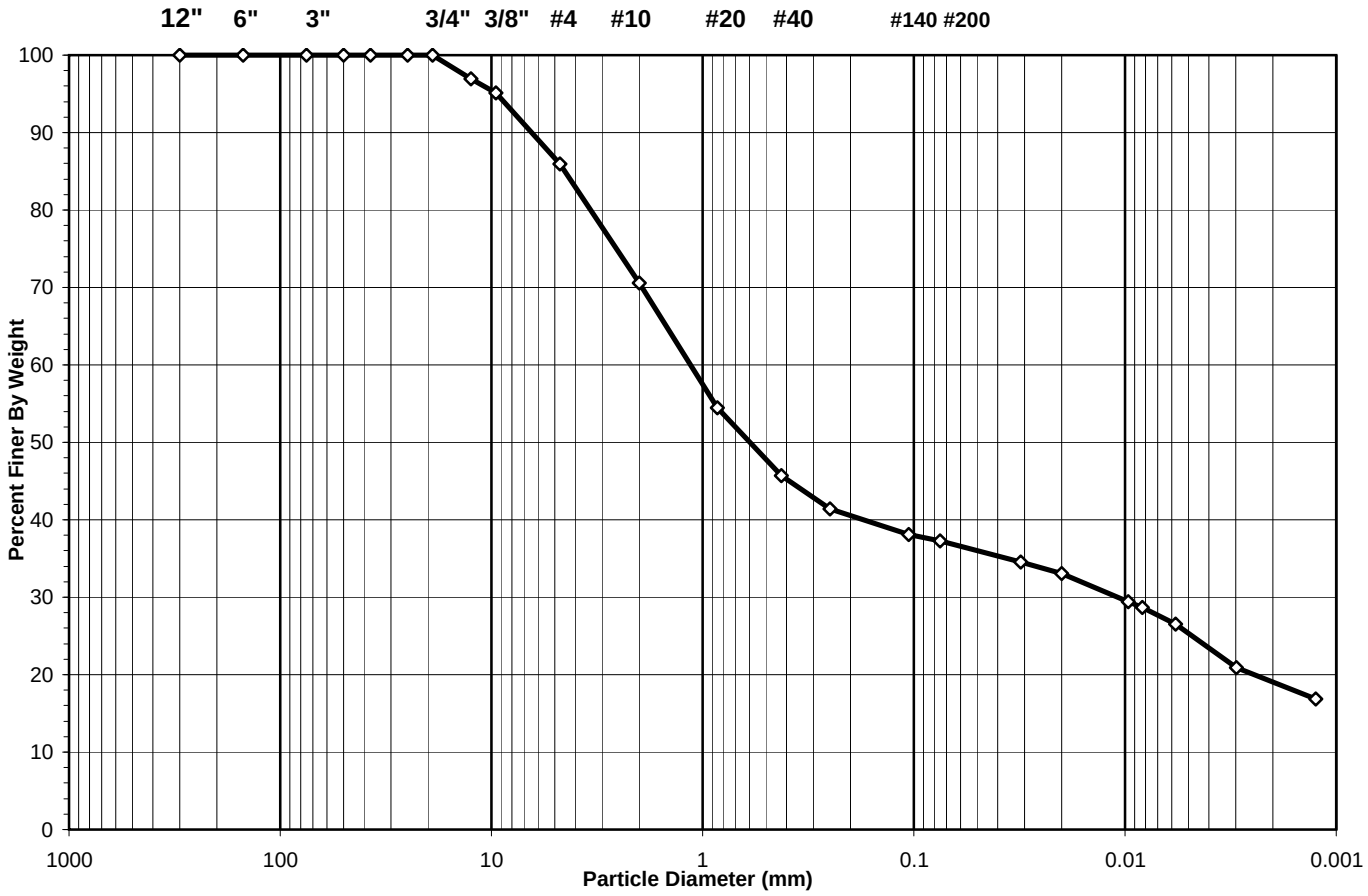
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-201
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	6.0-12.0
Project No.:	2015-263-001	Sample No.:	S-4 to S-6
Lab ID:	2015-263-001-005	Soil Color:	BROWN

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	14.04
#4 To #200	*Sand*	48.66
Finer Than #200	*Silt & Clay*	37.30

USCS Symbol:
SC, TESTED

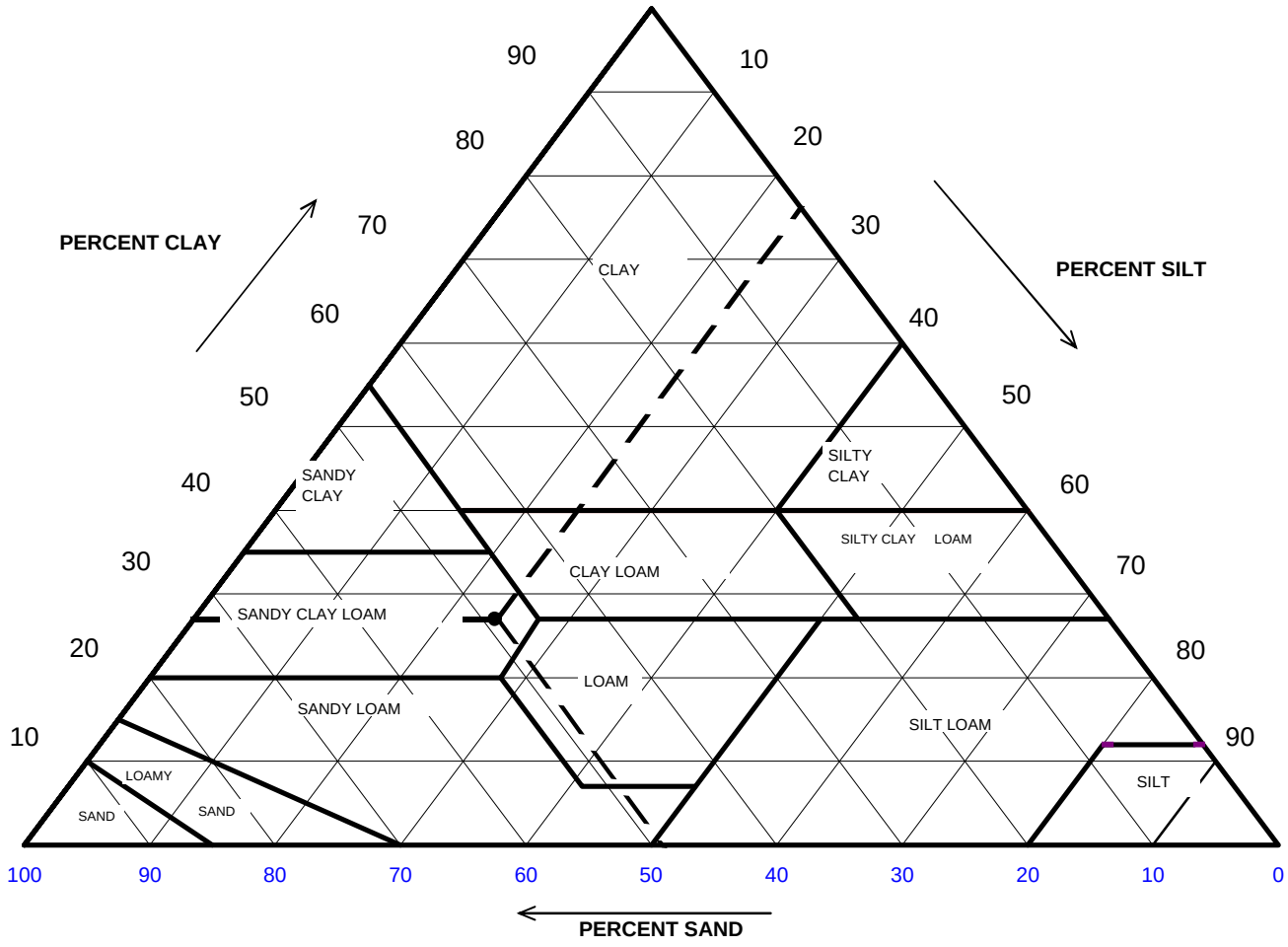
USCS Classification:
CLAYEY SAND

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-201
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	6.0-12.0
Project No.:	2015-263-001	Sample No.:	S-4 to S-6
Lab ID:	2015-263-001-005	Soil Color:	BROWN



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	29.44	**0.00**
2	70.56	*Sand*	34.54	**48.96**
0.05	36.01	*Silt*	16.95	**24.02**
0.002	19.06	*Clay*	19.06	**27.02**

USDA Classification: ***SANDY CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-201
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	6.0-12.0
Project No.:	2015-263-001	Sample No.:	S-4 to S-6
Lab ID:	2015-263-001-005	Soil Color:	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	64	Tare No.	NA
Weight of Tare & Wet Sample (g)	806.91	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	806.91	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	200.73	Weight of Tare (g)	NA
Weight of Water (g)	0.00	Weight of Water (g)	NA
Weight of Dry Sample (g)	606.18	Weight of Dry Sample (g)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	606.18
Dry Weight of -3/4" Sample (g)	380.05	Weight of - #200 Material (g)	226.13
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	380.05
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	18.68	3.08	3.08		96.92	**96.92**
3/8"	9.50	10.97	1.81	4.89		95.11	**95.11**
#4	4.75	55.43	9.14	14.04		85.96	**85.96**
#10	2.00	93.40	15.41	29.44		70.56	**70.56**
#20	0.85	97.36	16.06	45.50		54.50	**54.50**
#40	0.425	53.18	8.77	54.28		45.72	**45.72**
#60	0.250	25.96	4.28	58.56		41.44	**41.44**
#140	0.106	20.34	3.36	61.92		38.08	**38.08**
#200	0.075	4.73	0.78	62.70		37.30	**37.30**
Pan	-	226.13	37.30	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-201
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	6.0-12.0
Project No.:	2015-263-001	Sample No.:	S-4 to S-6
Lab ID:	2015-263-001-005	Soil Color:	BROWN

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		30.0	22.1	6.24	23.8	92.5	0.01311	0.0313	**34.5**
5		29.0	22.1	6.24	22.8	88.6	0.01311	0.0199	**33.1**
22		26.5	22.1	6.24	20.3	78.9	0.01311	0.0097	**29.4**
30		26.0	22.1	6.24	19.8	77.0	0.01311	0.0083	**28.7**
64		24.5	22.1	6.24	18.3	71.1	0.01311	0.0057	**26.5**
250		20.5	22.5	6.10	14.4	56.1	0.01305	0.0030	**20.9**
1440		17.5	23.1	5.89	11.6	45.2	0.01296	0.0013	**16.9**

Soil Specimen Data		**Other Corrections**		
Tare No.	964			
Weight of Tare & Dry Material (g)	130.10	a - Factor	0.99	
Weight of Tare (g)	99.68			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	37.30	
Weight of Dry Material (g)	25.4			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-201
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	6.0-12.0
Project No.:	2015-263-001	Sample No.:	S-4 to S-6
Lab ID:	2015-263-001-005	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	1244	1246	1286
Wt. of Tare & Wet Sample (g):	33.43	43.81	42.09
Wt. of Tare & Dry Sample (g):	28.57	38.58	36.67
Weight of Tare (g):	13.11	22.53	20.64
Weight of Water (g):	4.9	5.2	5.4
Weight of Dry Sample (g):	15.5	16.1	16.0
Moisture Content (%):	**31.4**	**32.6**	**33.8**
Number of Blows:	**35**	**28**	**22**

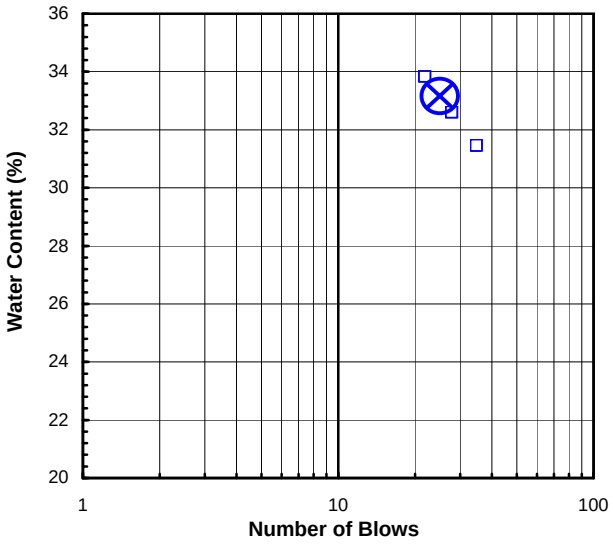
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	366	442	
Wt. of Tare & Wet Sample (g):	23.45	22.35	
Wt. of Tare & Dry Sample (g):	22.51	21.38	
Weight of Tare (g):	17.06	16.03	
Weight of Water (g):	0.9	1.0	
Weight of Dry Sample (g):	5.5	5.4	
Moisture Content (%):	**17.2**	**18.1**	**-0.9**

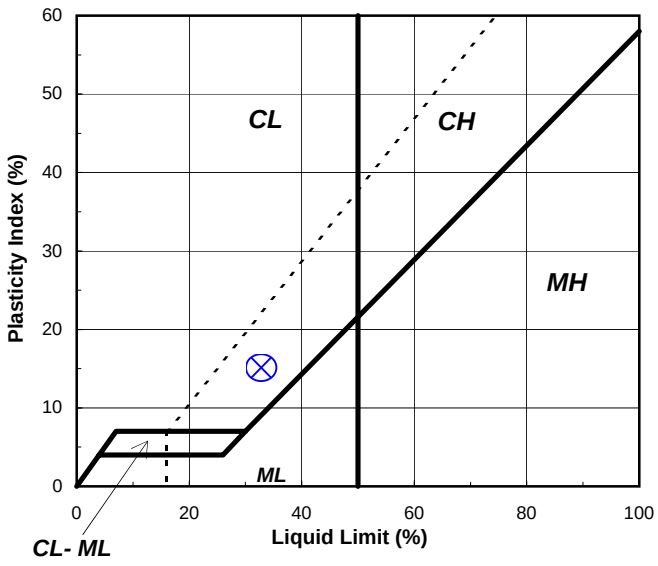
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**33**
Plastic Limit (%):	**18**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

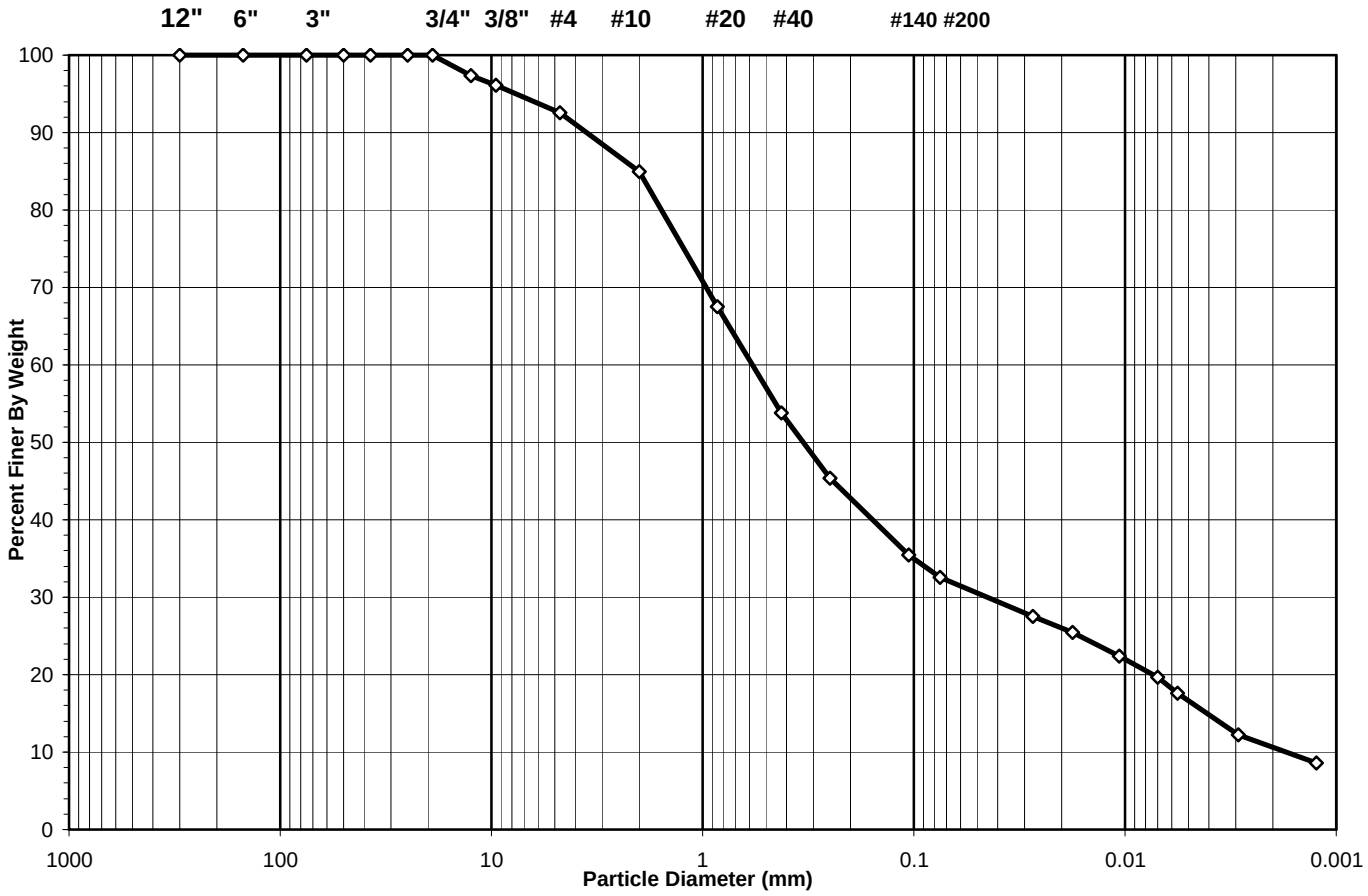
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-202
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-8.0
Project No.:	2015-263-001	Sample No.:	S-3 to S-4
Lab ID:	2015-263-001-006	Soil Color:	Black

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	7.45
#4 To #200	*Sand*	59.98
Finer Than #200	*Silt & Clay*	32.58

USCS Symbol:
SC, TESTED

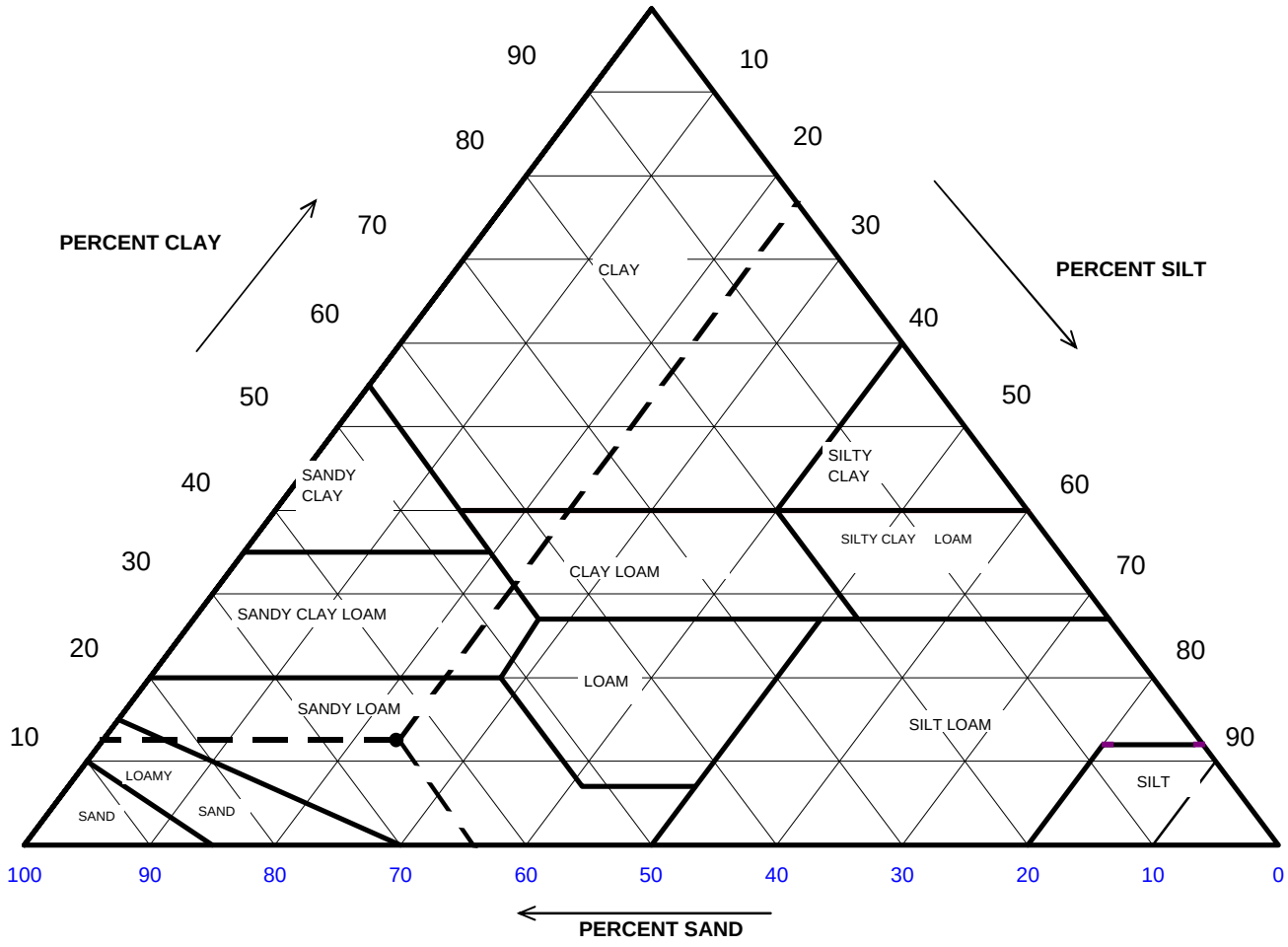
USCS Classification:
CLAYEY SAND

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-202
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-8.0
Project No.:	2015-263-001	Sample No.:	S-3 to S-4
Lab ID:	2015-263-001-006	Soil Color:	Black



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	15.00	**0.00**
2	85.00	*Sand*	54.45	**64.06**
0.05	30.55	*Silt*	19.90	**23.42**
0.002	10.64	*Clay*	10.64	**12.52**

USDA Classification: ***SANDY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-202
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-8.0
Project No.:	2015-263-001	Sample No.:	S-3 to S-4
Lab ID:	2015-263-001-006	Soil Color:	Black

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	55	Tare No.	NA
Weight of Tare & Wet Sample (g)	996.77	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	614.01	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	203.89	Weight of Tare (g)	NA
Weight of Water (g)	382.76	Weight of Water (g)	NA
Weight of Dry Sample (g)	410.12	Weight of Dry Sample (g)	NA
Moisture Content (%)	**93.3**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	410.12
Dry Weight of -3/4" Sample (g)	276.51	Weight of - #200 Material (g)	133.61
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	276.51
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	10.74	2.62	2.62		97.38	**97.38**
3/8"	9.50	5.26	1.28	3.90		96.10	**96.10**
#4	4.75	14.54	3.55	7.45		92.55	**92.55**
#10	2.00	30.98	7.55	15.00		85.00	**85.00**
#20	0.85	71.62	17.46	32.46		67.54	**67.54**
#40	0.425	56.25	13.72	46.18		53.82	**53.82**
#60	0.250	34.58	8.43	54.61		45.39	**45.39**
#140	0.106	40.72	9.93	64.54		35.46	**35.46**
#200	0.075	11.82	2.88	67.42		32.58	**32.58**
Pan	-	133.61	32.58	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-202
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-8.0
Project No.:	2015-263-001	Sample No.:	S-3 to S-4
Lab ID:	2015-263-001-006	Soil Color:	Black

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		46.5	22.1	6.24	40.3	84.4	0.01311	0.0273	**27.5**
5		43.5	22.1	6.24	37.3	78.2	0.01311	0.0178	**25.5**
15		39.0	22.1	6.24	32.8	68.7	0.01311	0.0107	**22.4**
37		35.0	22.1	6.24	28.8	60.3	0.01311	0.0070	**19.7**
60		32.0	22.1	6.24	25.8	54.0	0.01311	0.0056	**17.6**
250		24.0	22.5	6.10	17.9	37.5	0.01305	0.0029	**12.2**
1440		18.5	23.1	5.89	12.6	26.4	0.01296	0.0012	**8.6**

Soil Specimen Data		**Other Corrections**		
Tare No.	637			
Weight of Tare & Dry Material (g)	149.55	a - Factor	0.99	
Weight of Tare (g)	97.35			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	32.58	
Weight of Dry Material (g)	47.2			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-202
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	4.0-8.0
Project No.:	2015-263-001	Sample No.:	S-3 to S-4
Lab ID:	2015-263-001-006	Soil Description:	BLACK LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

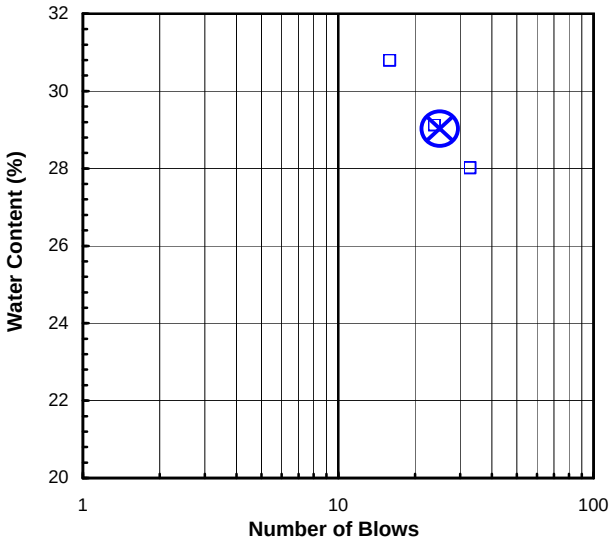
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	2234	349	2254	**U**
Wt. of Tare & Wet Sample (g):	36.41	38.94	37.11	**L**
Wt. of Tare & Dry Sample (g):	31.63	34.30	32.67	**T**
Weight of Tare (g):	16.10	18.36	16.81	**I**
Weight of Water (g):	4.8	4.6	4.4	**P**
Weight of Dry Sample (g):	15.5	15.9	15.9	**O**
				I
Moisture Content (%):	**30.8**	**29.1**	**28.0**	**N**
Number of Blows:	**16**	**24**	**33**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	320	189	
Wt. of Tare & Wet Sample (g):	26.00	25.79	
Wt. of Tare & Dry Sample (g):	25.16	24.98	
Weight of Tare (g):	19.91	19.66	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.3	5.3	
Moisture Content (%):	**16.0**	**15.2**	**0.8**

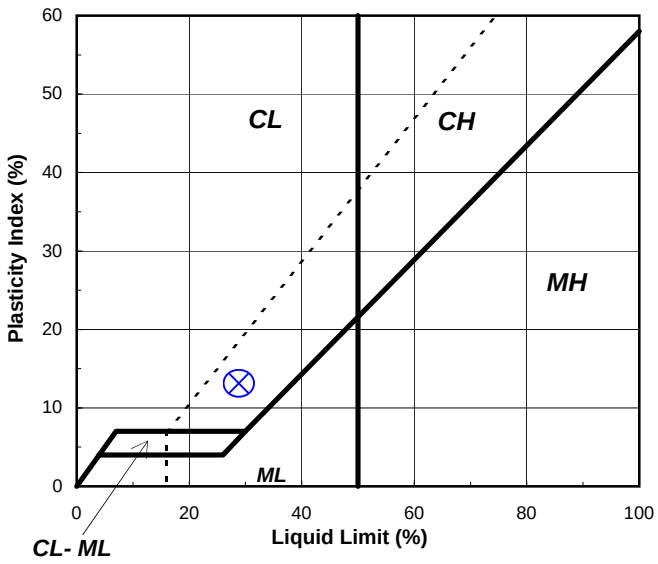
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**29**
Plastic Limit (%):	**16**
Plasticity Index (%):	**13**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

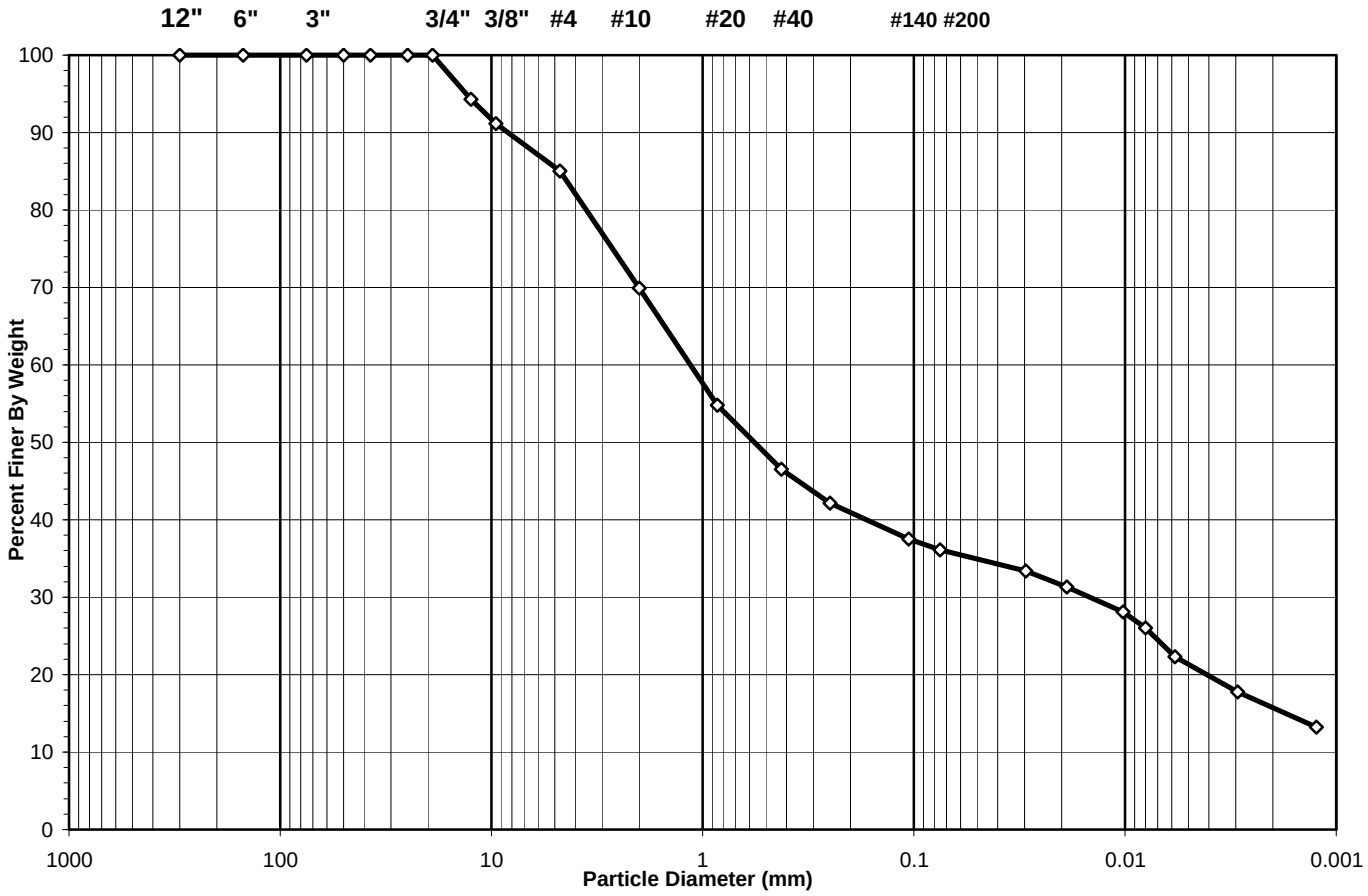
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-301
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	8.0-14.0
Project No.:	2015-263-001	Sample No.:	S-5 to S-7
Lab ID:	2015-263-001-007	Soil Color:	Brown and Black

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	14.96
#4 To #200	*Sand*	48.91
Finer Than #200	*Silt & Clay*	36.14

USCS Symbol:
SC, TESTED

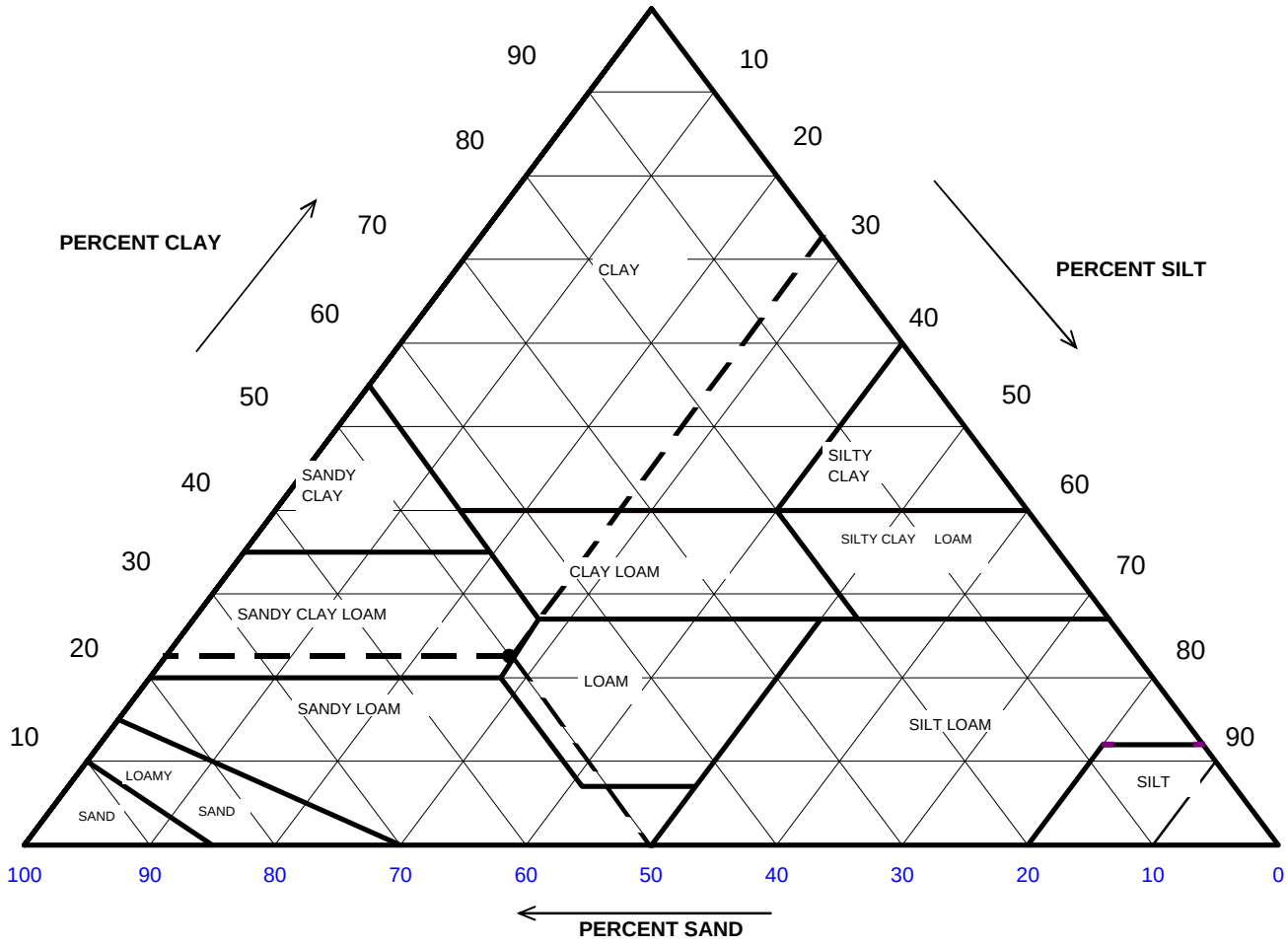
USCS Classification:
CLAYEY SAND

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-301
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	8.0-14.0
Project No.:	2015-263-001	Sample No.:	S-5 to S-7
Lab ID:	2015-263-001-007	Soil Color:	Brown and Black



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	30.09	**0.00**
2	69.91	*Sand*	34.97	**50.01**
0.05	34.95	*Silt*	19.18	**27.44**
0.002	15.76	*Clay*	15.76	**22.55**

USDA Classification: ***SANDY CLAY LOAM***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-301
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	8.0-14.0
Project No.:	2015-263-001	Sample No.:	S-5 to S-7
Lab ID:	2015-263-001-007	Soil Color:	Brown and Black

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	41	Tare No.	NA
Weight of Tare & Wet Sample (g)	807.56	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	807.56	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	205.99	Weight of Tare (g)	NA
Weight of Water (g)	0.00	Weight of Water (g)	NA
Weight of Dry Sample (g)	601.57	Weight of Dry Sample (g)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	601.57
Dry Weight of -3/4" Sample (g)	384.18	Weight of - #200 Material (g)	217.39
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	384.18
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	34.35	5.71	5.71		94.29	**94.29**
3/8"	9.50	19.09	3.17	8.88		91.12	**91.12**
#4	4.75	36.54	6.07	14.96		85.04	**85.04**
#10	2.00	91.01	15.13	30.09		69.91	**69.91**
#20	0.85	90.99	15.13	45.21		54.79	**54.79**
#40	0.425	49.88	8.29	53.50		46.50	**46.50**
#60	0.250	25.93	4.31	57.81		42.19	**42.19**
#140	0.106	28.02	4.66	62.47		37.53	**37.53**
#200	0.075	8.37	1.39	63.86		36.14	**36.14**
Pan	-	217.39	36.14	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-301
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	8.0-14.0
Project No.:	2015-263-001	Sample No.:	S-5 to S-7
Lab ID:	2015-263-001-007	Soil Color:	Brown and Black

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		38.0	22.1	6.24	31.8	92.4	0.01311	0.0294	**33.4**
5		36.0	22.1	6.24	29.8	86.6	0.01311	0.0189	**31.3**
18		33.0	22.1	6.24	26.8	77.9	0.01311	0.0102	**28.1**
30		31.0	22.1	6.24	24.8	72.0	0.01311	0.0080	**26.0**
60		27.5	22.1	6.24	21.3	61.9	0.01311	0.0058	**22.4**
250		23.0	22.5	6.10	16.9	49.2	0.01305	0.0029	**17.8**
1440		18.5	23.1	5.89	12.6	36.7	0.01296	0.0012	**13.3**

Soil Specimen Data		**Other Corrections**		
Tare No.	695			
Weight of Tare & Dry Material (g)	131.82	a - Factor	0.99	
Weight of Tare (g)	92.79			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	36.14	
Weight of Dry Material (g)	34.0			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-301
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	8.0-14.0
Project No.:	2015-263-001	Sample No.:	S-5 to S-7
Lab ID:	2015-263-001-007	Soil Description:	BROWN / BLACK LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	121	122	126
Wt. of Tare & Wet Sample (g):	41.16	40.77	40.25
Wt. of Tare & Dry Sample (g):	35.50	34.93	34.68
Weight of Tare (g):	19.43	18.65	19.46
Weight of Water (g):	5.7	5.8	5.6
Weight of Dry Sample (g):	16.1	16.3	15.2
Moisture Content (%):	**35.2**	**35.9**	**36.6**
Number of Blows:	**32**	**27**	**20**

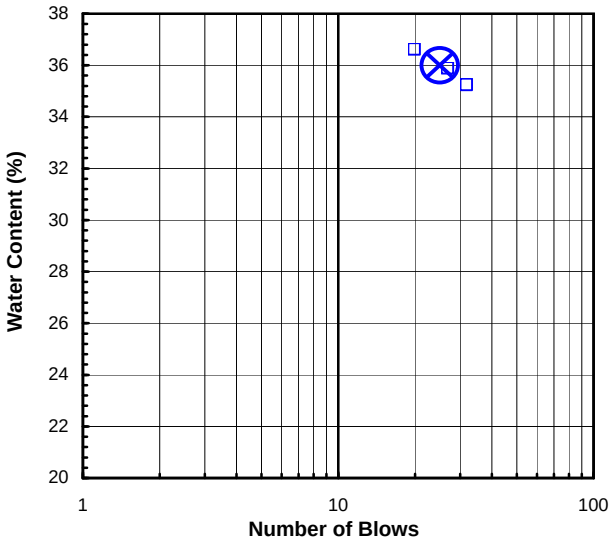
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	149	333	
Wt. of Tare & Wet Sample (g):	25.08	25.26	
Wt. of Tare & Dry Sample (g):	24.06	24.38	
Weight of Tare (g):	18.98	19.86	
Weight of Water (g):	1.0	0.9	
Weight of Dry Sample (g):	5.1	4.5	
Moisture Content (%):	**20.1**	**19.5**	**0.6**

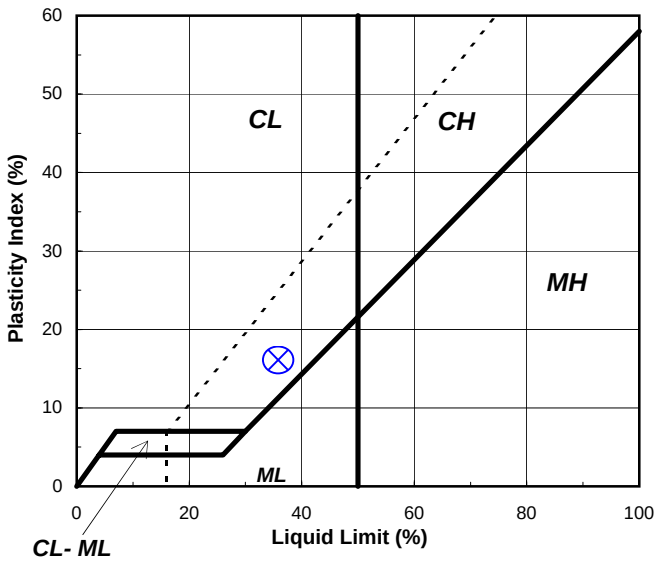
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**36**
Plastic Limit (%):	**20**
Plasticity Index (%):	**16**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-302
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-6.0
Project No.:	2015-263-001	Sample No.:	S-3
Lab ID:	2015-263-001-008	Soil Color:	Brown and Gray

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.24
#4 To #200	*Sand*	2.06
Finer Than #200	*Silt & Clay*	97.69

USCS Symbol:
CL, TESTED

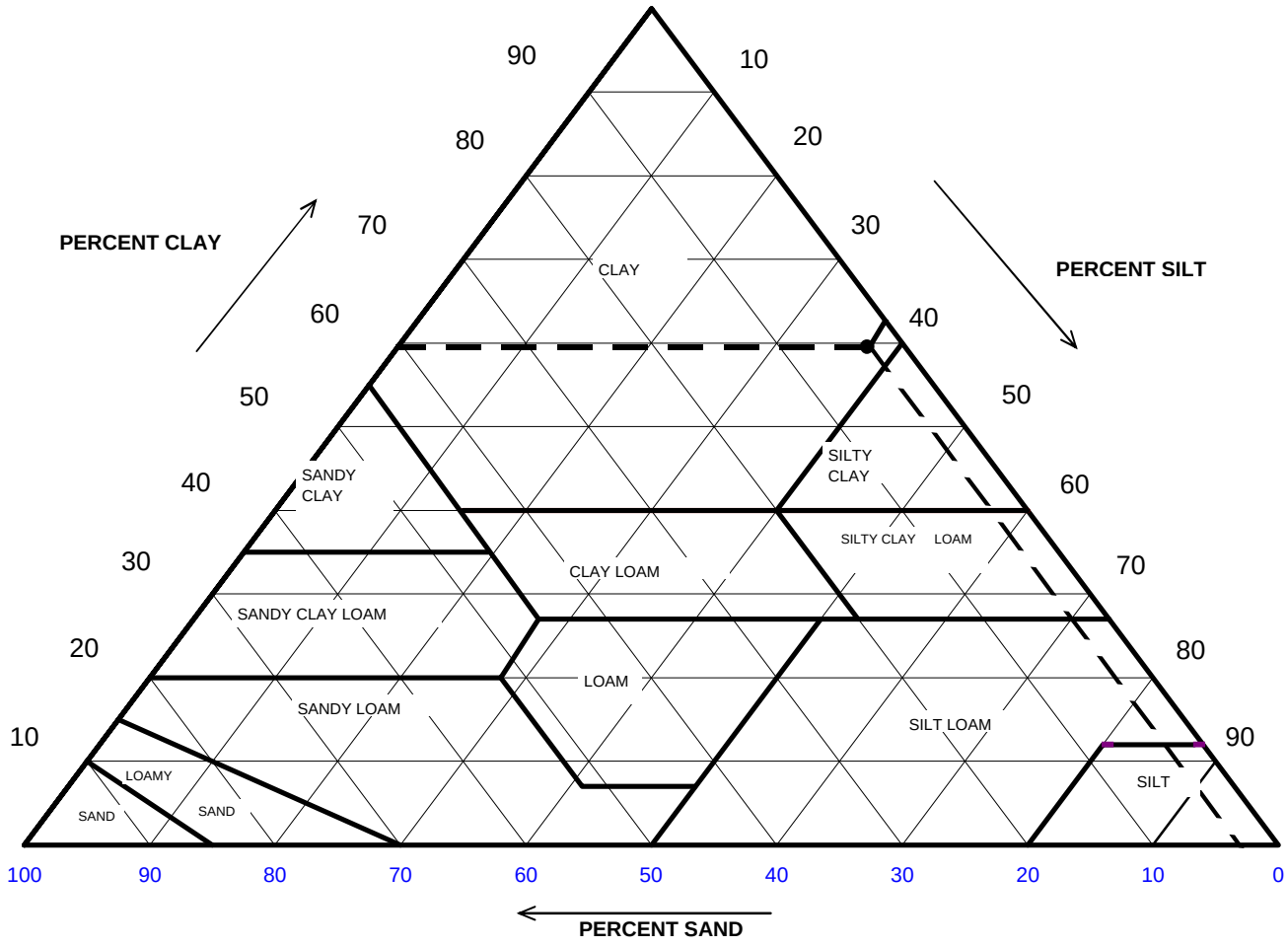
USCS Classification:
LEAN CLAY

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

USDA CLASSIFICATION CHART

Client:	CEC	Boring No.:	B-302
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-6.0
Project No.:	2015-263-001	Sample No.:	S-3
Lab ID:	2015-263-001-008	Soil Color:	Brown and Gray



Particle Size	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
(mm)	(%)		(%)	(%)
		Gravel	0.55	**0.00**
2	99.45	*Sand*	2.95	**2.97**
0.05	96.50	*Silt*	37.27	**37.48**
0.002	59.23	*Clay*	59.23	**59.56**

USDA Classification: ***CLAY***

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-302
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-6.0
Project No.:	2015-263-001	Sample No.:	S-3
Lab ID:	2015-263-001-008	Soil Color:	Brown and Gray

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	65	Tare No.	NA
Weight of Tare & Wet Sample (g)	354.00	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	354.00	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	201.38	Weight of Tare (g)	NA
Weight of Water (g)	0.00	Weight of Water (g)	NA
Weight of Dry Sample (g)	152.62	Weight of Dry Sample (g)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	152.62
Dry Weight of -3/4" Sample (g)	3.52	Weight of - #200 Material (g)	149.10
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	3.52
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	**100.00**
6"	150	0.00	0.00	0.00		100.00	**100.00**
3"	75	0.00	0.00	0.00		100.00	**100.00**
2"	50	0.00	0.00	0.00		100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00		100.00	**100.00**
1"	25.0	0.00	0.00	0.00		100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00		100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00		100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00		100.00	**100.00**
#4	4.75	0.37	0.24	0.24		99.76	**99.76**
#10	2.00	0.47	0.31	0.55		99.45	**99.45**
#20	0.85	0.95	0.62	1.17		98.83	**98.83**
#40	0.425	0.70	0.46	1.63		98.37	**98.37**
#60	0.250	0.42	0.28	1.91		98.09	**98.09**
#140	0.106	0.36	0.24	2.14		97.86	**97.86**
#200	0.075	0.25	0.16	2.31		97.69	**97.69**
Pan	-	149.10	97.69	100.00		-	**-**

Tested By RAL Date 5/22/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client:	CEC	Boring No.:	B-302
Client Reference:	Montour Ash Disp Area #1 150-989	Depth (ft):	4.0-6.0
Project No.:	2015-263-001	Sample No.:	S-3
Lab ID:	2015-263-001-008	Soil Color:	Brown and Gray

Elapsed Time		R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)			(°C)			(%)		(mm)	(%)
0		NA	NA	NA	NA	NA	NA	NA	NA
2		35.0	22.1	6.24	28.8	97.2	0.01311	0.0301	**95.0**
5		33.5	22.1	6.24	27.3	92.2	0.01311	0.0193	**90.0**
15		32.0	22.1	6.24	25.8	87.1	0.01311	0.0113	**85.1**
33		31.5	22.1	6.24	25.3	85.4	0.01311	0.0076	**83.4**
67		29.0	22.1	6.24	22.8	77.0	0.01311	0.0054	**75.2**
250		25.0	22.5	6.10	18.9	63.9	0.01305	0.0029	**62.4**
1440		22.5	23.1	5.89	16.6	56.1	0.01296	0.0012	**54.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	708			
Weight of Tare & Dry Material (g)	131.45	a - Factor	0.99	
Weight of Tare (g)	97.17			
Weight of Deflocculant (g)	5.0	Percent Finer than # 200	97.69	
Weight of Dry Material (g)	29.3			
		Specific Gravity	2.7	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Tested By TO Date 5/26/15 Checked By JEB Date 5/29/15

DCN: CT-S3A DATE: 3/18/13 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	CEC	Boring No.:	B-302
Client Reference:	Montour Ash Disp Area No. 1 150-989	Depth (ft):	4.0-6.0
Project No.:	2015-263-001	Sample No.:	S-3
Lab ID:	2015-263-001-008	Soil Description:	BROWN / GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

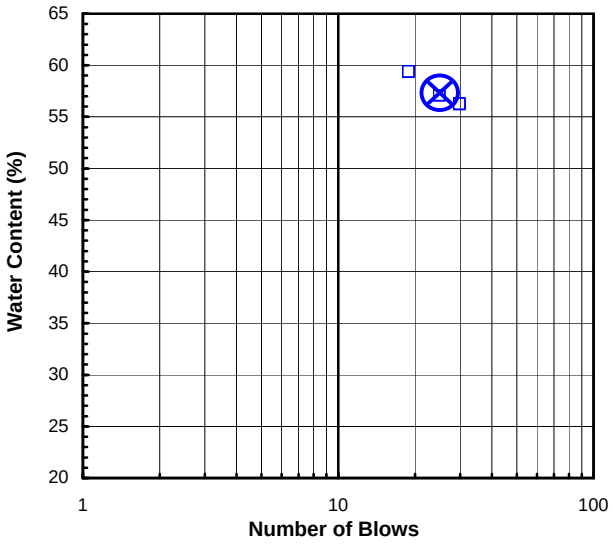
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	412	1228	1248	**U**
Wt. of Tare & Wet Sample (g):	39.44	41.54	32.61	**L**
Wt. of Tare & Dry Sample (g):	32.23	33.42	24.85	**T**
Weight of Tare (g):	19.40	19.18	11.77	**I**
Weight of Water (g):	7.2	8.1	7.8	**P**
Weight of Dry Sample (g):	12.8	14.2	13.1	**O**
				I
Moisture Content (%):	**56.2**	**57.0**	**59.3**	**N**
Number of Blows:	**30**	**25**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	386	472	
Wt. of Tare & Wet Sample (g):	26.82	26.06	
Wt. of Tare & Dry Sample (g):	25.43	24.65	
Weight of Tare (g):	20.62	19.66	
Weight of Water (g):	1.4	1.4	
Weight of Dry Sample (g):	4.8	5.0	
Moisture Content (%):	**28.9**	**28.3**	**0.6**

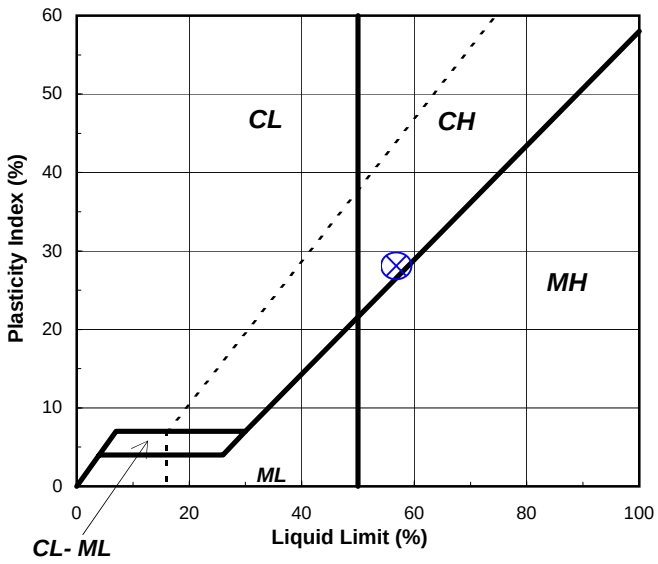
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**57**
Plastic Limit (%):	**29**
Plasticity Index (%):	**28**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/19/15 *Checked By* KC *Date* 5/20/15

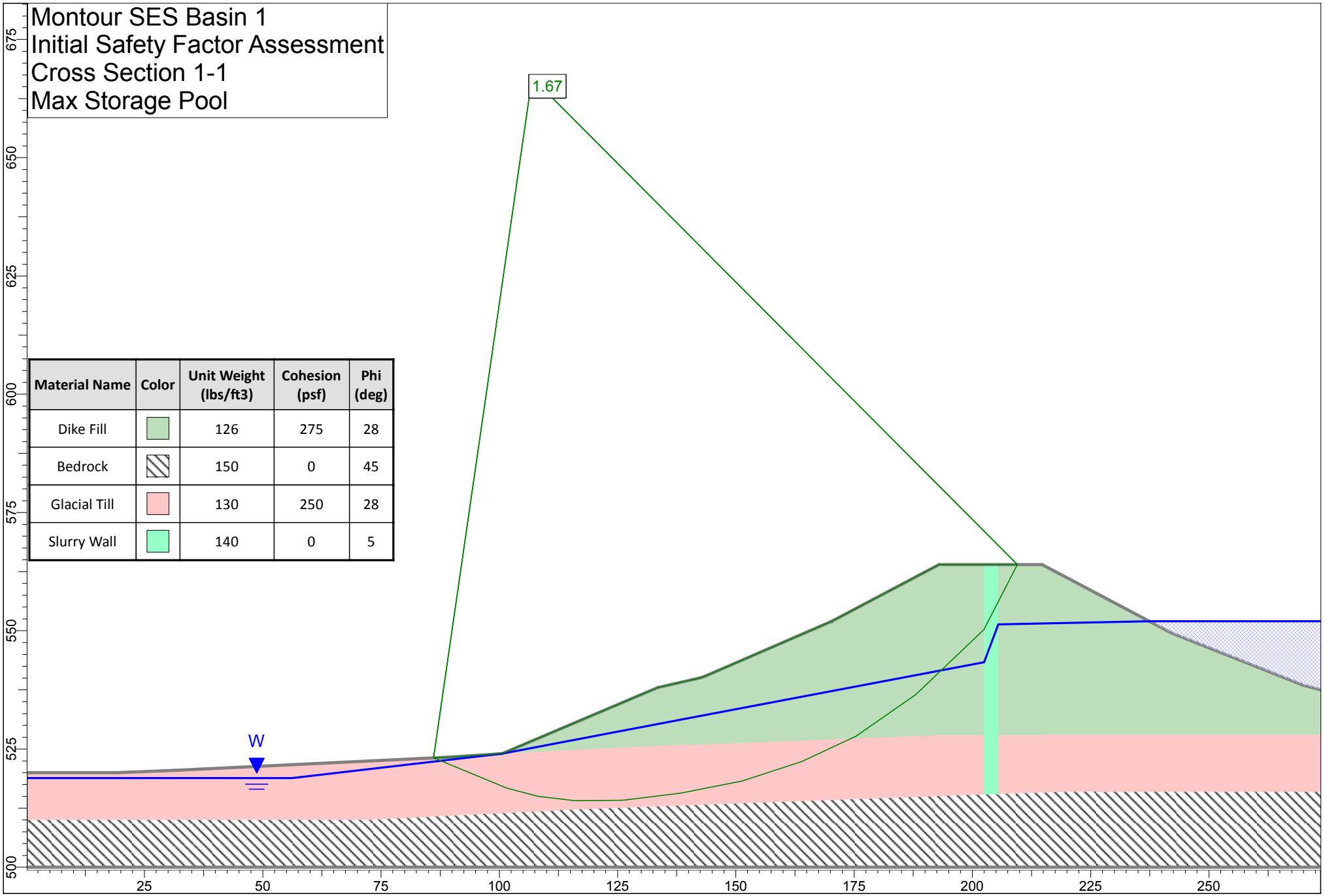
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTACHMENT E

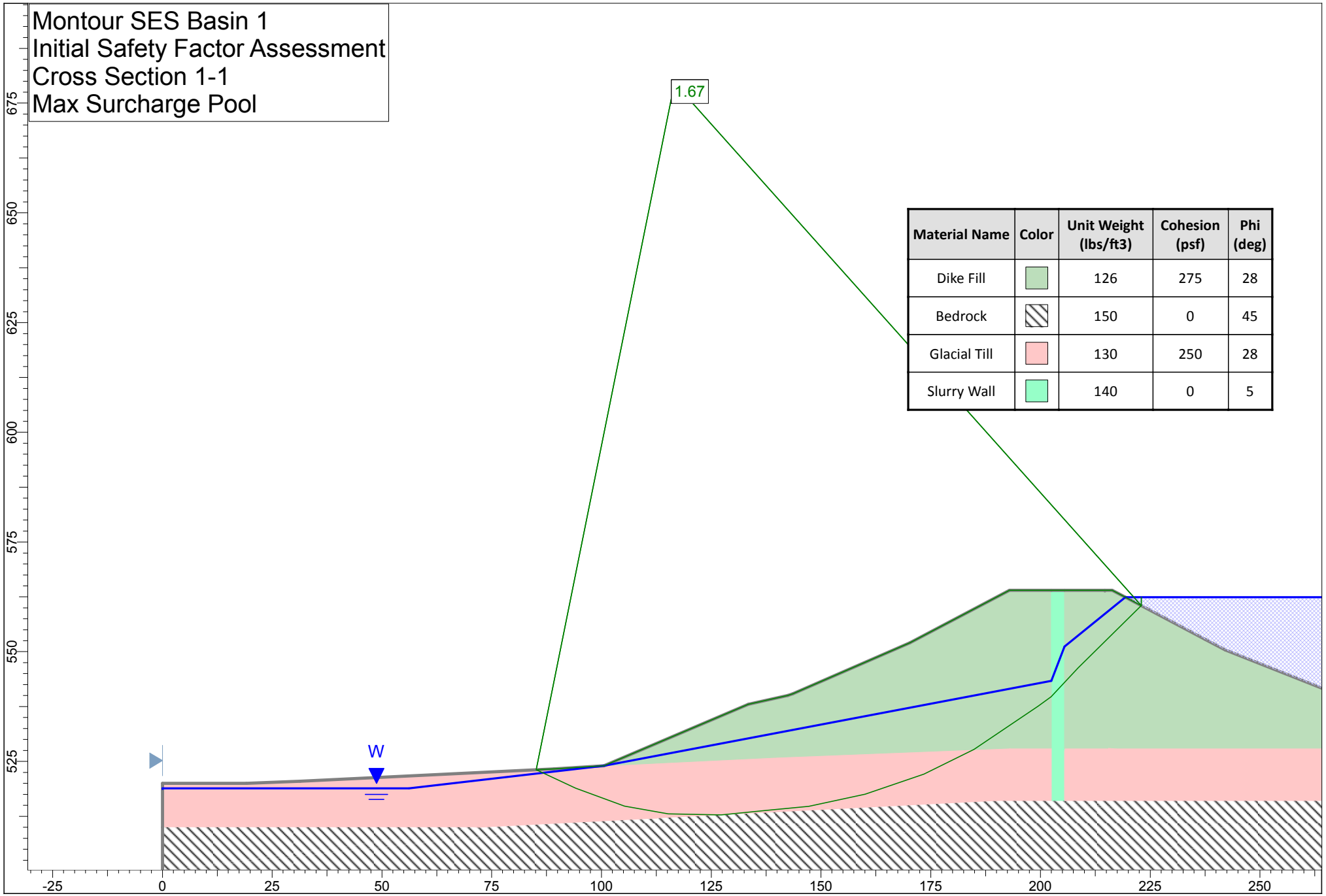
SLOPE STABILITY ANALYSIS OUTPUT

Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 1-1
Max Storage Pool



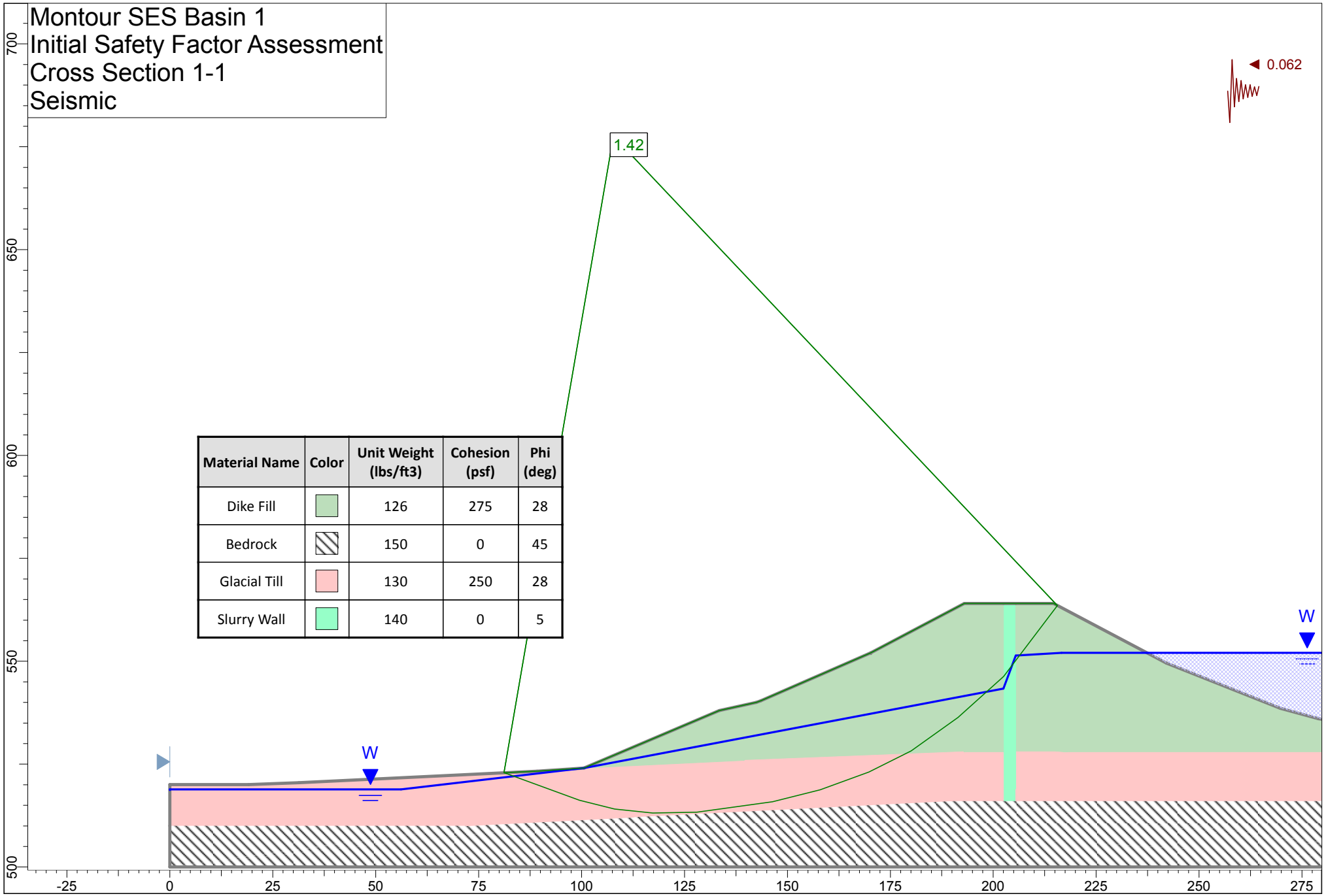
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Dike Fill		126	275	28
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 1-1
Max Surcharge Pool



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Dike Fill		126	275	28
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

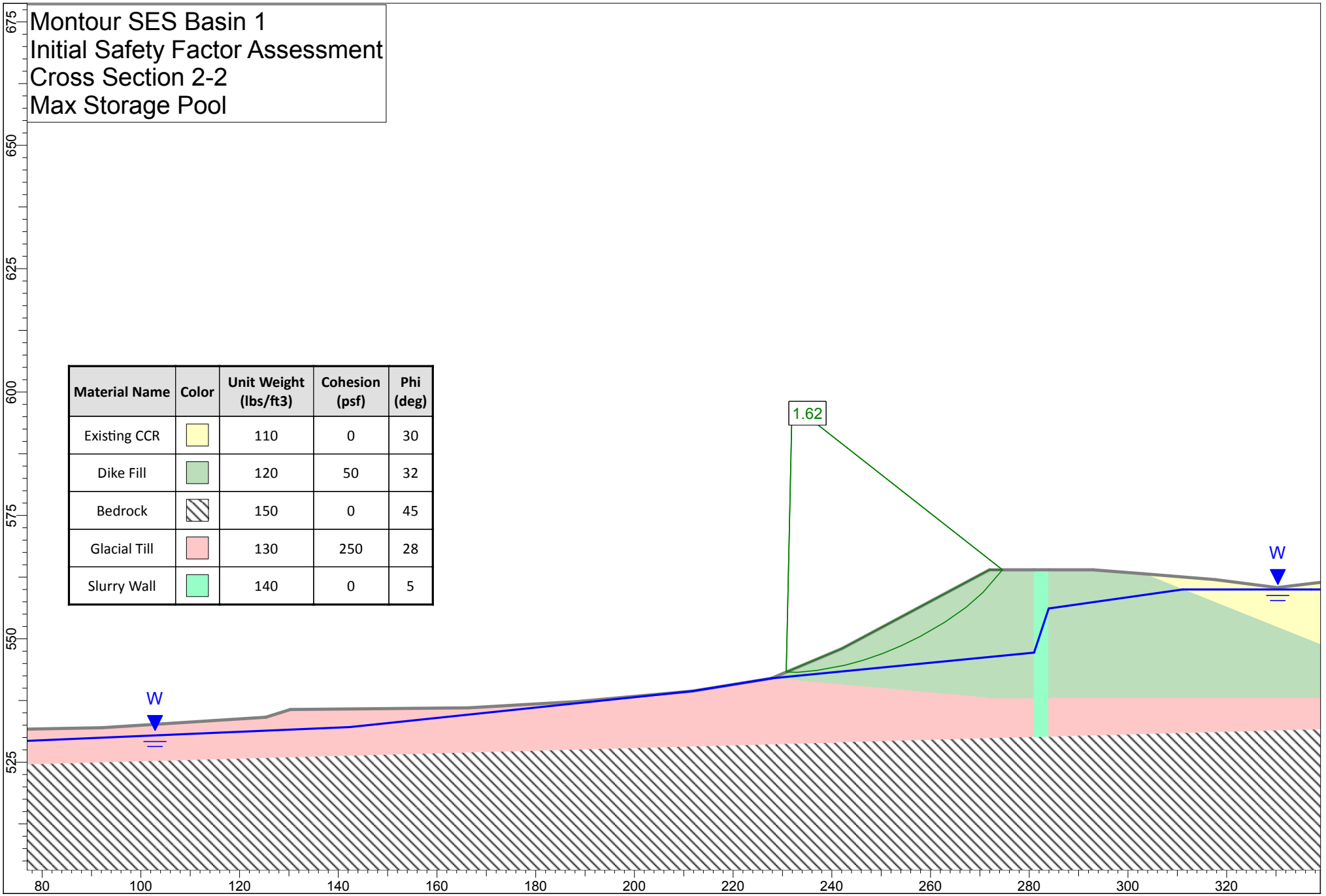
Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 1-1
Seismic



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Dike Fill		126	275	28
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

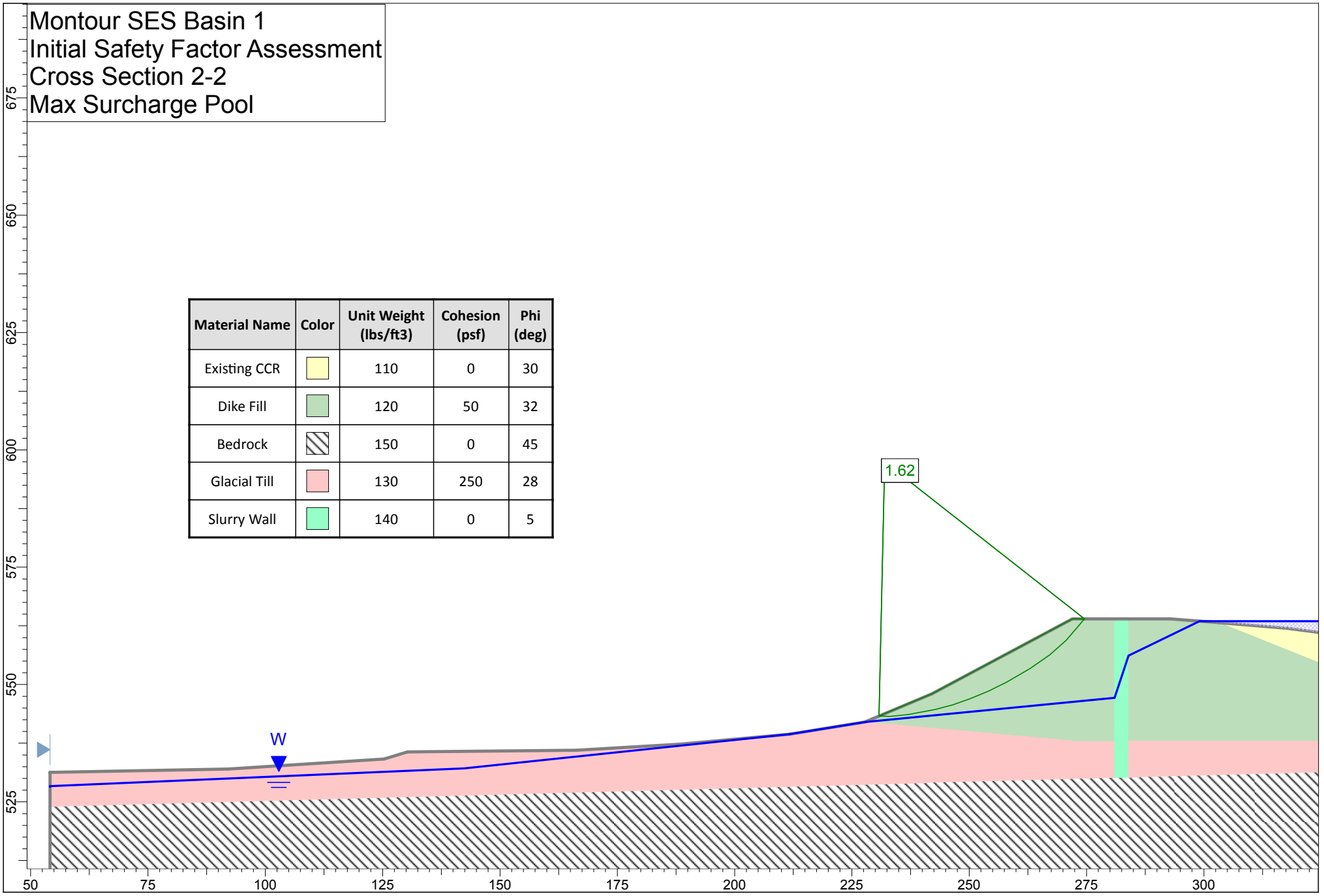
Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 2-2
Max Storage Pool

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

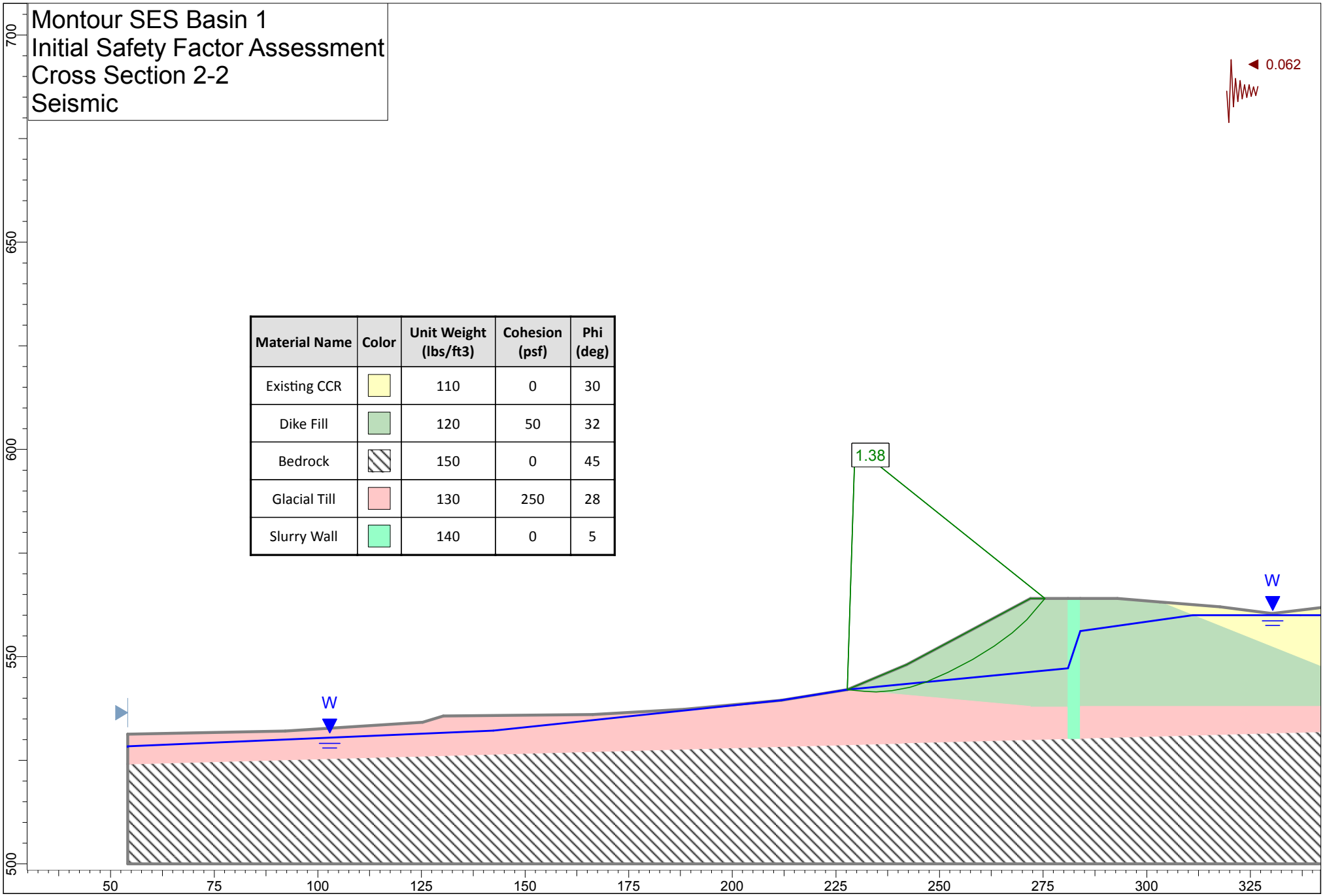


Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 2-2
Max Surcharge Pool

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

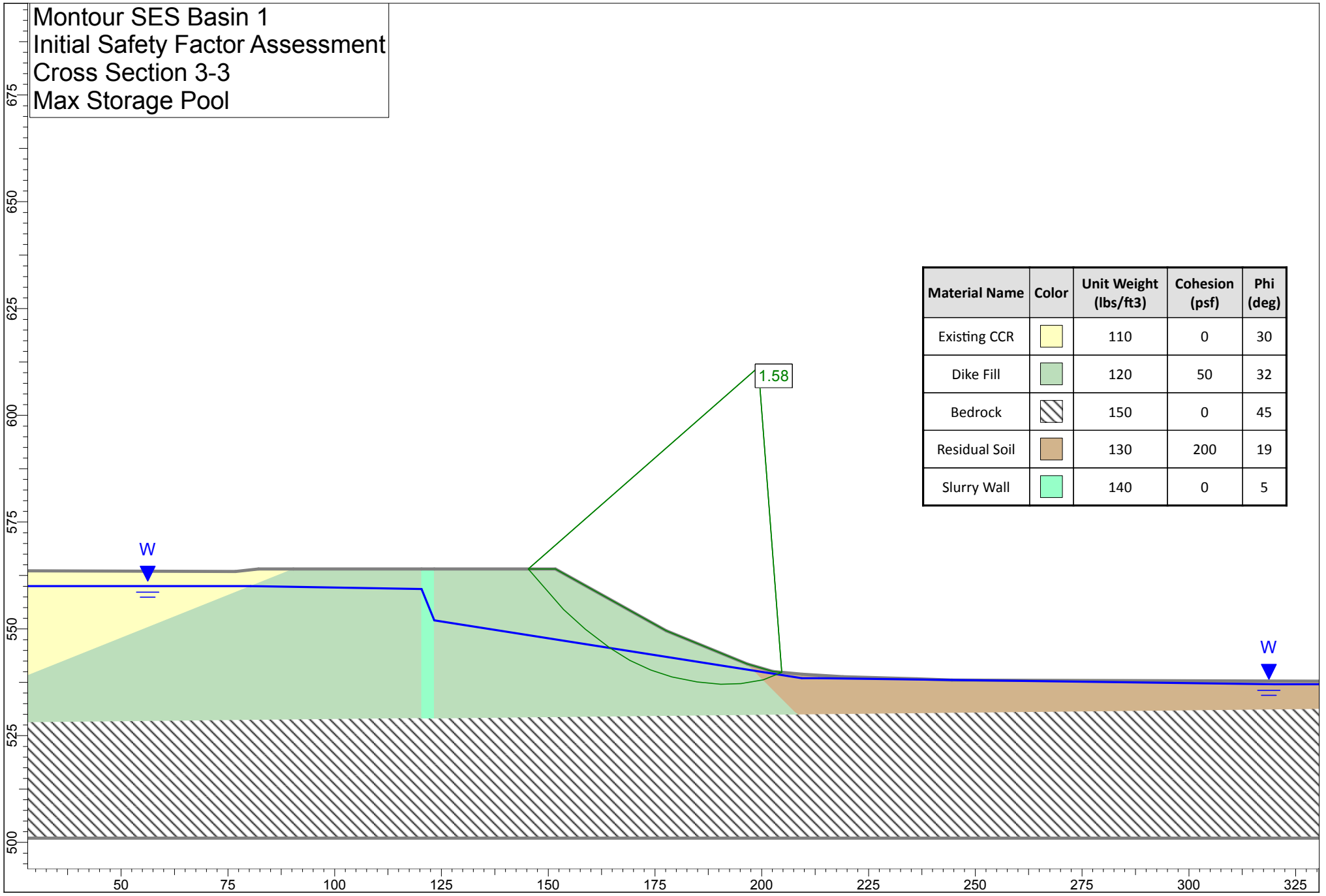


Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 2-2
Seismic



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Glacial Till		130	250	28
Slurry Wall		140	0	5

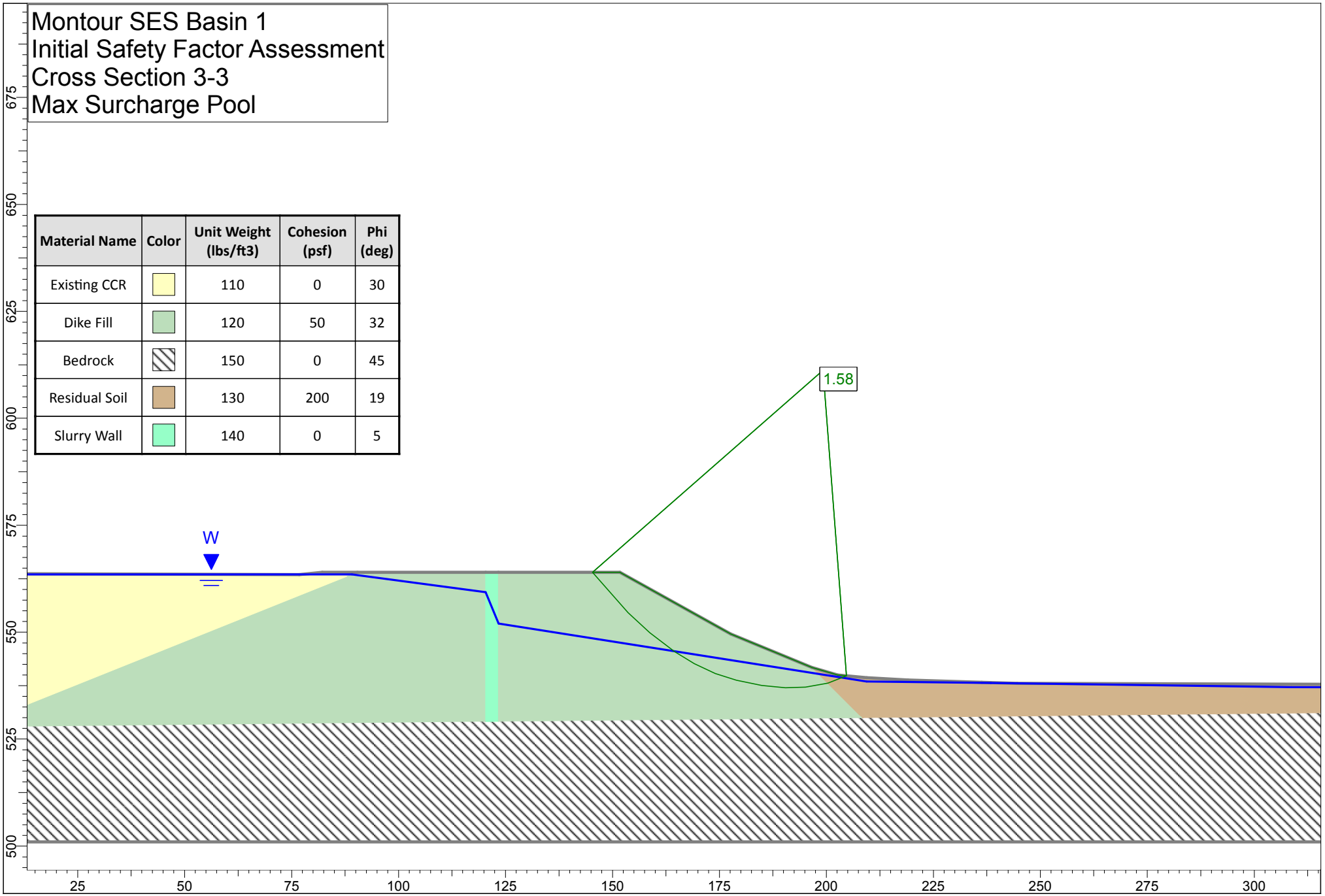
Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 3-3
Max Storage Pool

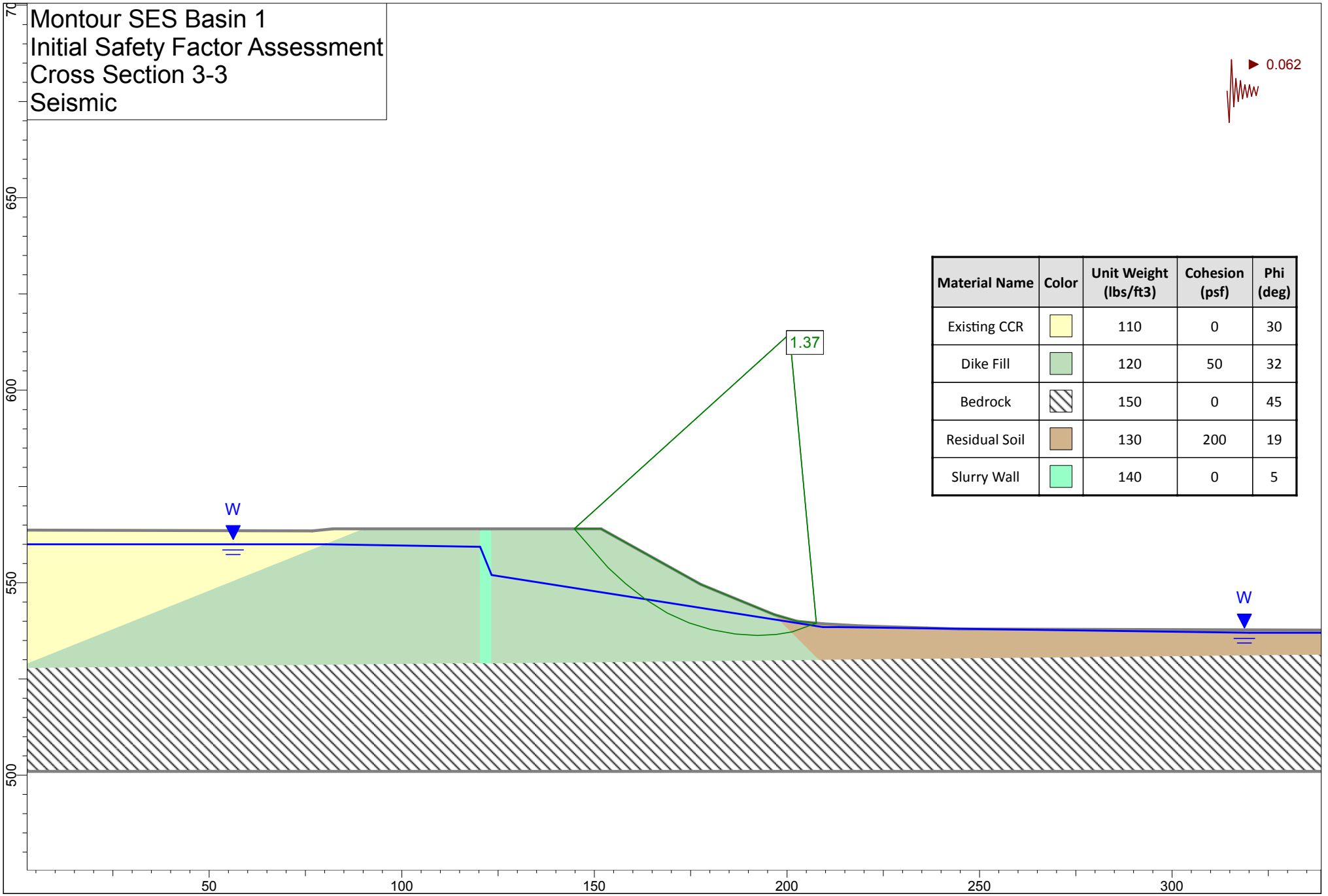


Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Residual Soil		130	200	19
Slurry Wall		140	0	5

Montour SES Basin 1
Initial Safety Factor Assessment
Cross Section 3-3
Max Surcharge Pool

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Residual Soil		130	200	19
Slurry Wall		140	0	5

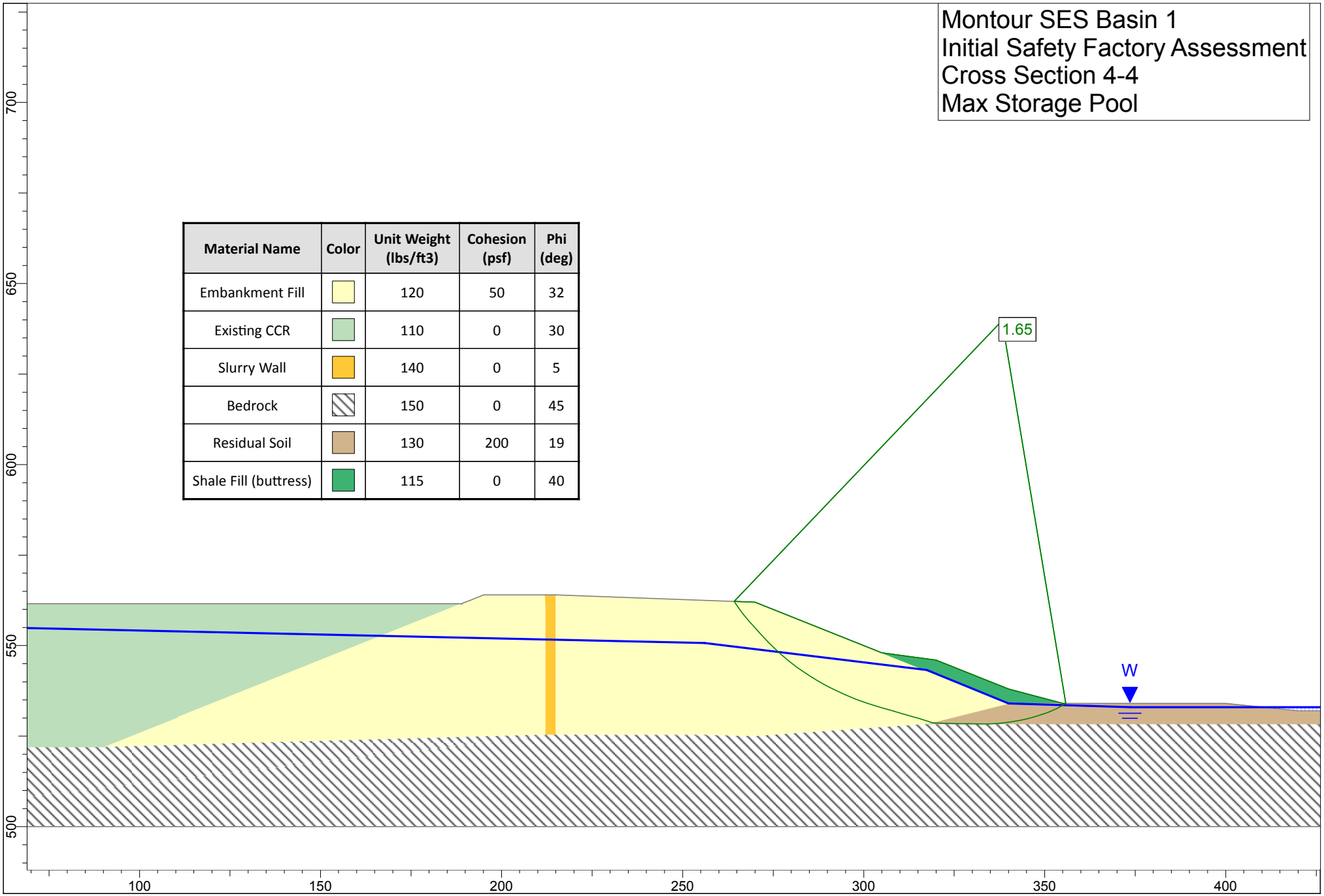




Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing CCR		110	0	30
Dike Fill		120	50	32
Bedrock		150	0	45
Residual Soil		130	200	19
Slurry Wall		140	0	5

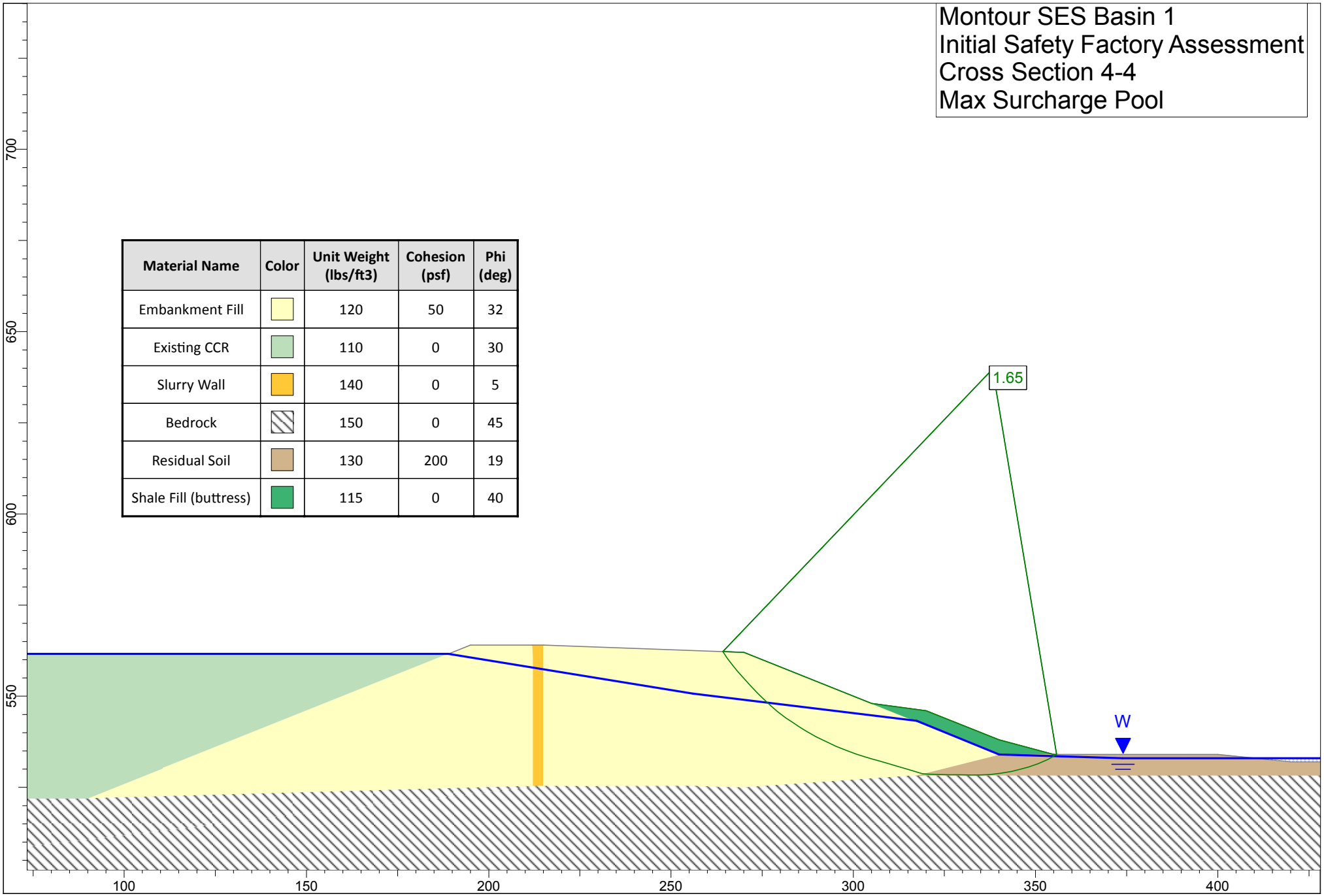
Montour SES Basin 1
Initial Safety Factory Assessment
Cross Section 4-4
Max Storage Pool

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Embankment Fill		120	50	32
Existing CCR		110	0	30
Slurry Wall		140	0	5
Bedrock		150	0	45
Residual Soil		130	200	19
Shale Fill (buttress)		115	0	40



Montour SES Basin 1
Initial Safety Factory Assessment
Cross Section 4-4
Max Surcharge Pool

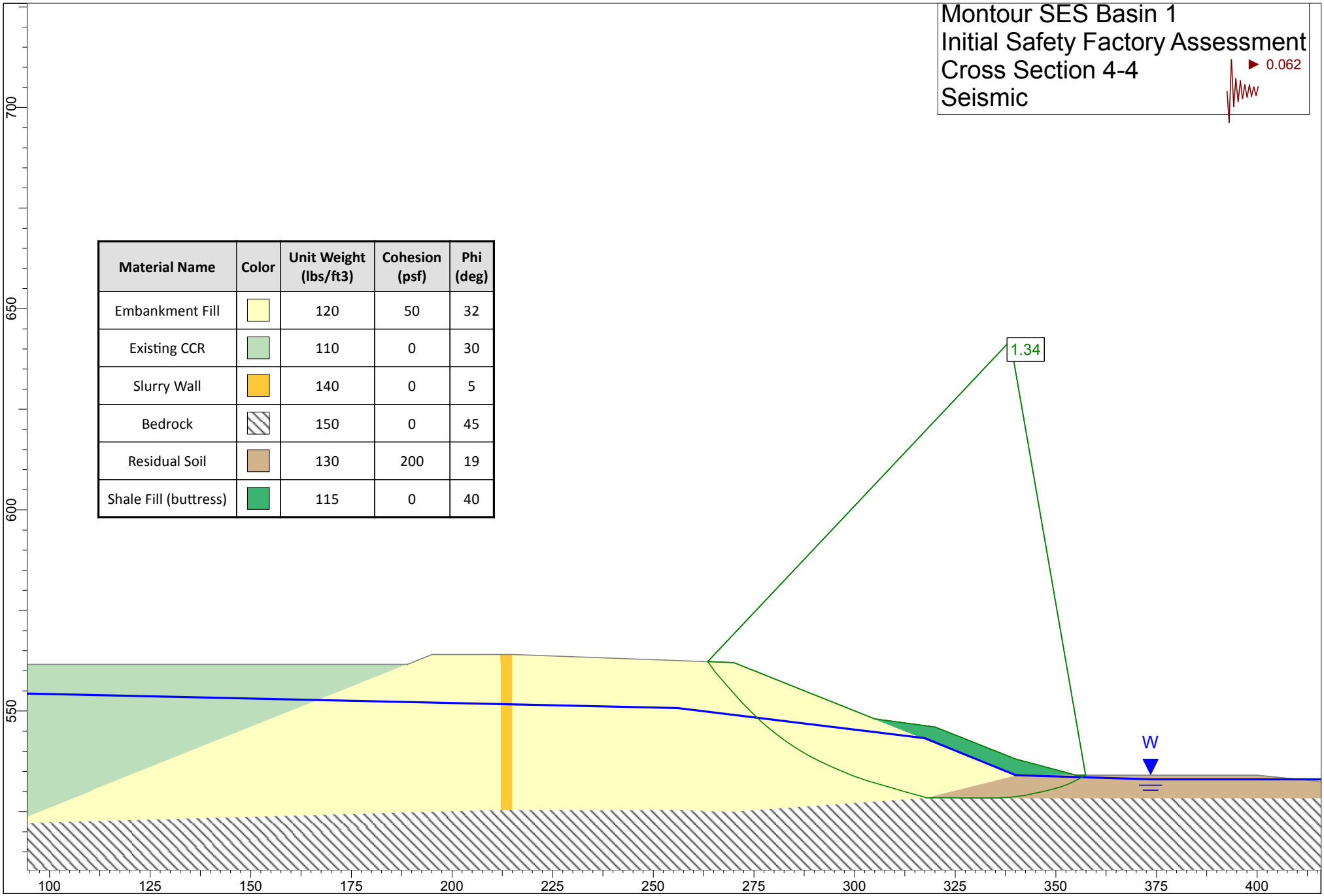
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Embankment Fill		120	50	32
Existing CCR		110	0	30
Slurry Wall		140	0	5
Bedrock		150	0	45
Residual Soil		130	200	19
Shale Fill (buttress)		115	0	40



Montour SES Basin 1
Initial Safety Factory Assessment
Cross Section 4-4
Seismic

0.062

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Embankment Fill		120	50	32
Existing CCR		110	0	30
Slurry Wall		140	0	5
Bedrock		150	0	45
Residual Soil		130	200	19
Shale Fill (buttress)		115	0	40



ATTACHMENT F

PREVIOUS INVESTIGATIONS AND ANALYSES

Environmental Consultants
804 Salem Woods Drive, Suite 201B, Raleigh, NC 27615-3343
Phone (919) 844-9890 Fax (919) 844-0917 Cell/VM (408) 892-3233
Web site: www.ishincusa.com Email: ishwar@ishincusa.com
Alternative Email: ishinc@earthlink.net

May 18, 2007 (via Federal Express)

Mr. John Cincilla, P.E.
PPL Generation, LLC
Two North Ninth Street (GENPL6)
Allentown, PA 18101-1179

Dear Sir John:

Ish Inc. is pleased to submit the final report containing the Slope Stability Analysis performed for Ash Basin 1 at the Montour Steam Electric Station. Key Environmental Inc. was instrumental in carrying out the engineering analysis work as integral part of the Ish Inc. team. We have submitted four copies of the printed version of this report for your use and for internal distribution. We will be sending two additional copies on Monday that will be stamped by our Pennsylvania P.E. for submittal to regulatory agencies if you need to do so. I will be sending to you a CD containing the PDF file of this complete report soon as an electronic deliverable for the work performed. If you need additional printed copies, I will be most happy to print and send them to you as quickly as possible.

It has been our pleasure to serve PPL and you on this project. We are now focusing our attention next to develop the engineering design documents for the construction of the buttresses in the two areas using shale as the media.

If you have any questions on this report, please feel free to contact me on my mobile phone at 408-892-3233.

Sincerely,

Ishwar P. Murarka, Ph.D.
Executive Scientist and President
Ish Inc.

Encl: Report of Slope Stability Analysis for Montour Basin 1 (four copies)

xc: Al Briggs, Key Environmental (one copy)

REPORT ON SLOPE STABILITY ANALYSIS PERFORMED FOR ASH BASIN 1 AT THE MONTOUR STEAM ELECTRIC STATION

Prepared for:

Montour Steam Electric Station
Washingtonville, PA

Prepared by:

Key Environmental, Inc.
Pittsburgh, PA

And

Ish Inc.
Raleigh, NC

May 2007

Professional Engineer Certification

This report presents a summary of work performed in association with slope stability analyses performed for two areas of the Ash Basin 1, located at the Pennsylvania Power and Light Montour Steam Electric Station in Washingtonville, Pennsylvania.

I, Alan E. Briggs, a Professional Engineer registered in the Commonwealth of Pennsylvania, certify that based on my review and involvement in the project work and to the best of my knowledge and belief, the report referenced above properly presents the components of slope stability analyses performed to develop the recommendations for abatement of the two areas evaluated.

Alan E. Briggs, P.E.
Pennsylvania License No. 24GE03878500
Key Environmental, Inc.

5/18/07
Date

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

PPL had recently contracted with the Shaw consulting group to conduct an environmental risk evaluation of the Montour SES Basin 1. From that evaluation, a concern was identified for a potential failure of the berm on Ash Basin 1. The following is an excerpt from the Shaw findings:

> *There is evidence of saturated berm conditions in the drilling logs generated from the water quality assessments along the south seep area and the MW1-6N area (east area). Figure 4 in assessment Report of Seeps on the South Side of Basin-1 at Montour Electric Station shows two zones of moist wet brown clay with bottom ash within the embankment outside of the slurry wall. Drill log for PZ-204 and PZ-205 used to construct Figure 4, show low blow counts in berm materials, especially the log for PZ-205 which shows very low blow counts, continuously from the surface to about 35 feet below surface. Other logs for borings along section in Figure 4 show moist to wet conditions in berm materials including PZ-201, PZ-207, SB-209, and SB-210, but not with low blow counts. Figure 4-3 in Assessment Report of the Water Quality Changes in Monitoring Well MW1-6 on the Eastside of Basin 1 at the Montour Steam Electric Station shows piezometer PZ-211 drilled outside of the slurry wall. The log for PZ-211 also shows moist to wet zones from 7 feet to about 32 feet from surface and extremely low blow counts through berm materials. This piezometer is screened across both berm material (labeled overburden) and weathered shale; therefore, it is uncertain whether the water level in PZ-211 (which is at the average elevation of basin water level) is representative of a confined condition in the weathered shale or a phreatic surface through the slurry wall. Another potential condition is that the berm is saturated from upward flow outside of the slurry wall.*

In response to this finding, PPL determined that a geotechnical evaluation of the berm conditions at the South Seep Area and at the MW1-6 Area be performed. PPL requested Ish Inc. to submit a proposal for the technical evaluation services deemed appropriate to accomplish the project goals. Ish Inc. formed a project team (Ish Inc. team) consisting of geotechnical engineers from Key Environmental, Inc., geologists/hydrogeologists from MTR, Inc., Professor William Wolfe of Ohio State University and an Ish Inc. scientist to perform the project work. Ish Inc. team has determined this evaluation should include collection of pertinent data to characterize the structural properties of the berm soils, definition of the water saturation conditions at the respective areas, and employing a computer model to calculate the safety factors for the berm slope stability under static and seismic conditions.

2.0 TECHNICAL APPROACH AND DATA COLLECTION ACTIVITIES

Provided below is a description of the technical approach used by the Ish Inc. team to evaluate slope stability at the Basin 1 berm, in the vicinity of piezometers PZ-205 and PZ-211. The approximate locations of these study areas are presented on Figure 1.

2.1 FRAMEWORK OF ANALYSIS

The software program PCSTABL5M (developed by Purdue University) was utilized to evaluate the stability of the slopes. In addition, the software program STEDWin (Version 2.79) by Annapolis Engineering Software was used as a visual interface for the Slope Stability Analysis Program identified above. The PCSTABL5M program evaluates slope stability by employing two-dimensional limiting equilibrium methods. A factor of safety against slope failure is calculated by dividing the sum of the calculated resisting moments by the sum of the calculated driving moments. Because the critical sliding surface is unknown, the program provides for the evaluation of numerous trial failure surfaces in a single "run" and the calculation of corresponding factors of safety for each. The most critical (i.e., lowest) factors of safety for each run are reported and the failure surfaces plotted. Multiple runs may be performed by the user, adjusting the "limits" of the trial failure surfaces to evaluate various locations and configurations, and thus determine the minimum factor of safety for the cross section of study.

The stability analysis for this particular application required the following input data:

- Stratigraphic information including geometric definition of the following layers:
    - Ground surface;
    - Bedrock;
    - Soft "Bank" material;
    - Fly ash or bottom ash;
    - Slurry wall; and,
    - Phreatic surface.
- Soil strength and unit weight parameters; and,
- Pseudo-static seismic coefficients.

Previous topographic surveys and geotechnical investigations were utilized to obtain a portion of the required input data. However, additional data was required to more completely characterize site stratigraphy in the areas of interest and to obtain representative soil samples from the berm for subsequent laboratory geotechnical analyses. Collection of this data is described in greater detail in Sections 2.2 and 2.3 of this report.

Minimum acceptable factors of safety were established based on prior regulatory requirements. The permit-specified regulatory design criteria for slope stability at maximum water elevation (two feet freeboard) for Basin 1 are (See Form 24R page 1 and attachment 2 of Form 24R):

- Static Conditions: 1.38
- Seismic (Dynamic) Conditions: 1.2

Under current regulatory requirements, these criteria are applied during the design phase of a project, to in part account for uncertainties regarding actual site conditions such as soil strength properties, location of the piezometric surface, etc. Conversely for an already completed project (such as Montour Basin 1), post-construction field measurements and testing reduce or eliminate many of the pre-design uncertainties, as follows:

- Actual topographic features were measured by field survey;
- Stratigraphic boundaries were determined through intrusive investigation;
- Soil properties were determined from geotechnical laboratory testing; and,
- The piezometric surface was measured through the installation of piezometers.

As such, alternative "minimum professionally acceptable" factors of safety may be applied to provide a more realistic assessment of slope stability for actual field conditions. PPL has requested this evaluation be completed using the more conservative "regulatory criteria".

2.2 SUBSURFACE INVESTIGATION

2.2.1 Drilling and Sampling

A total of eight piezometers were installed at the two investigation areas (PZ-205 and PZ-211) and include PZ-205A through PZ-205D and PZ-211A through PZ-211D (Figures 2 and 3). The "A" through "C" series piezometers were located outside the slurry wall, in close proximity to existing piezometers (PZ-205 and PZ 211), and screened at discrete and stratified depths ("A" designates the shallowest and "C" the deepest piezometers). The "D" series piezometers were located inboard of the slurry wall. Borings ST-205C and ST-211C were drilled to collect lithologic information and samples for geotechnical testing. Boring ST-205C was converted to a piezometer (PZ-205C) whereas ST-211C was abandoned (tremie grouted with cement bentonite) since "slough run-up" prevented piezometer installation. A new boring was completed to install piezometer PZ-211C.

The piezometer boreholes were drilled with 4¼ - inch inside diameter hollow stem augers. Borings ST-205C and ST-211C were advanced using continuous split spoon sampling methods. Four Shelby tube samples were collected from ST-205C (depth interval of 10 - 12, 16 - 18, 24 - 26, and 30 - 32 feet bgs) and ST-211C (8 - 10, 14 - 16, and 22 - 24 feet bgs). At some of the boring locations (PZ-205D, PZ-211B, PZ-211D) split spoon samples were collected on five-foot intervals to provide additional lithologic information. Lithologic information from previously installed piezometers PZ-205 and PZ-211 were used to direct the installation of PZ-205A and PZ-211A, whereas the first boring for PZ-211C that was logged and then abandoned, provided

the information to install the peizometer PZ-211C where additional split spoon sampling was not performed. Appendix A provides a copy of the boring logs.

The piezometers were constructed of 2-inch inside diameter (ID) schedule 40 PVC. The screen length for the "A" through "C" series piezometers was 5-foot and the "D" series piezometer screen length was 10 foot. The screen for PZ-211C was three foot long due to subsurface conditions encountered and installation sequence. Table 1 provides the screened intervals. A sand pack was placed around and above the screen, followed by a bentonite seal, and cement bentonite grout to ground surface. The piezometers were completed as stick-ups with protective risers (5- or ten foot depending on sand pack/bentonite seal height) and a concrete pad. Each piezometer was developed after installation was completed.

Groundwater levels were measured weekly in the PZ-205 and PZ-211 areas from September 15, 2006 through January 31, 2007. The groundwater level measurements and subsequent elevations are shown on Table 2.

2.2.2 Subsurface and Groundwater Conditions

Lithologically, the PZ-205 and PZ-211 areas outside the slurry wall consist of unconsolidated sediments overlying consolidated bedrock (Marcellus). The general stratigraphic sequence includes soft clay with varying amounts of silt, shale fragments and some ash grading into stiffer clay, transitioning to weathered bedrock then consolidated shale of the Marcellus formation. Figures 4 through 7 show the stratigraphy in the area. Inside the slurry wall, PZ-205 encountered some ash near surface then similar units as described above though the soft clay unit was thinner and stiff clay found shallower. A similar observation was also noted in the PZ-211 area except a greater thickness of ash was noted and is expected since this piezometer is likely located near the edge of filled (Stabil-Fil) Basin 1.

The piezometer screened intervals and groundwater elevations from September and October are also shown on Figures 4 through 7. In the PZ-205 area similar groundwater elevations are noted between PZ-205A and PZ-205D, whereas, PZ-205B and PZ-205C elevations are lower. The groundwater elevations from PZ-211 through PZ-211C located outside the slurry wall were lower than PZ-211D, which is located inside the slurry wall.

2.3 GEOTECHNICAL LABORATORY ANALYSES

Representative undisturbed (i.e., Shelby tube) and composite bulk soil samples were delivered to Geotechnics Laboratory in East Pittsburgh, Pennsylvania for subsequent geotechnical analyses.

Laboratory tests included the following:

- Natural moisture content and unit weight;
- Triaxial shear strength testing;
- Unconfined compression testing;
- Atterberg limits;

- Grain size distribution;
- Specific gravity; and,
- Moisture/density relationships.

The results of these tests are summarized on Table 3, and detailed laboratory test results are provided in Appendix B. These results were used to establish input data for the slope stability analyses as described below.

3.0 STABILITY ANALYSES RESULTS

Cross sections depicting the ground surface, bedrock, soft and saturated bank material, ash, and slurry wall surfaces/interfaces were developed for both the PZ 205 and PZ-211 areas identified above. The assumed phreatic surface was established based upon periodic measurements during the fall of 2006 of the piezometric surface in piezometers installed during the aforementioned subsurface investigation program. Surface/interface data was converted to "X/Y" coordinates and entered into the STEDWin program. The input geometry for the PZ-205 and PZ-211 areas is depicted on Figures 8 and 9 of this report, respectively.

Soil strength and unit weight parameters for the embankment material were selected based upon the results of the geotechnical testing of undisturbed samples collected during drilling operations conducted in August 2006. Based upon this testing an angle of internal friction of 32 degrees and a cohesion intercept of 0 psf was selected for the soft, saturated embankment material.

Strength and unit weight parameters for the fly ash and bottom ash material deposited inside of the ash basins were selected based upon additional data provided by PPL Generation and obtained from the "User Guidelines for Waste and Byproduct Materials in Pavement Construction" by the Turner-Fairbank Highway Research Center (Federal Highway Administration). The properties of the slurry wall constructed within the embankment were selected based on knowledge of similar installations. Slope failures extending into the underlying bedrock stratum were not anticipated; therefore strength and unit weight parameters were assigned for this material that would restrict the failure surfaces to the embankment materials, fly or bottom ash, and/or the slurry wall materials. Table 4 provides a summary of the strength and unit weight parameters utilized in the analyses.

For the purposes of seismic evaluations, pseudo-static seismic coefficients for the Basin 1 location were determined by using the "1994 Uniform Building Code zone map" (See Page 1 in Appendix C). This map was selected because it presented data in effect when the impoundment was re-permitted. A horizontal coefficient of 0.075 was used for the evaluation (rounded to 0.08 within the STEDWin program).

The results of slope stability analyses for existing conditions in the area of PZ-205 or PZ-211 are summarized in Table 5. Both circular (Runs A through C) and block-type (Run D) failures were evaluated for static conditions; only circular-type failures were evaluated for seismic conditions, in the same general locations found to be most critical for static conditions. Extremely shallow failure surfaces were found to be most critical (Run A) for the PZ-211 area, however, these results were not considered representative of the most critical conditions due to their slough-like failure mode (in fact, existing vegetation on the face of the berm likely provides much greater surficial slope stability than was represented in the numerical analyses).

Results of the individual slope stability analyses are provided in Appendix C. A total of 12,500 trial surfaces were generated for each run, and each of the runs varies only in the location of the initiation and termination limits specified to control the boundaries of the program search. The

initiation and termination limits on the output plots presented in Appendix C are indicated by yellow dots and two red dots, respectively.

The lowest factors of safety for each location are graphically depicted on Figures 10 and 11, and were compared to the regulatory criteria defined in Section 2.1 of this report. The results of this comparison are presented in Table 6. For the PZ-211 area, the regulatory criteria were met or exceeded for static conditions but not for seismic conditions; for the PZ- 205 area, the regulatory criteria were not met for either static or seismic conditions. Therefore, at a minimum, abatement action to improve overall slope stability in both locations appears warranted.

4.0 ASSESSMENT OF POTENTIAL UPGRADES

Additional slope stability analyses were conducted to assess potential methods for upgrade of the embankment system to achieve more acceptable stability conditions. The upgrade alternatives included the following:

- Installation of a "toe drain" collection system at the toe of the embankment;
- Installation of a "mid-slope" subsurface drain within the embankment;
- Provision for natural lowering of the phreatic surface in response to filling of the basin with low permeability material and the attendant reduction in surface ponding; and,
- Emplacement of a slope "buttress" on the lower portion of the embankment face, increasing the force resisting a rotational-type slope stability failure.

These analyses were performed for both the PZ 205 and PZ 211 locations. A summary of the results of these analyses are presented on Table 6, and more a detailed assessment of each alternative is provided below.

4.1 TOE DRAIN COLLECTION SYSTEM

A toe drain collection system would be comprised of a perforated pipe within a coarse aggregate collection zone, installed near the toe of the existing embankment. Collected seepage would be directed by gravity flow within the pipe to extraction points (i.e., collection sumps/pump stations or similar appurtenances) for removal from the system. Slope stability analyses for this alternative demonstrated the impact on the phreatic surface at either PZ 205 or PZ 211 would be insufficient to affect an increase in the factors of safety to acceptable values (see Figures 12 and 13). As such, this alternative was judged to be unacceptable.

4.2 MID-SLOPE SUBSURFACE DRAIN

A mid-slope subsurface drain would also be comprised of a perforated pipe within a coarse aggregate collection zone; however, the drain would be located inward (i.e., closer to the slurry wall) from the toe of slope and would result in a much deeper trench excavation depth. Slope stability analyses for this alternative demonstrated that the trench depth would need to be at least 11.5 feet at PZ 205 area and at least 8.5 feet at PZ 211 area (see Figures 14 and 15). Excavation to these depths within the embankment could further compromise slope stability conditions while the excavation is open, therefore costly measures for temporary bracing would likely be required during construction operations. Therefore, this alternative was removed from further consideration due to both cost and risk considerations.

4.3 PHREATIC SURFACE DEPRESSION

This approach is predicated on the response of the phreatic surface within the embankment to filling operations within the basin. As the basin is filled with low permeability materials (currently underway) and standing water is displaced/precluded from the surface of the basin,

infiltration should be reduced and the phreatic surface depressed. Slope stability analyses for this alternative demonstrated the minimum required drop of the phreatic surface at PZ 205 is 8.5 feet (see Figure 16). Based upon the minimal fluctuation of the phreatic surface observed during routine monitoring events conducted this past year, it appears that a very long time would be required to achieve the required drop in the phreatic surface. In addition, it is possible long-term, steady-state conditions for the phreatic surface may be attained at an elevation that is insufficient to achieve the required factors of safety. At PZ 211, depression of the phreatic surface (alone) will not increase the critical factor of safety for seismic conditions above 1.1 because the corresponding failure surface no longer lies within the water table zone (see Figure 17). Therefore, phreatic surface depression due to filling of the basin will not readily achieve the required factors of safety at PZ 205 and is not expected to achieve them for PZ 211 regardless of the magnitude of depression. This alternative was removed from further consideration due to apparent infeasibility.

4.4 SLOPE BUTTRESSING

A slope buttress would be comprised of a layer of fill material placed on the lower portion of the slope to provide additional resistance to rotational failure. Slope stability analyses were iteratively performed to determine the material type, thickness and extent of slope buttressing necessary to achieve the required factors of safety. Results from initial analyses demonstrated the required fill volumes were not excessive; therefore additional analyses were conducted to further refine this alternative. In addition, a supplemental site reconnaissance was completed in April 2007 to better define topographic conditions for the embankment near PZ-205, to complete a more precise evaluation. Further development of the slope buttressing configurations for the PZ 205 and PZ 211 areas are discussed in the following sections.

PZ 205 Area Slope Buttressing:

For the PZ 205 area the slope stability analyses were iteratively performed utilizing four basic geometries and two different material types to determine the final configuration of slope buttressing necessary to achieve the minimum required factors of safety. Safe access to a regularly sampled groundwater monitoring well within the anticipated slope buttressing area and minimizing disruption to the adjacent rail line were determined to be key constraints influencing any slope buttressing configuration. Four (4) basic buttressing concepts were initially evaluated: 1) backfilling of the existing drainage ditch and placement of additional fill material to achieve a relatively shallow embankment slope; 2) placement of fill materials on the existing slope bench with a 2 horizontal to 1 vertical (2H:1V) outside slope, and providing access to the monitoring well via stairs and a platform on the face of the improved slope; 3) placement of fill materials in a two-terraced approach that would provide access to the monitoring well via the lower terrace; and, 4) placement of fill materials beginning at the toe of the existing slope (i.e., at the edge of the existing drainage ditch) and extending this fill material upward at a 2H:1V slope to a new bench, and providing access to the monitoring well via a platform extending from the newly constructed bench. Each of these configurations was evaluated utilizing estimated geotechnical properties corresponding to shale fill (available from an on site source) and limestone aggregate (obtained from offsite sources). The specific configurations required to meet the minimum factors of safety for each concept were then determined.

After evaluation and comparison of the various buttressing options, it was concluded that the aforementioned fourth option was the preferred approach to meeting the minimum factors of safety for slope stability. In addition, the use of shale to construct the buttress was determined to be the more economical option than using limestone aggregate. The required shale fill buttress (see Figure 18) has a maximum thickness of roughly eight (8) feet with a maximum width (i.e., North-South extent) of about 65 feet. Based on the hydrogeological and geotechnical data available for the area from previous investigations, we have estimated a proposed buttress length of about 450 feet in the East-West direction for the PZ 205 area. Therefore, approximately 30,000 square feet of surface area will be targeted for buttressing to achieve the slope stability results meeting the regulatory criteria. The resultant fill volume will be approximately 3,800 cubic yards. A modest structural platform will be required to "bridge" the area between the edge of the bench and the extended PZ 107D piezometer casing (see Figure 19).

PZ 211 Area Slope Buttressing:

Due to the lack of site constraints in the PZ 211 area, the development of a slope buttress for this area was much less involved than the PZ 205 area. The slope buttress for the PZ 211 area consists of placement of shale fill materials on the lower portion of the slope to provide additional resistance to rotational failure. Slope stability analyses were iteratively performed to determine the thickness and extent of fill buttressing required achieving the regulatory factors of safety. Based on economic findings associated with the PZ-205 area, only shale fill was evaluated as a buttressing material. The resultant shale buttress (see Figures 20 and 21) is modest in size, with a maximum thickness of about two (2) feet and a maximum width of about 37 feet. Based on the hydrogeological and geotechnical data available for the area from previous investigations, we have estimated a proposed buttress length of about 100 feet in the East-West direction for the PZ 211 area. Therefore, approximately 3,700 square feet of surface area will be targeted for buttressing to achieve the slope stability results meeting the regulatory criteria. The resultant fill volume will be approximately 200 cubic yards.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Engineering judgment based acceptability criteria applied to the results of the slope stability analyses led us to conclude that the likelihood of an imminent slope stability failure in the area of PZ-205 or PZ-211 under static conditions is very limited and unlikely in the near term. In addition, considering the configuration of the most critical failure surfaces, and that should slope failure occur, it would mobilize relatively little material within the sliding mass, and would extend only to a limited distance into the basin itself. Materials contained within the basin and adjacent to the inside slope of the basin berm in the study areas are generally solid/stable (versus liquid) in character; thus it is unlikely a "flow-type" release of this material would occur during a slope failure of the basin embankment. Finally, it is projected that the current sub-basin A filling operations by PPL will be completed in about two years (i.e. end of 2008), resulting in improved strength within the basin thereafter. In conclusion, the risks associated with a slope stability failure are professionally judged to be relatively small for the South side (PZ 205 area) and the East side (PZ 211 area) of the Montour Basin 1.

Because the factors of safety in the either area do not fully achieve applicable regulatory criteria, we conclude that abatement measures to upgrade the slopes may be warranted. Supplemental slope stability analyses demonstrated that an additional surcharge load (i.e., shale fill buttress as shown in Figures 18 and 20) placed on the lower outside face of the basin berm should provide sufficient resisting force to increase the factor of safety to meet the regulatory criteria. Although other abatement measures were considered and evaluated, these other alternatives were judged to be either impractical or not cost-effective.

We therefore, recommend that PPL buttress the slopes by using the shale material, which is readily available on the site, as shown in Figure 18 for PZ 205 area and as shown in Figure 20 for the PZ 211 area. Approximately 30,000 square feet of surface area will be targeted for buttressing in the PZ 205 area and an additional 3,700 square feet of surface area will be targeted for buttressing in the PZ 211 area to achieve the slope stability results meeting the regulatory criteria.

Ish Inc. further recommends that construction design details be developed to implement the buttressing plans of the slopes in the areas of PZ 205 and PZ 211, in the areas depicted on Figure 22, to meet the regulatory criteria for static and seismic safety factors for Montour Ash Basin.

TABLES

Table 1

Piezometer Screened Intervals and Bottom Elevations
PZ-205 and PZ-211 Areas

PPL Montour, LLC
Montour, PA

PZ-205 Area Piezometers					
Piezometer Identification	Ground Elevation (feet MSL)(1)	Screened Interval (feet bgs) (2)	Depth to Bottom of Piezometer (feet bgs)	Piezometer Bottom Elevation (feet MSL)	Notes
PZ-205A	563.19	7.9 - 12.9	12.9	550.29	Located outside slurry wall, 5-foot screen
PZ-205B	563.15	17.8 - 22.8	22.8	540.35	Located outside slurry wall, 5-foot screen
PZ-205C	563.05	28.0 - 33.0	33.0	530.05	Located outside slurry wall, 5-foot screen
PZ-205D	563.75	9.5 - 19.5	19.5	544.25	Located inside slurry wall, 10 foot screen

PZ-211 Area Piezometers					
Piezometer Identification	Ground Elevation (feet MSL)	Screened Interval (feet bgs)	Depth to Bottom of Piezometer (feet bgs)	Piezometer Bottom Elevation (feet MSL)	Notes
PZ-211A	564.48	9.7 - 14.7	14.7	549.78	Located outside slurry wall, 5-foot screen
PZ-211B	564.48	17.9 - 22.9	22.9	541.58	Located outside slurry wall, 5-foot screen
PZ-211C	564.47	24.8 - 27.8	27.8	536.67	Located outside slurry wall, 3-foot screen
PZ-211D	563.99	9.8 - 19.8	19.8	544.19	Located inside slurry wall, 10 foot screen

Notes:
(1) elevations are assumed to be referenced to mean sea level.
(2) bgs below ground surface.

Table 2
Weekly Depth to Groundwater Measurements and Elevations

PPL Montour, LLC
Montour, PA

September 2006							
		September 15		September 22		September 29	
Identification	Top of Casing Elevation (feet MSL) [1]	Depth to Groundwater (feet btoc)[2]	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)
PZ-205 Area							
MW 1-10	565.50	12.67	552.83	12.79	552.71	12.61	552.89
PZ-110	543.45	NM [3]	NM	7.37	536.08	7.24	536.21
PZ-205	565.72	15.08	550.64	14.95	550.77	15.01	550.71
PZ-205A	565.29	4.70	560.59	4.68	560.61	4.60	560.69
PZ-205B	565.57	10.41	555.16	10.49	555.08	10.10	555.47
PZ-205C	564.84	15.75	549.09	14.82	550.02	14.77	550.07
PZ-205D	566.72	6.00	560.72	5.88	560.84	5.81	560.91
PZ-211 Area							
PZ-21	550.17	NM	NM	0.70	549.47	0.61	549.56
PZ-211	567.13	13.52	553.61	13.71	553.42	13.56	553.57
PZ-211A	566.77	13.92	552.85	14.10	552.67	13.94	552.83
PZ-211B	566.88	14.65	552.23	13.54	553.34	13.41	553.47
PZ-211C	567.10	12.59	554.51	12.54	554.56	12.48	554.62
PZ-211D	566.39	6.13	560.26	6.41	559.98	6.18	560.21

October 2006									
		October 6		October 13		October 20		October 27	
Identification	Top of Casing Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)
PZ-205 Area									
MW 1-10	565.50	12.79	552.71	12.96	552.54	12.71	552.79	12.78	552.72
PZ-110	543.45	7.39	536.06	7.54	535.91	7.41	536.04	7.57	535.88
PZ-205	565.72	14.92	550.80	15.02	550.70	14.92	550.80	14.91	550.81
PZ-205A	565.29	4.52	560.77	4.71	560.58	4.70	560.59	4.56	560.73
PZ-205B	565.57	10.42	555.15	9.88	555.69	9.81	555.76	10.33	555.24
PZ-205C	564.84	14.25	550.59	13.93	550.91	13.88	550.96	13.65	551.19
PZ-205D	566.72	5.82	560.90	6.06	560.66	5.98	560.74	5.79	560.93
PZ-211 Area									
PZ-21	550.17	0.60	549.57	0.55	549.62	0.10	550.07	0.60	549.57
PZ-211	567.13	13.50	553.63	13.54	553.59	13.31	553.82	13.50	553.63
PZ-211A	566.77	14.17	552.60	13.92	552.85	13.62	553.15	14.11	552.66
PZ-211B	566.88	13.04	553.84	12.76	554.12	12.48	554.40	12.95	553.93
PZ-211C	567.10	12.42	554.68	12.20	554.90	12.12	554.98	12.32	554.78
PZ-211D	566.39	5.50	560.89	6.09	560.30	5.89	560.50	6.19	560.20

November 2006							
		November 3		November 13		November 21	
Identification	Top of Casing Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)
PZ-205 Area							
MW 1-10	565.50	12.72	552.78	12.71	552.79	12.70	552.80
PZ-110	543.45	7.51	535.94	7.58	535.87	7.61	535.84
PZ-205	565.72	14.91	550.81	14.81	550.91	14.92	550.80
PZ-205A	565.29	4.52	560.77	3.75	561.54	3.78	561.51
PZ-205B	565.57	9.91	555.66	9.91	555.66	10.01	555.56
PZ-205C	564.84	13.71	551.13	13.46	551.38	13.81	551.03
PZ-205D	566.72	5.81	560.91	5.49	561.23	5.52	561.20
PZ-211 Area							
PZ-21	550.17	0.40	549.77	0.52	549.65	0.48	549.69
PZ-211	567.13	13.34	553.79	13.20	553.93	13.25	553.88
PZ-211A	566.77	13.81	552.96	14.08	552.69	13.98	552.79
PZ-211B	566.88	12.76	554.12	13.09	553.79	13.62	553.26
PZ-211C	567.10	12.14	554.96	12.02	555.08	12.38	554.72
PZ-211D	566.39	6.01	560.38	5.38	561.01	5.41	560.98

Notes: (1) Reference elevation assumed to be mean sea level (3) Not Measured
(2) btoc - below top of casing

Table 2 - Continued
Weekly Depth to Groundwater Measurements and Elevations

PPL Montour, LLC
Montour, PA

December 2006							
		December 5		December 14		December 27	
Identification	Top of Casing Elevation (feet MSL) [1]	Depth to Groundwater (feet btoc)[2]	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)
PZ-205 Area							
MW 1-10	565.50	12.64	552.86	12.60	552.90	12.40	553.10
PZ-110	543.45	7.85	535.60	7.84	535.61	7.79	535.66
PZ-205	565.72	14.74	550.98	14.78	550.94	14.49	551.23
PZ-205A	565.29	4.25	561.04	4.31	560.98	3.89	561.40
PZ-205B	565.57	9.72	555.85	9.74	555.83	9.36	556.21
PZ-205C	564.84	13.25	551.59	13.08	551.76	12.96	551.88
PZ-205D	566.72	5.43	561.29	5.36	561.36	5.17	561.55
PZ-211 Area							
PZ-21	550.17	0.33	549.84	0.40	549.77	0.40	549.77
PZ-211	567.13	13.09	554.04	13.11	554.02	13.03	554.10
PZ-211A	566.77	14.11	552.66	14.07	552.70	14.17	552.60
PZ-211B	566.88	13.23	553.65	13.27	553.61	13.39	553.49
PZ-211C	567.10	11.80	555.30	11.85	555.25	11.70	555.40
PZ-211D	566.39	5.24	561.15	5.18	561.21	5.22	561.17

January 2007									
		January 5		January 12		19-Jan		January 31	
Identification	Top of Casing Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet MSL)
PZ-205 Area									
MW 1-10	565.50	12.36	553.14	12.51	552.99	12.54	552.96	12.65	552.85
PZ-110	543.45	7.80	535.65	7.89	535.56	8.00	535.45	7.91	535.54
PZ-205	565.72	14.41	551.31	14.57	551.15	14.61	551.11	14.66	551.06
PZ-205A	565.29	3.91	561.38	4.21	561.08	4.33	560.96	4.55	560.74
PZ-205B	565.57	9.34	556.23	9.39	556.18	9.44	556.13	9.29	556.28
PZ-205C	564.84	12.91	551.93	12.81	552.03	12.75	552.09	12.71	552.13
PZ-205D	566.72	5.18	561.54	5.35	561.37	5.41	561.31	5.69	561.03
PZ-211 Area									
PZ-21	550.17	0.38	549.79	0.41	549.76	0.40	549.77	0.93[4]	549.24
PZ-211	567.13	13.00	554.13	13.00	554.13	13.13	554.00	13.63	553.50
PZ-211A	566.77	14.14	552.63	14.30	552.47	14.41	552.36	14.55	552.22
PZ-211B	566.88	13.28	553.60	13.37	553.51	13.48	553.40	13.45	553.43
PZ-211C	567.10	11.65	555.45	11.45	555.65	11.39	555.71	11.87	555.23
PZ-211D	566.39	5.20	561.19	5.33	561.06	5.42	560.97	6.22	560.17

Notes:
(1) Reference elevation assumed to be mean sea level
(2) btoc - below top of casing
(3) Not Measured
(4) An ice plug (approx. 4") was removed when the plastic cap was lifted to allow sampling

TABLE 3: GEOTECHNICAL TEST RESULTS

BASIN 1 - MONTOUR STEAM ELECTRIC STATION

WASHINGTONVILLE, PENNSYLVANIA

	Depth (ft)						Triaxial Test		Atterberg Limits			Gradation					Proctor Test	
Boring	From	To	Sample Type	Natural Moisture (%)	Total Unit Weight (pcf)	Unconfined Compression (psi)	C (psi)	Phi (°)	LL	PL	PI	% Gravel	% Sand	% Fines	Specific Gravity	USCS Symbol	Max Dry Density (pcf)	Optimum Water Content (%)
ST-205A	0	10	Bucket	26	---	---	---	---	43	21	22	17.59	35.28	47.13	---	SC	11[illegible]6	14.1
ST-205B	10	20	Bucket	25.2	---	---	---	---	38	21	17	9.04	45.67	45.28	---	SC	109.1	13
ST-211C	0	20	Bucket	24.9	---	---	---	---	45	23	22	11.15	32.58	56.27	2.72	CL	109.4	15.8
ST-211C	18	20	Bag	24.6	---	---	---	---	46	22	24	16.78	36.49	46.74	---	SC	—	---
ST-211C	8	10	Shelby Tube	24.2	105.1	2.83	---	---	48	24	24	19.17	27.77	53.06	---	CL	—	---
ST-211C	14	16	Shelby Tube	24.4	118.6	---	0	32.63	46	24	22	22.13	40.11	37.75	---	SC	—	---
ST-211C	22	24	Shelby Tube	25.4	120.2	---	0.8	33.35	42	22	20	12.35	40.23	47.72	---	SC	—	---
ST-205C	10	12	Shelby Tube	22.35	123.3	---	0.08	42.06	39	21	18	22.45	41.71	35.84	---	SC	—	---
ST-205C	16	18	Shelby Tube	21.5	122.7	---	1.06	32.25	38	20	18	23.81	47.49	28.6	---	SC	—	---
ST-205C	24	26	Shelby Tube	25.85	119.12	1.05	---	---	47	22	25	7.85	32.46	59.69	2.47	CL	—	---
ST-205C	30	32	Shelby Tube	27	121.2	0.59	0.8	31.31	44	21	23	17.32	37.43	45.25	---	SC	—	---

Notes:
LL - Liquid Limit
PL - Plastic Limit
PI - Plasticity Index

TABLE 4: GEOTECHNICAL PARAMETERS FOR STABILITY ANALYSES

BASIN 1 - MONTOUR STEAM ELECTRIC STATION

WASHINGTONVILLE, PENNSYLVANIA

Soil Description	Soil Type No.	Total Unit Weight (pcf)	Saturated Unit Weight (pcf)	Cohesion Intercept (psf)	Friction Angle (°)
Bank	1	120	120	0	32
Fly Ash	2	110	110	0	30
Slurry	3	140	140	0	5
Shale	4	150	150	2000	45

TABLE 5: SUMMARY OF RESULTS - SLOPE STABILITY ANALYSES

BASIN 1 - MONTOUR STEAM ELECTRIC STATION

WASHINGTONVILLE, PENNSYLVANIA

	LOCATION: PZ-205		LOCATION: PZ-211			
	Factor of Safety	Failure Type	Factor of Safety	Failure Type		
Static Analyses					Unit Weight of Bank Material (pcf)	Termination Limits Differ for Runs A, B, and C
Run A	**1.32**	**Circular Surface Slide**	1.12	Shallow Planar Failure, Disregard[4]	120	
Run B	1.47	Circular Slide	**1.39**	**Circular Slide**	120	
Run C	1.34	Circular Slide	1.83	Circular Slide	120	
Run D	1.67	Block Type Failure[1]	2.11	Block Type Failure[1]	120	
Sensitivity Analyses						
Run A	1.29	Circular Surface Slide	1.12	Shallow Planar Failure, Disregard.	110	
Run B	1.44	Circular Slide	1.40	Circular Slide	110	
Run C	1.30	Circular Slide	1.83	Circular Slide	110	
Run D	1.63	Block Type Failure[1]	2.09	Block Type Failure[1]	110	
Seismic Analyses					***Seismic Pseudo-Static Coefficients***	
					Kv	Kh
Run C	1.0	Circular Slide[2]	1.1	Circular Slide[3]	0.0	0.075

Note 1: The block type failure mode evaluated in Run D indicates that a failure surface vertically or near vertically through the slurry wall does not result in a lower factor of safety. Additional analyses, not presented here, were conducted that forced the failure surface to occur vertically through the slurry wall and resulted in higher factors of safety. These additional analyses confirm the finding that the preferential failure surface for these areas does not occur vertically through the slurry wall.

Note 2: Uses Termination Limits from "Static Run A"

Note 3: Uses Termination Limits from "Static Run B"

Note 4: Extremely shallow failure surfaces were found to be most critical (Run A) for the PZ 211 area, however, these results were not considered representative of the most critical conditions due to their slough-like failure mode (in fact, existing vegetation on the face of the berm likely provides much greater surficial slope stability than was represented in the numerical analyses).

Indicates Most Critical Surfaces

TABLE 6: ASSESSMENT OF POTENTIAL UPGRADES

BASIN 1 - MONTOUR STEAM ELECTRIC STATION
WASHINGTONVILLE, PENNSYLVANIA

LOCATION: PZ-205				
Description	Static Analyses		Seismic Analyses	
	Factor of Safety	Meets Regulatory Criteria[1]	Factor of Safety	Meets Regulatory Criteria[1]
Existing Conditions (Figure 8 and 10)	1.32	No	1.0	No
Candidate Toe Drain (Figure 12)	1.33	No	1.0	No
Candidate Mid-slope Subsurface Drain (Figure 14)	1.55	Yes	1.2	Yes
Anticipated Basin Dewatering (Figure 16)	1.55	Yes	1.2	Yes
Candidate Shale Fill Buttress (Figure 18)	1.51	Yes	1.2	Yes

LOCATION: PZ-211				
Description	Static Analyses		Seismic Analyses	
	Factor of Safety	Meets Regulatory Criteria[1]	Factor of Safety	Meets Regulatory Criteria[1]
Existing Conditions (Figure 9 and 11)	1.39	Yes	1.1	No
Candidate Toe Drain (Figure 13)	1.39	Yes	1.1	No
Candidate Mid-slope Subsurface Drain (Figure 15)	1.39	Yes	1.1	No
Anticipated Basin Dewatering (Figure 17)	1.39	Yes	1.1	No
Candidate Shale Fill Buttress (Figure 20)	1.52	Yes	1.2	Yes

Note 1: Regulatory Criteria as Defined in Section 2.1 - Minimum Factor of Safety for Static Conditions: 1.38, Minimum Factor of Safety for Seismic Conditions: 1.2.

FIGURES

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 02/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 02/05/07	
APPD: AEB	DATE: 02/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE
AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

SITE PLAN

PROJECT NO: 06-309

FIGURE 1

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

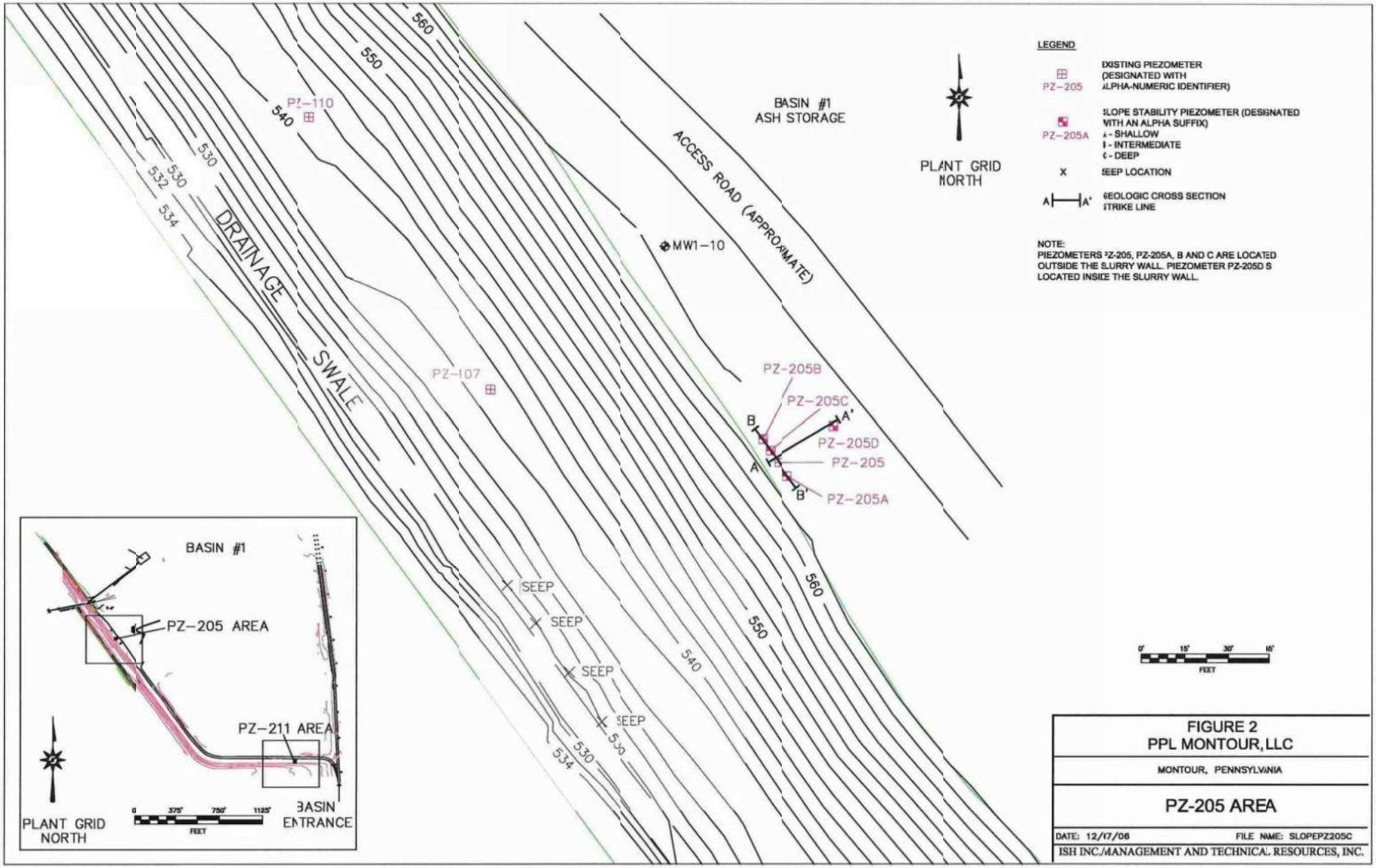


FIGURE 2
PPL MONTOUR, LLC

MONTOUR, PENNSYLVANIA

PZ-205 AREA

DATE: 12/07/06 FILE NAME: SLOPEPZ205C

ISH INC./MANAGEMENT AND TECHNICAL RESOURCES, INC.

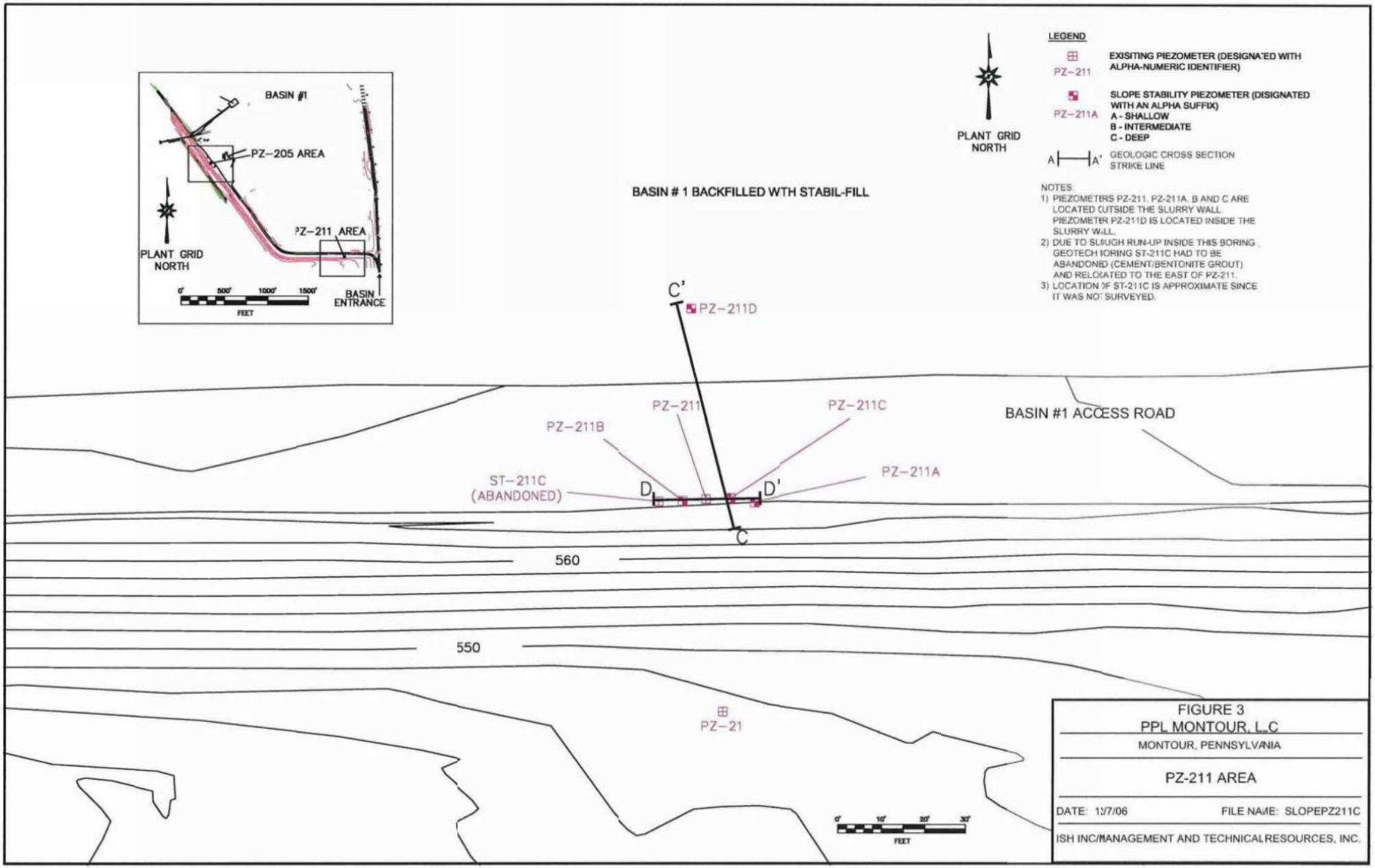
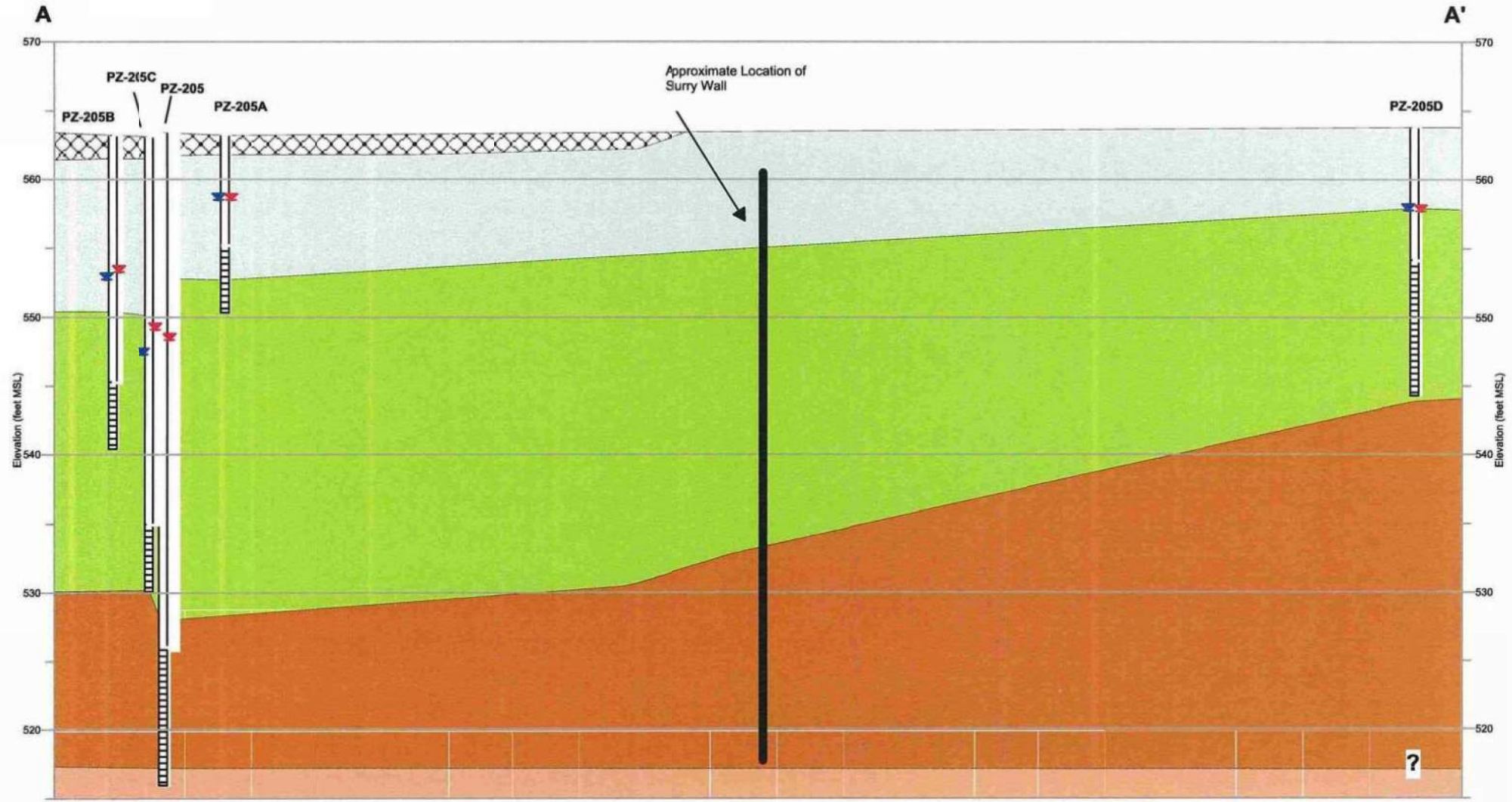


FIGURE 3
PPL MONTOUR, L.C
MONTOUR, PENNSYLVANIA

PZ-211 AREA

DATE: 1/7/06 FILE NAME: SLOPEPZ211C

ISH INC/MANAGEMENT AND TECHNICAL RESOURCES, INC.



Lithology:

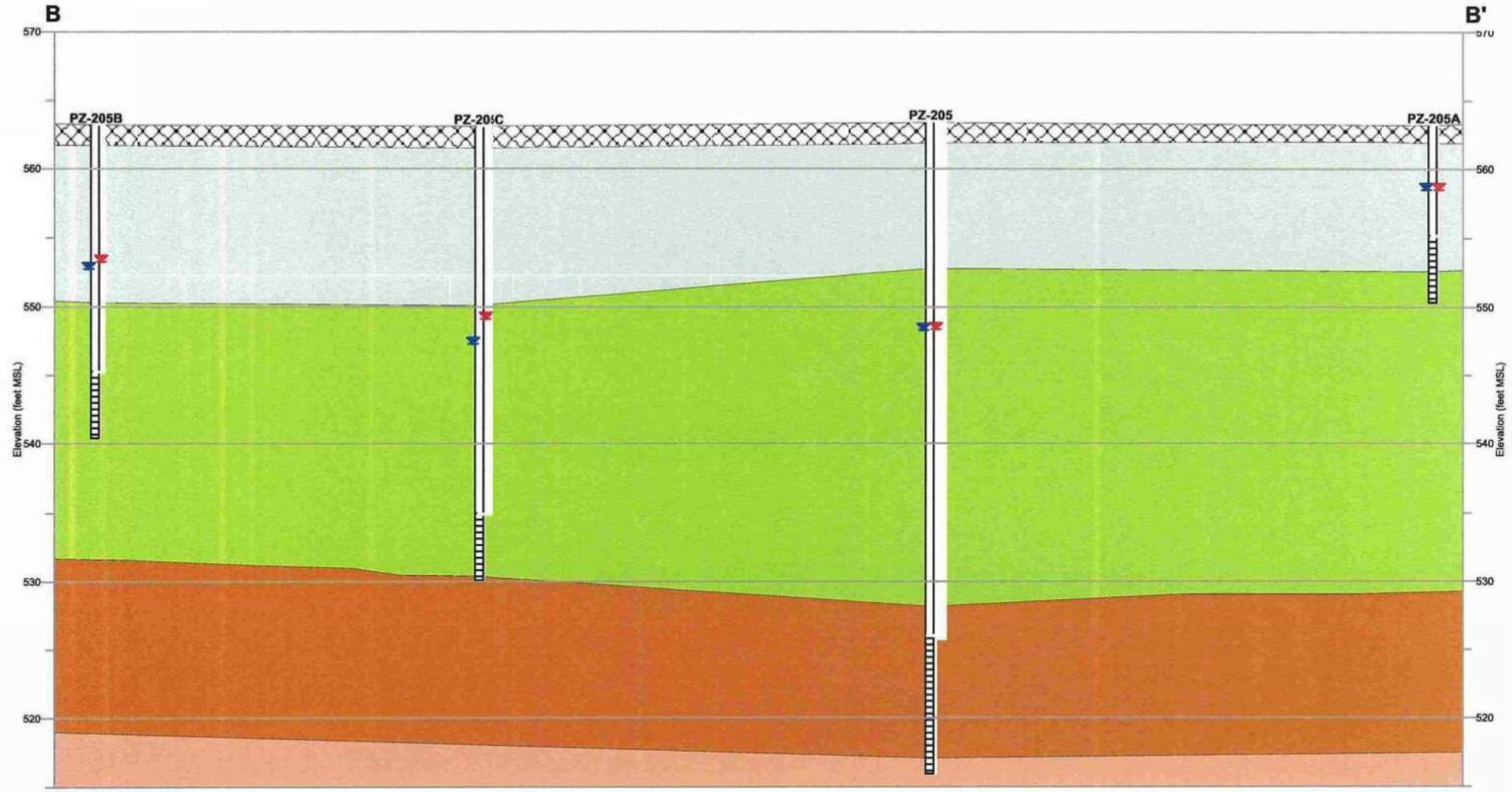
- Brown silt with some clay and rock fragments
- Brown to black clay, with some silt and shale fragments
- Gray-brown stiff clay, orange mottling
- Black weathered shale grading to competent shale
- Ash and/to some silt and clay

Note: 1) Slurry wall location and depth as shown is approximate and inferred for illustraion purposes
2) Lihologic information from ST-205C used in developing cross section, and augmented at depth with PZ-205
3) Al contacts inferred

- Groundwater Elevation (September 15, 2006)
- Groundwater Elevation (October 13, 2006)
- Piezometer screened interval

Horizontal Scale Bar (feet)
0 1

Figure 4
Client: PPL Montour, LLC
Title: PZ-205 Area Hydrogeologic Cross Section A-A'
Site: Montour Steam Electric Station
Date: 11/28/2006 MTR, INC.



Lithology:

- Brown silt with some clay and rock fragments
- Brown to black clay, with some silt and shale fragments
- Gray-brown stiff clay, orange mottling
- Black weathered shale grading to competent shale
- Ash and/to sone silt and clay

Note:All contacts inferred

- Groundwaer Elevation (September 15, 2006)
- Groundwater Elevation (October 13, 2006
- Piezometer screened interval

Horizontal Scale Bar (feet)

0 1

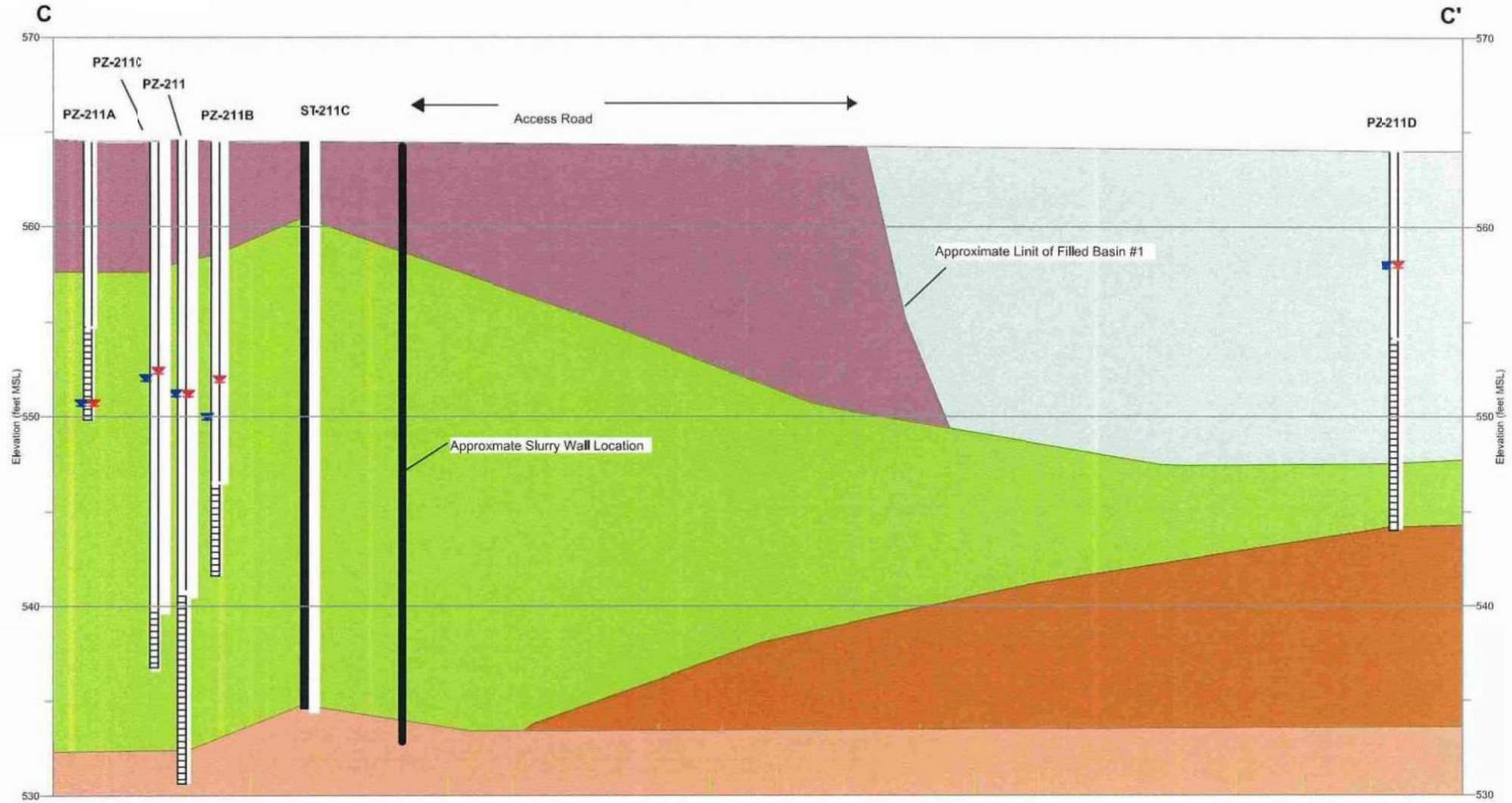
Figure 5

Client: PPL Montour, LLC

Tile: PZ-205 Area Hydrogeologic Cross Section B-B'

Site: Montour Steam Electric Station

Date: 11/28/2006 MTR, INC.



Lithology:

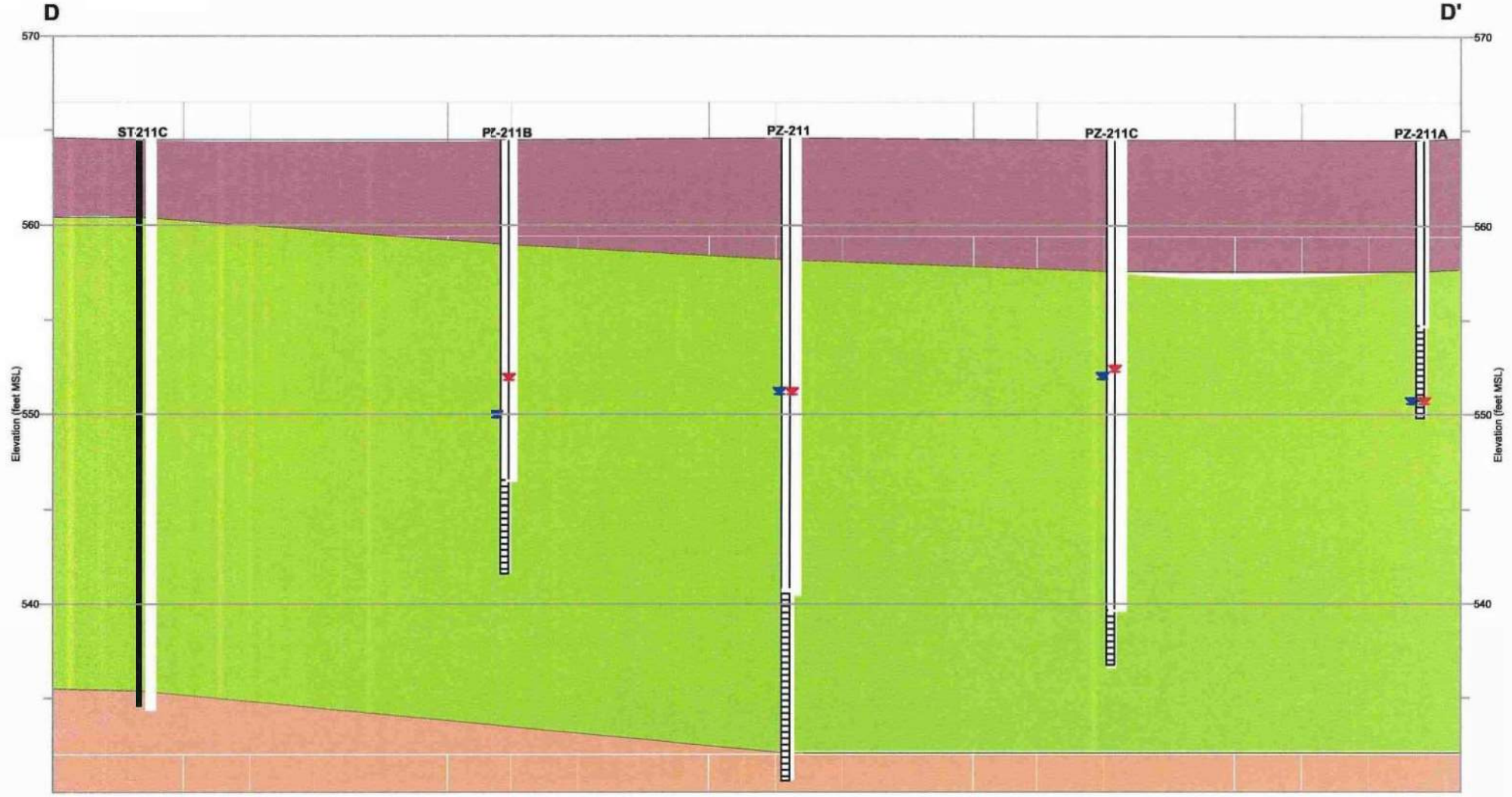
- Ash and shale fragments grading to ash
- Dark gray clay with silt and shale fragments
- Light brown to gray clay, with some silt and shale fragments.
- Gray, stiff clay, orange mottling
- Black weathered shale grading to competent shale

Notes: 1) Slurry wall location and depth is approximate and inferred for illustration purposes
2) Observations from ST-211C used to describe lithology in the PZ-211 area.
3) Stratigraphy developed from combination ST-211C, PZ-211, and PZ-211D observations
4) All contacts inferred
5) Investigative points superimposed on strike line for illustrative purposes

- Groundwater Elevation (September 15, 2006)
- Groundwater Elevation (October 13, 2006)
- Piezometer screened interval

Horizontal Scale Bar (feet)
0 3

Figure 6
Client: PPL Montour, LLC
Title: PZ-211 Area Hydrogeologic Cross Section C-C'
Site: Montour Steam Electric Station
Date: 12/5/2006 MTR, INC.



Lithology:

- Dark gray clay with silt and shale fragments
- Light brown to gray clay wth some silt and shale fragments
- Black weathered shale grading to competent shale

Note: All contacs inferred

- Groundwater Elevation (September 15,2006)
- Groundwate Elevation (October 13, 2006)
- Piezometer screened interva

Horizontal Scale Bar (feet)

0 1

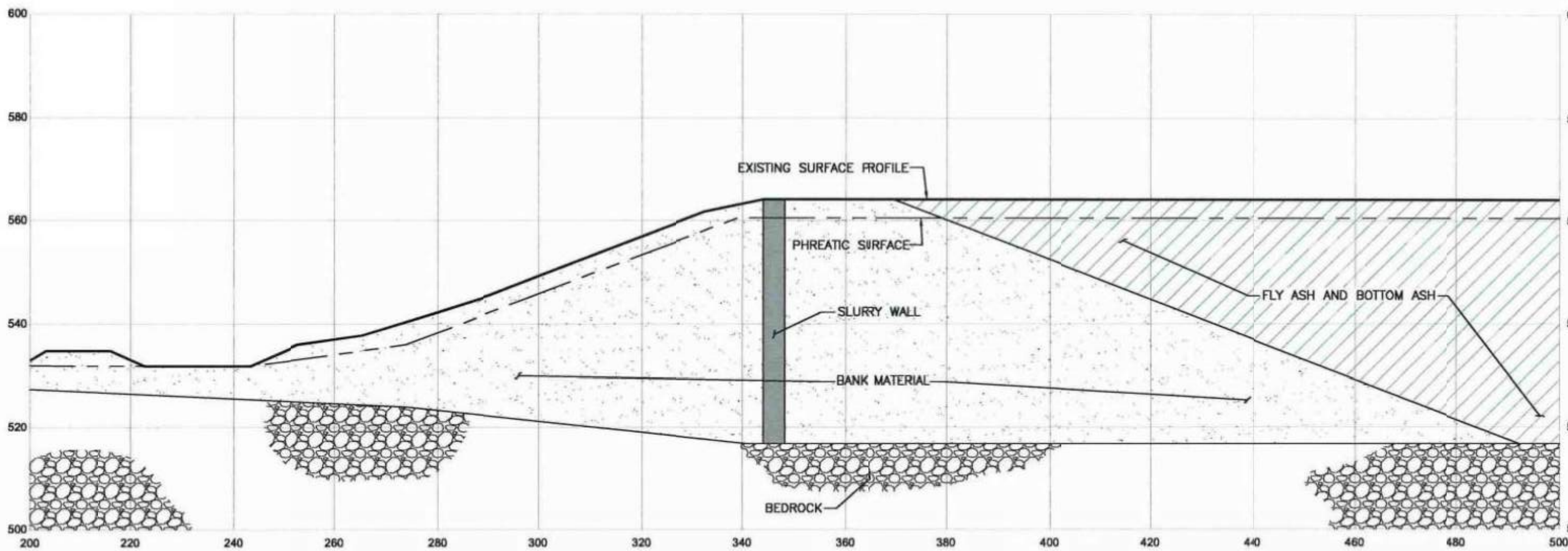
Figure 7

Client: PPL Montour, LLC

Tile: PZ-211 Area Hydrogeologic Cross Section D-D'

Site: Montour Steam Electric Station

Date: 12/6/2006 MTR, INC.



LEGEND

- EXISTING SURFACE PROFILE
- PHREATIC SURFACE
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

REV #	DATE	DESCRIPTION	APPD

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 03/05/07
CHKD: STS	DATE: 03/05/07
APPD: AEB	DATE: 03/05/07
SCALE:	AS SHOWN

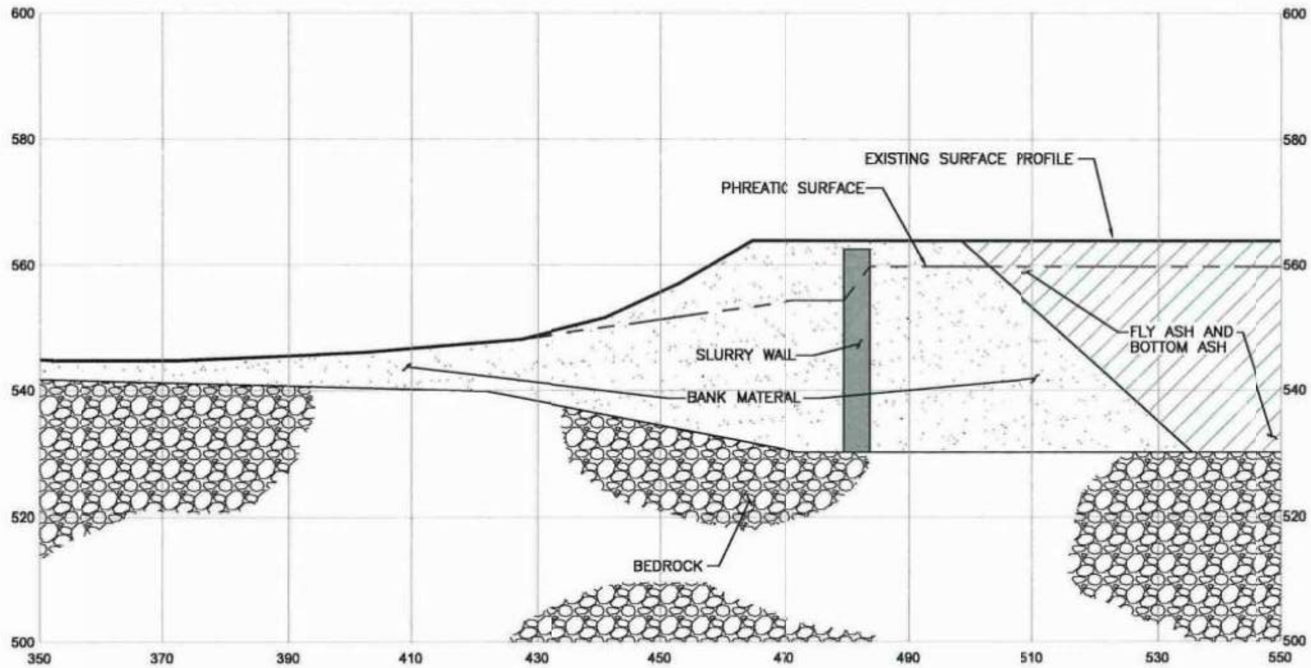
KEY ENVIRONMENTAL INCORPORATED

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

PZ-205 EXISTING CONDITIONS

PROJECT NO: 06-309

FIGURE 8



LEGEND

EXISTING SURFACE PROFILE
PHREATIC SURFACE
SLURRY WALL

V: 0 20 40 FEET
H: 0 20 40 FEET

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

REV #	DATE	DESCRIPTION	APPD

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC DATE: 02/05/07
CHKD: BTS DATE: 02/05/07
APPD: AEB DATE: 02/05/07
SCALE: AS SHOWN

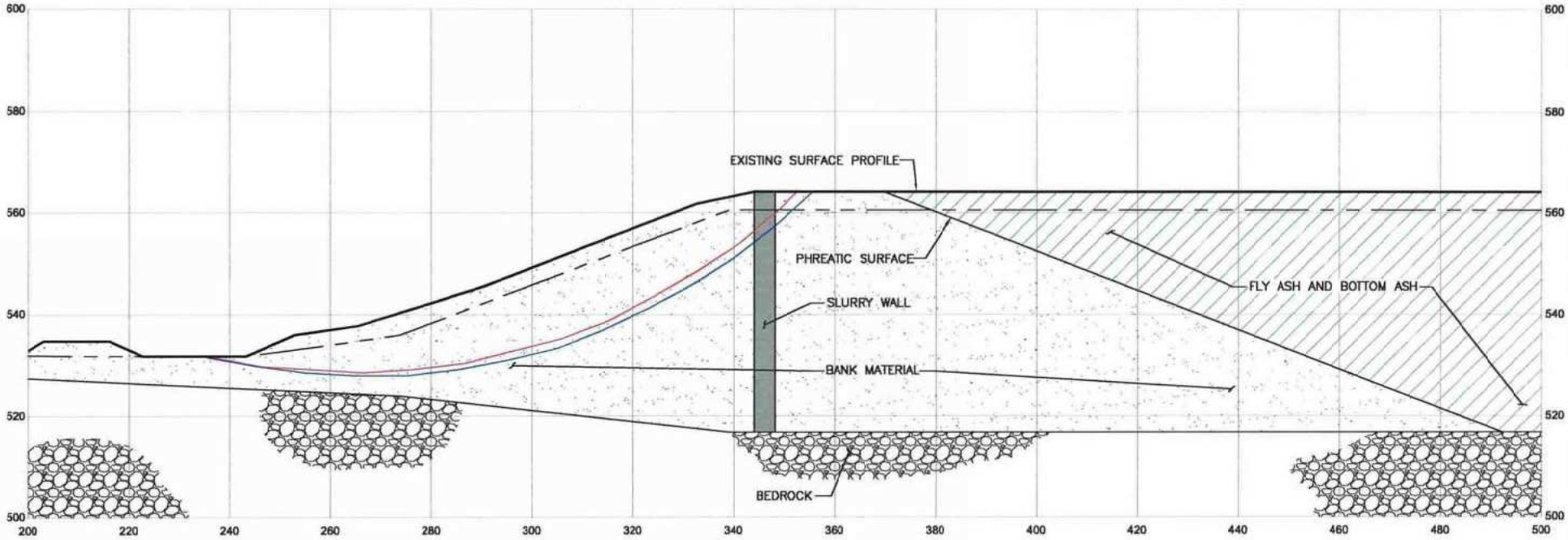
KEY ENVIRONMENTAL INCORPORATED

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

PZ-211 EXISTING CONDITIONS

PROJECT NO: 06-308

FIGURE 9



LEGEND

- EXISTING SURFACE PROFILE
- PHREATIC SURFACE
- FAILURE SURFACE FOR STATIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.32)
- FAILURE SURFACE FOR SEISMIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.0)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
CARNEGIE, PA 15106

ISH, INC.
RALEIGH, NORTH CAROLINA

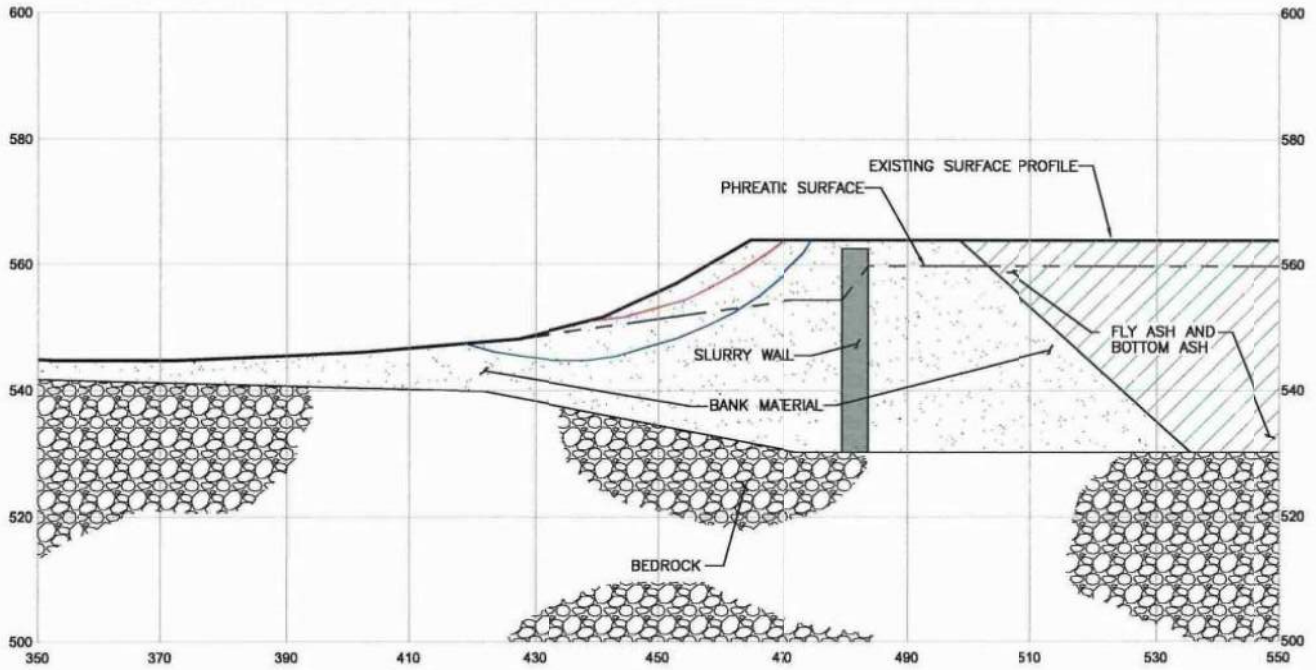
DRWN: GLC	DATE: 02/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 02/05/07	
APPD: AES	DATE: 02/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE
AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CRITICAL FAILURE SURFACE PZ-205

PROJECT NO: 06-309

FIGURE 10



LEGEND

- EXISTING SURFACE PROFILE
- PHREATIC SURFACE
- FAILURE SURFACE FOR STATIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.39)
- FAILURE SURFACE FOR SEISMIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.1)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 03/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 03/05/07	
APPD: AEB	DATE: 03/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE
AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CRITICAL FAILURE SURFACE FZ-211

PROJECT NO: 06-309

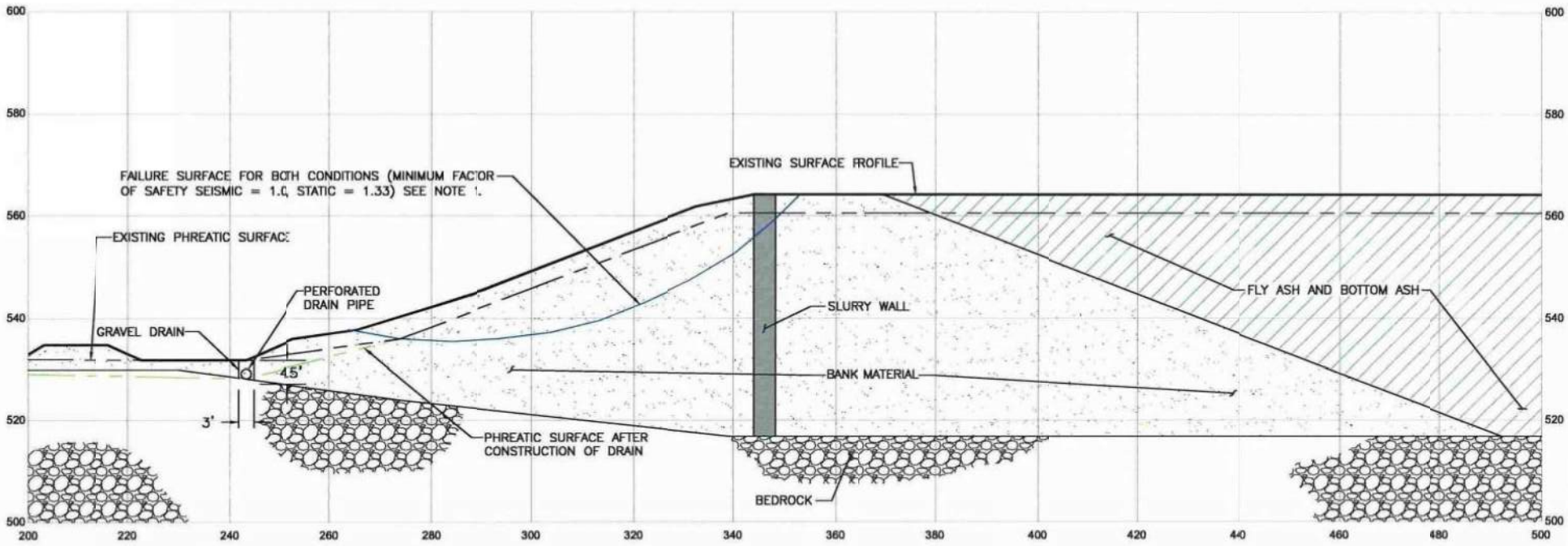
FIGURE 11

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
CARNEGIE, PA 15106



LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHREATIC SURFACE AFTER CONSTRUCTION OF DRAIN
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.0, STATIC = 1.33) SEE NOTE 1.
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

NOTES:

1. CANDIDATE TOE DRAIN DOES NOT PROVIDE ADEQUATE FACTOR OF SAFETY FOR EITHER STATIC OR SEISMIC CONDITIONS.

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 03/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 03/05/07	
APP'D: AES	DATE: 03/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE TOE DRAIN
PZ 205 AREA

PROJECT NO: 06-339

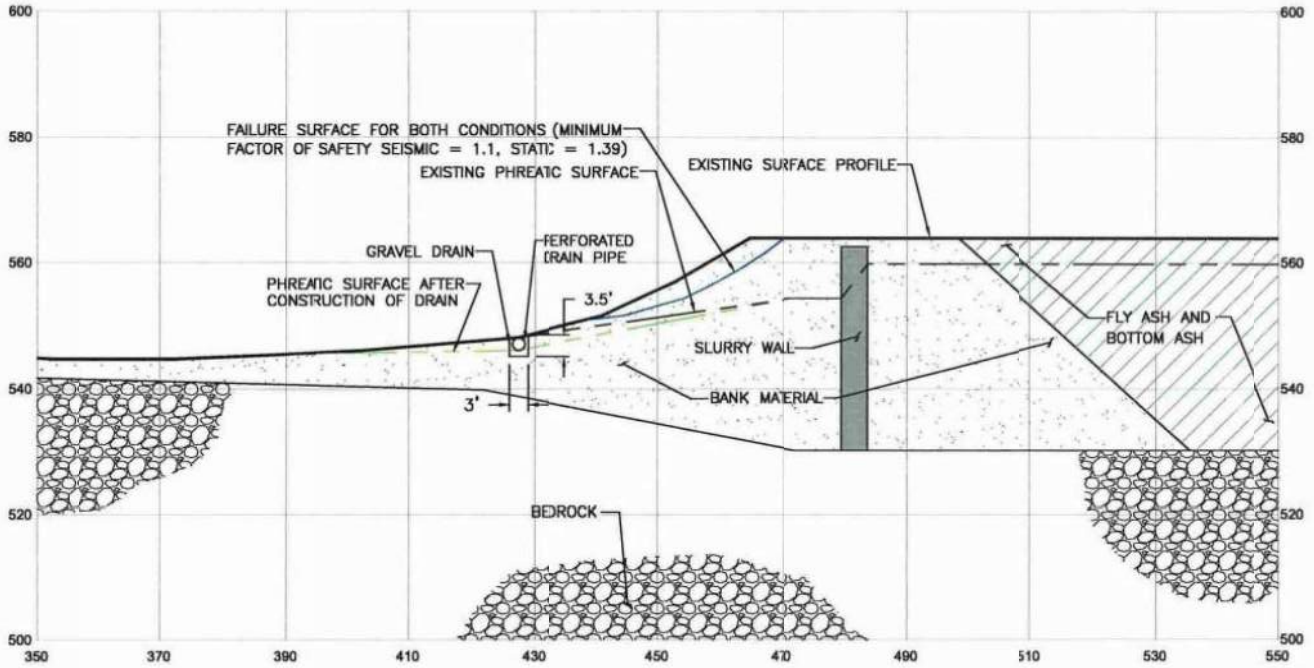
FIGURE 12

REV #	DATE	DESCRIPTION	APP'D
3			
2			
1			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106



LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHREATIC SURFACE AFTER CONSTRUCTION OF DRAIN
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.1, STATIC = 1.39)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

REV #	DATE	DESCRIPTION	APPD

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

ISH, INC.
RALEIGH, NORTH CAROLINA

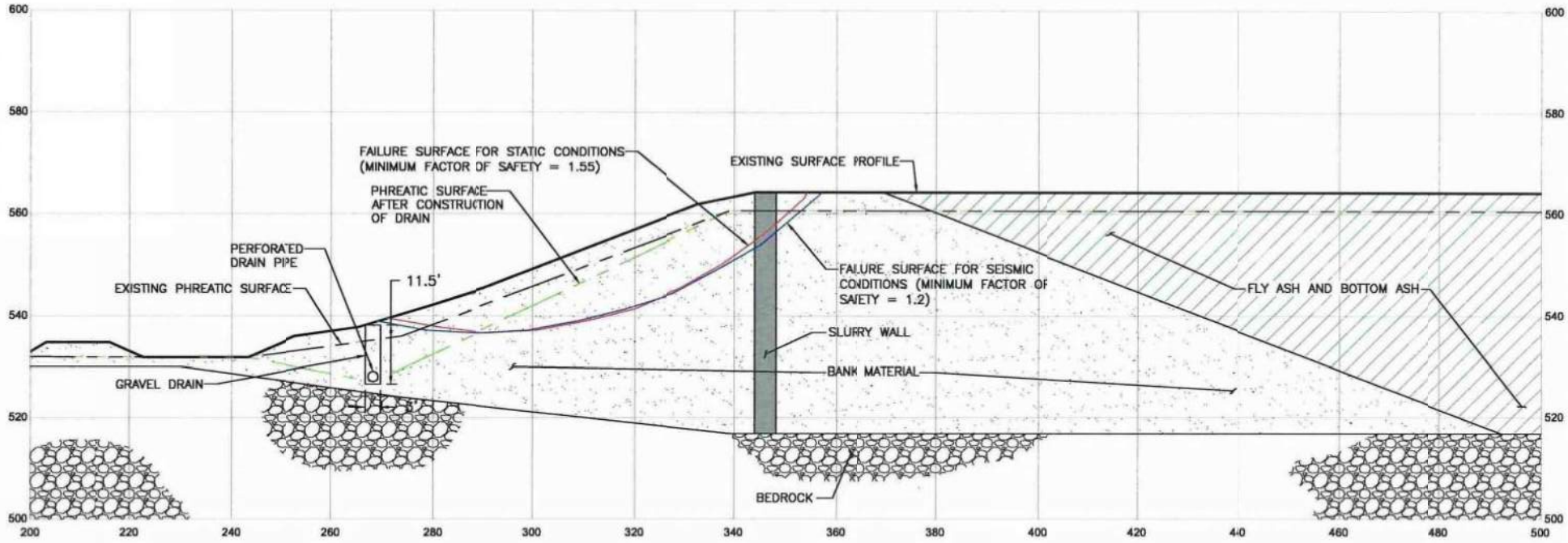
DRWN: GLC	DATE: 3-21-07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 3-21-07	
APPD: AES	DATE: 3-21-07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE
AND MW 1-8 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE TOE DRAIN
PZ 211 AREA

PROJECT NO: 06-309

FIGURE 13



LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHREATIC SURFACE AFTER CONSTRUCTION OF DRAIN
- FAILURE SURFACE FOR STATIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.55)
- FAILURE SURFACE FOR SEISMIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.2)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

NOTES:

1. TARGETED FACTORS OF SAFETY ARE ACHIEVED WITH A MINIMUM SUBSURFACE DRAIN DEPTH OF 11.5 FEET.

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 03/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 03/05/07	
APPD: ACB	DATE: 03/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE MID-SLOPE SUBSURFACE DRAIN PZ 205 AREA

PROJECT NO: 06-308

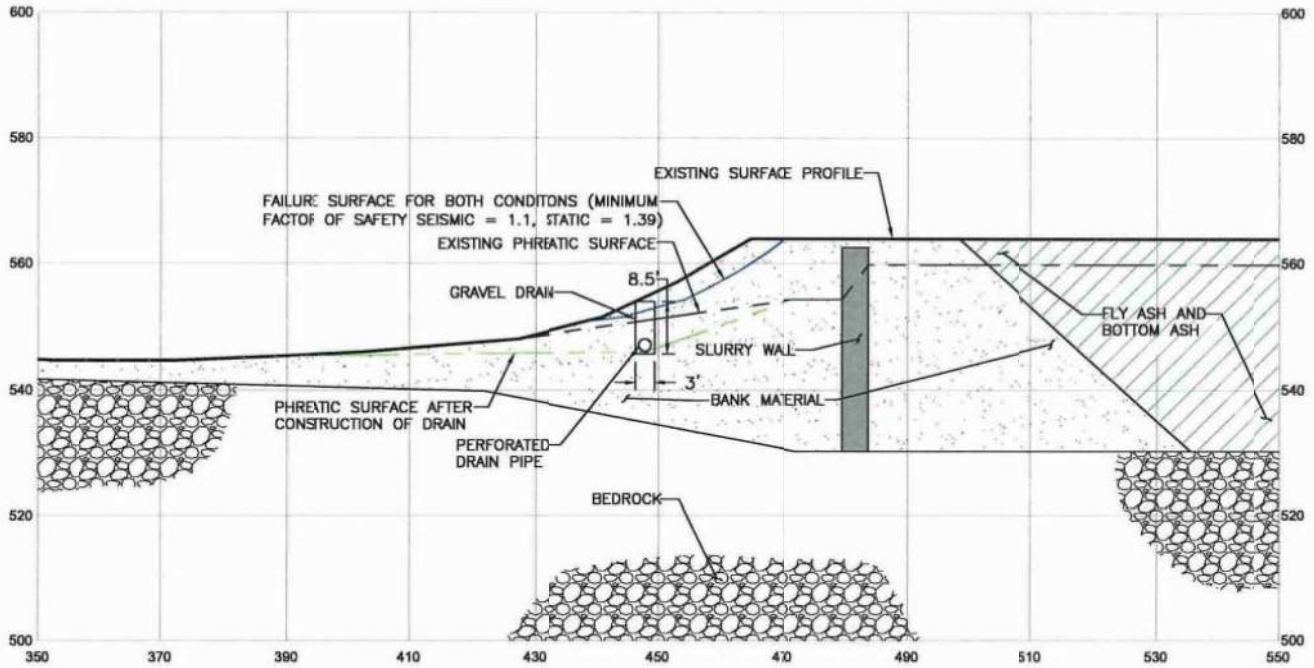
FIGURE 14

REV	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106



V: 0 20 40 FEET

H: 0 20 40 FEET

LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHREATIC SURFACE AFTER CONSTRUCTION OF DRAIN
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.1, STATIC = 1.39)
- SLURRY WALL

REV #	DATE	DESCRIPTION	APPD
3			
2			
1			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
DANVILLE, PA 17821

ISH, INC.
RALEIGH, NORTH CAROLINA

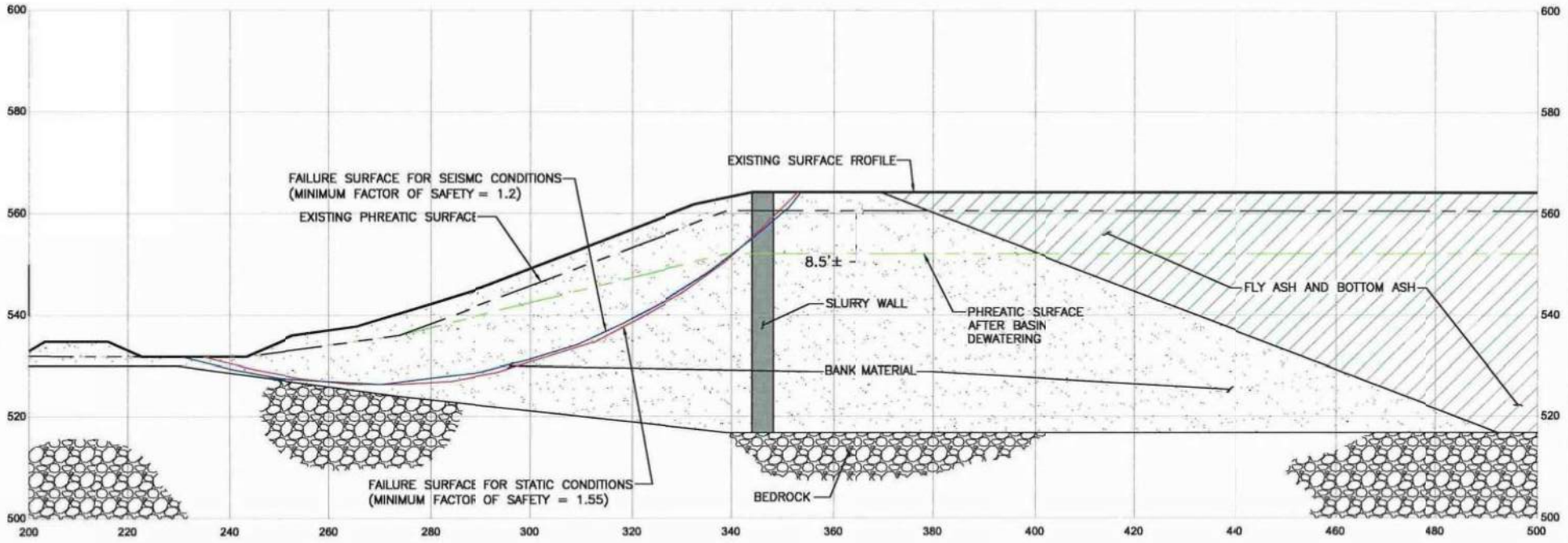
DRWN: GLC	DATE: 3-21-07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 3-21-07	
APPD: ACB	DATE: 3-21-07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE MID-SLOPE SUBSURFACE DRAIN - PZ 211 AREA

PROJECT NO: 06-309

FIGURE 15



LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHREATIC SURFACE AFTER BASIN DEWATERING
- FAILURE SURFACE FOR STATIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.55)
- FAILURE SURFACE FOR SEISMIC CONDITIONS (MINIMUM FACTOR OF SAFETY = 1.2)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

NOTES:

1. TARGETED FACTORS OF SAFETY ARE ACHIEVED WITH A DROP OF THE PHREATIC SURFACE WITHIN THE BASIN OF 8.5 FEET.

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 02/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 02/05/07	
APPD: ACB	DATE: 02/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

ANTICIPATED BASIN DEWATERING PZ 205 AREA

PROJECT NO: 06-309

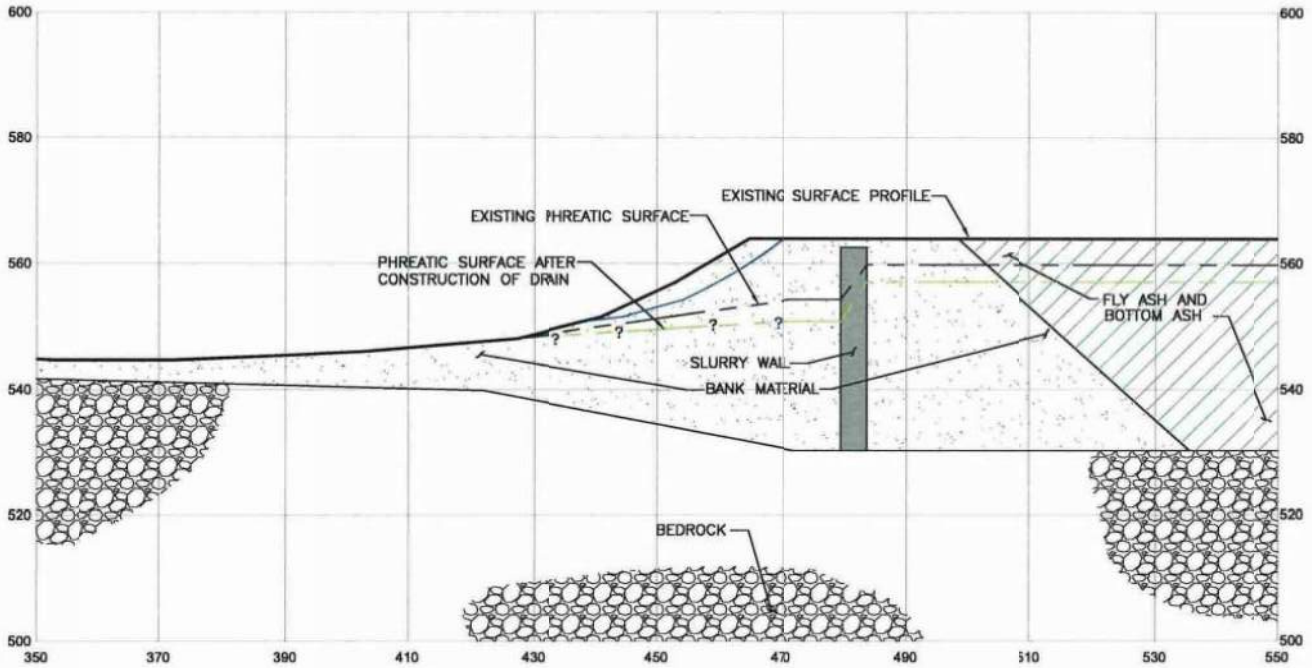
FIGURE 16

REV #	DATE	DESCRIPTION	APPD

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
CARNEGIE, PA 15106



LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- PHRIATIC SURFACE AFTER CONSTRUCTION OF DRAIN
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.1 STATIC = 1.39)
- SLURRY WALL

V: 0 20 40 FEET

H: 0 20 40 FEET

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 3-21-07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTB	DATE: 3-21-07	
APP'D: ACB	DATE: 3-21-07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

ANTICIPATED BASIN DEWATERING PZ211 AREA

PROJECT NO: 06-309

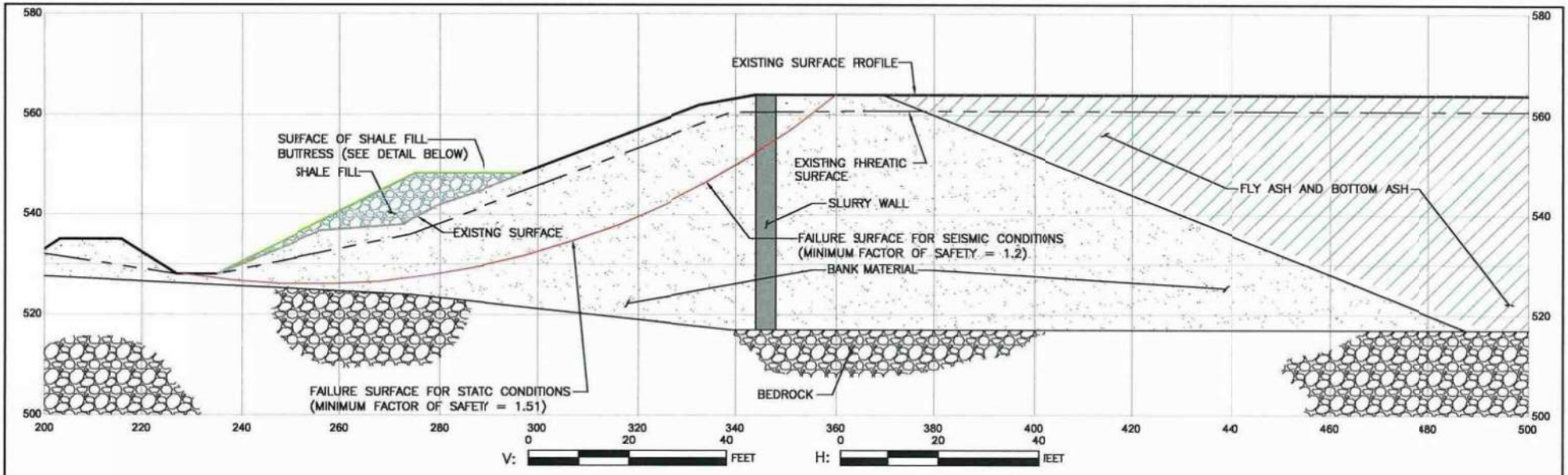
FIGURE 17

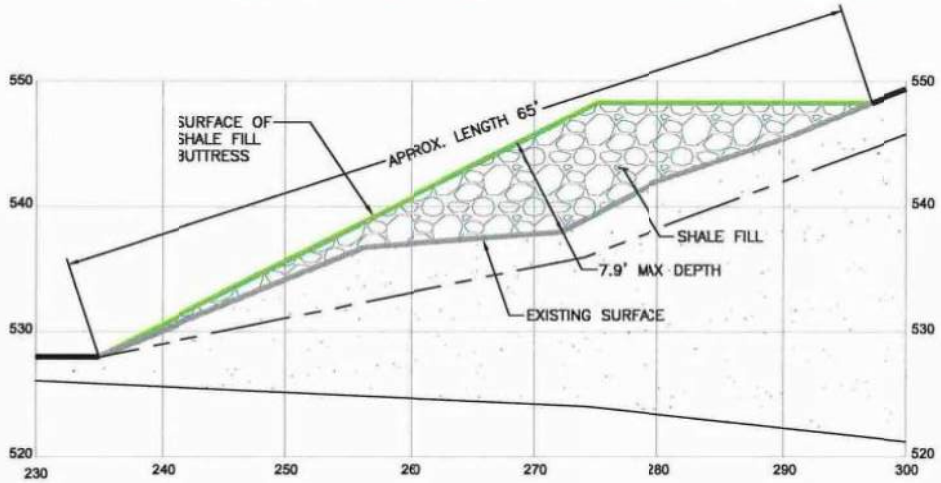
REV #	DATE	DESCRIPTION	APP'D

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
CHARLEROI, PA 15022





SHALE FILL BUTTRESS DETAIL

V: 0 10 20 FEET

H: 0 10 20 FEET

LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.2, STATIC = 1.51)
- SURFACE OF SHALE FILL BUTRESS
- SLURRY WALL

NOTES:

1. TARGETED FACTORS OF SAFETY ARE ACHIEVED WITH PLACEMENT OF SHALE FILL TO THE APPROXIMATE DIMENSIONS SHOWN ON THE DETAIL.

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 02/05/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: BTS	DATE: 02/05/07	
APPD: ACS	DATE: 02/05/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-8 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE SHALE FILL BUTRESS PZ 205 AREA

PROJECT NO: 06-309

FIGURE 18

REV #	DATE	DESCRIPTION	APPD

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

KEY ENVIRONMENTAL, INC. 300 THIRD AVENUE CHARLEROI, PA 15022

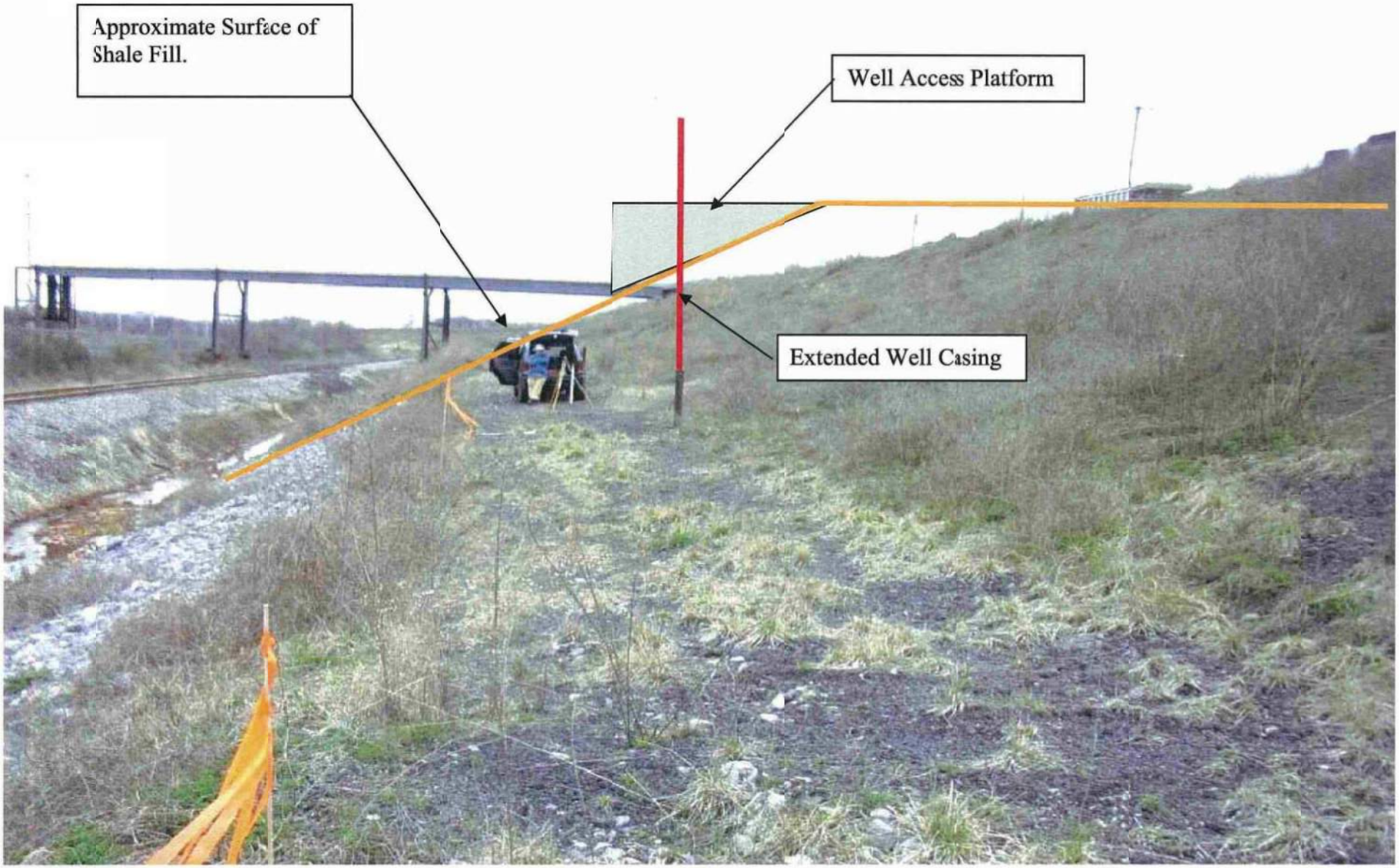
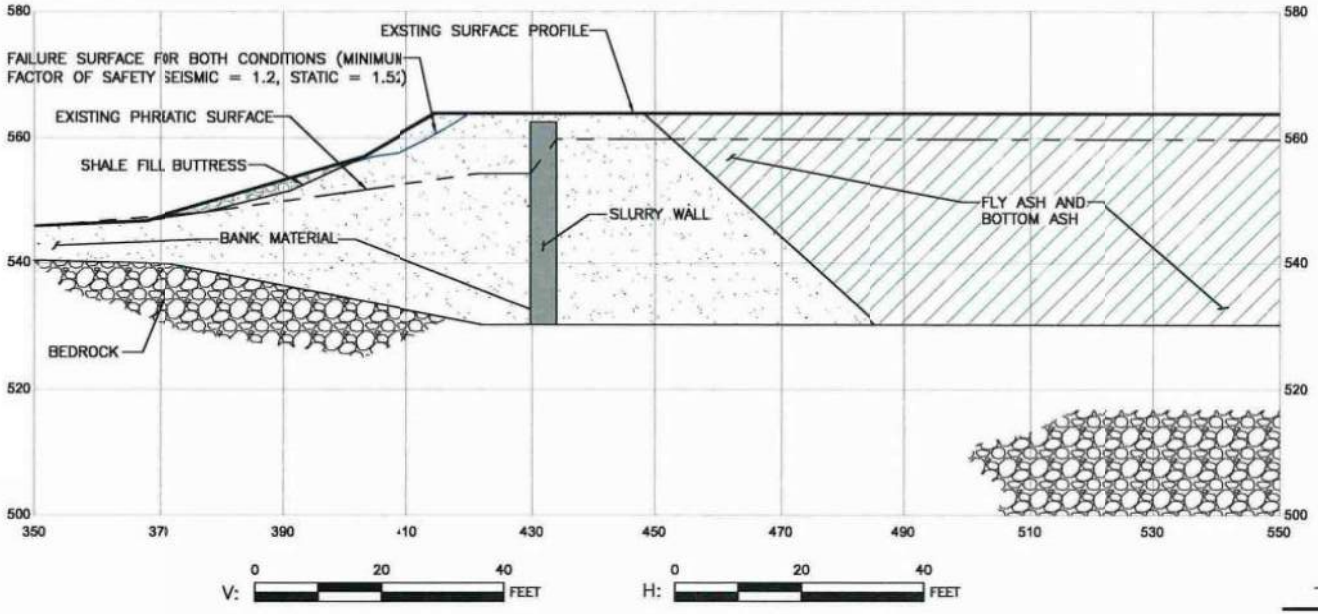
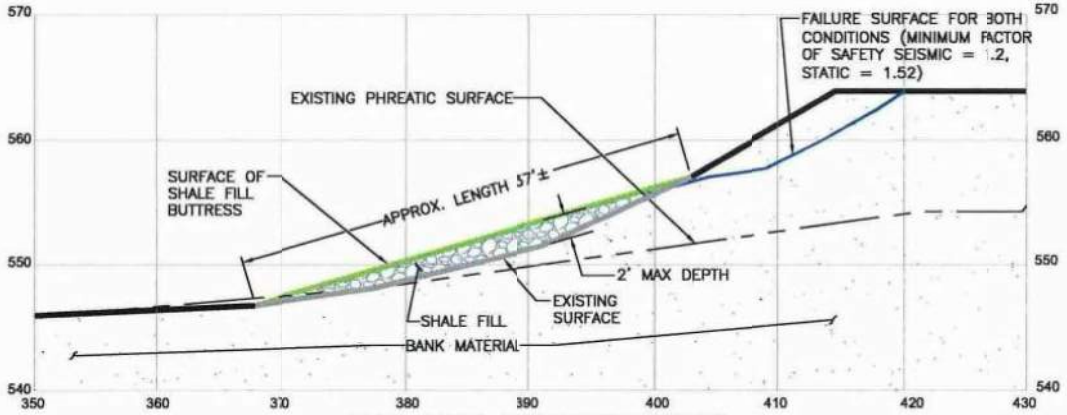


Figure 19: Candidate Shale Fill Buttress PZ-205 Area Illustration
Note: All locations are approximate. This figure is for illustrative purposes only.





SHALE FILL BUTTRESS DETAIL

V: 0 10 20 FEET

H: 0 10 20 FEET

LEGEND

- EXISTING SURFACE PROFILE
- EXISTING PHREATIC SURFACE
- FAILURE SURFACE FOR BOTH CONDITIONS (MINIMUM FACTOR OF SAFETY SEISMIC = 1.2, STATIC = 1.52)
- SURFACE OF SHALE FILL BUTRESS
- SLURRY WALL

NOTES:

1. TARGETED FACTORS OF SAFETY ARE ACHIEVED WITH PLACEMENT OF SHALE FILL TO THE APPROXIMATE DIMENSIONS SHOWN ON THE DETAIL.

ISH, INC.
RALEIGH, NORTH CAROLINA

DRWN: GLC	DATE: 03/06/07	KEY ENVIRONMENTAL INCORPORATED
CHKD: WTS	DATE: 03/06/07	
APPD: AES	DATE: 03/06/07	
SCALE: AS SHOWN		

GEOTECHNICAL EVALUATION OF SOUTH SIDE AND MW 1-6 AREAS OF BASIN No.1
PPL GENERATION, LLC
MONTOUR STEAM ELECTRIC STATION
WASHINGTON, PENNSYLVANIA

CANDIDATE SHALE FILL BUTTRESS PZ 211 AREA

PROJECT NO: 06-309

FIGURE 20

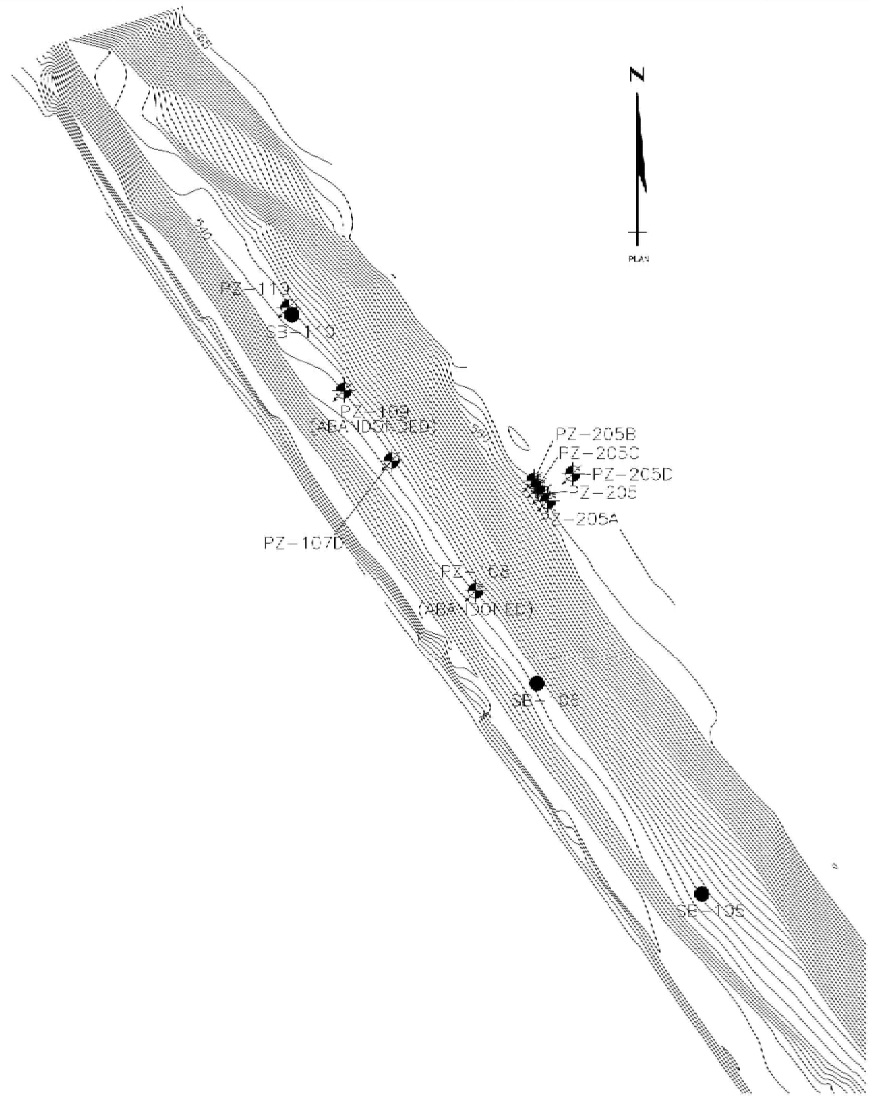
REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:
NOTE: ALL LOCATIONS ARE APPROXIMATE

ISSUE DATE:

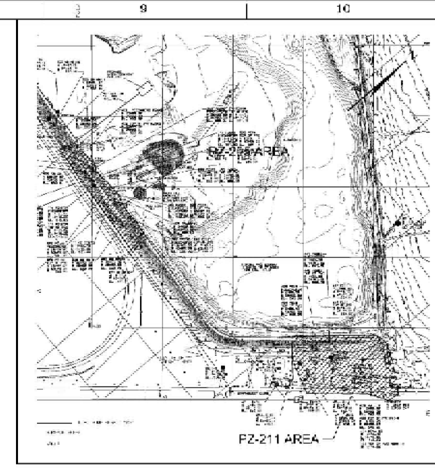
KEY ENVIRONMENTAL, INC.
300 THIRD AVENUE
CARNEGIE, PA 15106

Figure 21: Candidate Shale Fill Buttress PZ-211 Area Illustration
Note: All locations are approximate. This figure is for illustrative purposes only.

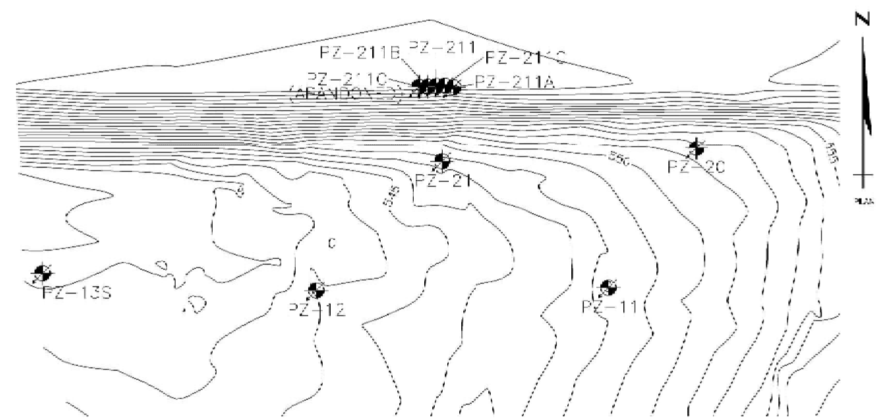


PZ-205 AREA EXISTING CONDITIONS

0 40 80 FEET



"PARTIAL PLAN - ASH BASIN #1"



PZ-211 AREA EXISTING CONDITIONS

0 40 80 FEET

LEGEND

● SOIL BORING

PIEZOMETER

EXISTING CONTOURS

ISH, INC.
RALEIGH, NORTH CAROLINA

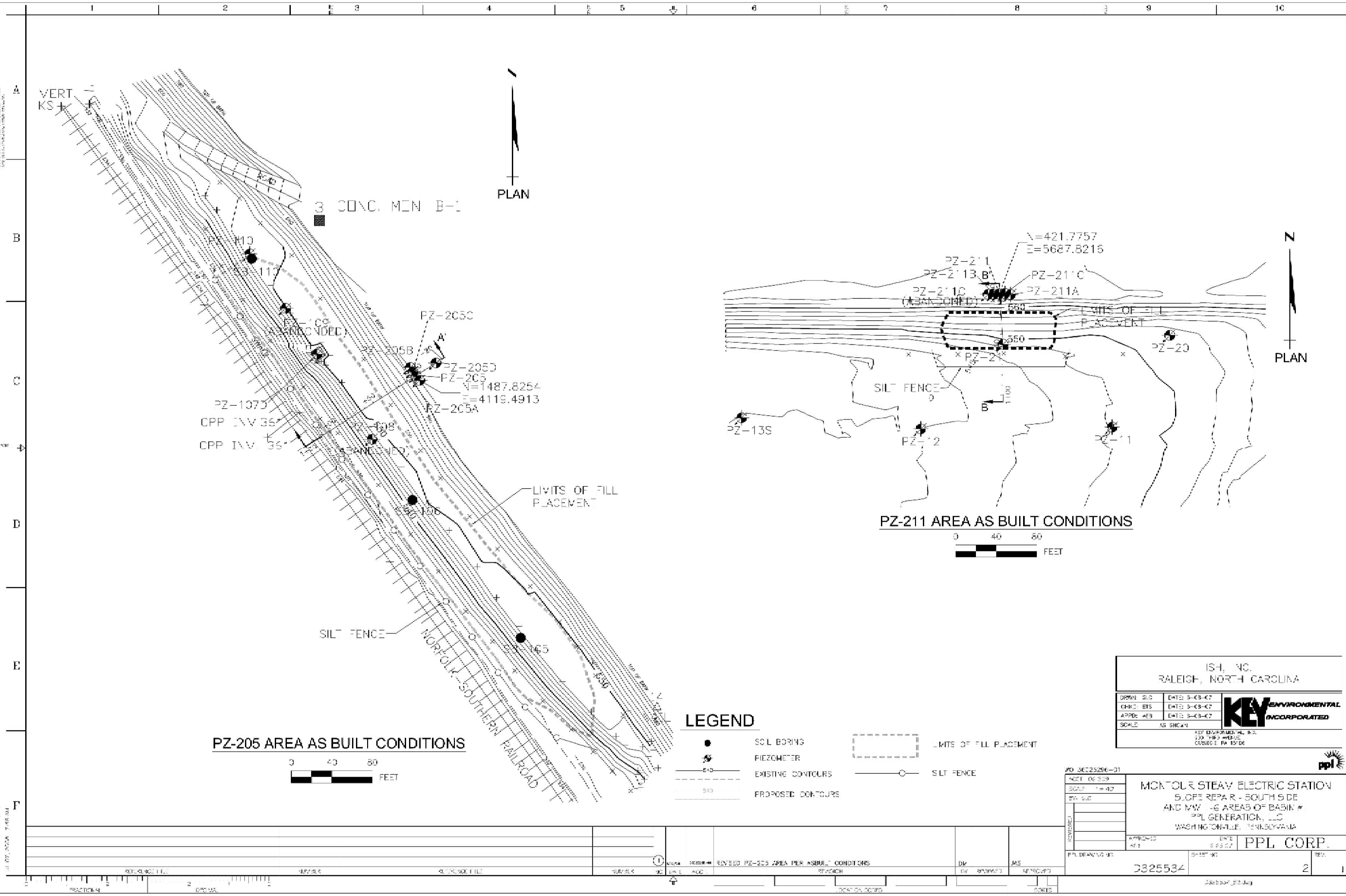
KEY ENVIRONMENTAL INCORPORATED

SCALE: AS SHOWN

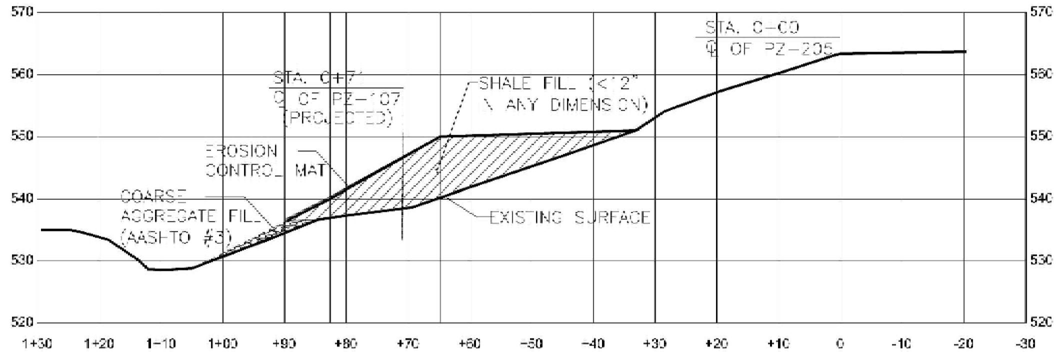
MONTOUR STEAM ELECTRIC STATION
SLOPE REPAIR - SOUTH SIDE
AND MW-16 AREAS OF BASIN #1
PPL GENERATION, LLC
WASHINGTONVILLE, PENNSYLVANIA

PPL CORP.

D325534



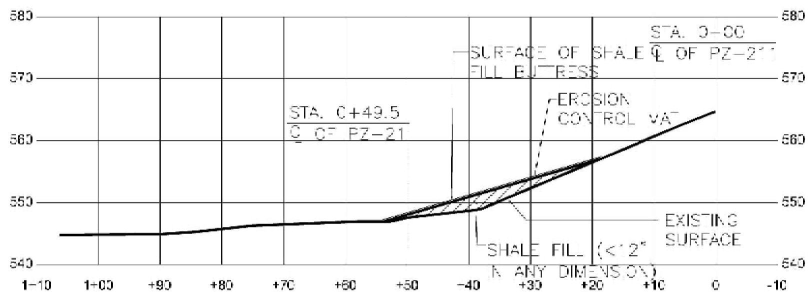
PZ-205 AREA AS BUILT CONDITIONS
PZ-211 AREA AS BUILT CONDITIONS
PLAN
N
FEET
3" CONC. MON. B-1
NORFOLK SOUTHERN RAILROAD
SILT FENCE
LIMITS OF FILL PLACEMENT
PZ-205C
PZ-205B
PZ-205D
PZ-205
N=1487.8254
E=4119.4913
PZ-205A
PZ-107D
CPP INV. 35'
PZ-108
(ABANDONED)
PZ-109
PZ-110
PZ-211
PZ-211C
PZ-211A
N=421.7757
E=5687.8216
(ABANDONED)
PZ-20
PZ-13S
PZ-12
PZ-11
LEGEND
SOIL BORING
PIEZOMETER
EXISTING CONTOURS
PROPOSED CONTOURS
LIMITS OF FILL PLACEMENT
SILT FENCE
ISH, INC.
RALEIGH, NORTH CAROLINA
KEY ENVIRONMENTAL INCORPORATED
MONTOUR STEAM ELECTRIC STATION
SLOPE REPAIR - SOUTH SIDE
PPL GENERATION, LLC
WASHINGTONVILLE, PENNSYLVANIA
PPL CORP.
D325534
REVISED PZ-205 AREA PER ASBUILT CONDITIONS



PZ-205 AREA SECTION A-A'

V 0 10 20 FEET

H 0 10 20 FEET



PZ-211 AREA SECTION B-B'

V 0 10 20 FEET

H 0 10 20 FEET

NOTE:
FOR PLAN LOCATION OF CROSS SECTIONS SEE SHEET C002

1		REVISED PZ-205 AREA PER ASBUILT CONDITIONS
NO.	DATE	REVISION

ISH, INC.
RALEIGH, NORTH CAROLINA

KEY ENVIRONMENTAL INCORPORATED

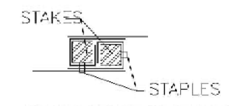
DRWN: SJC	DATE: 3-08-07
CHKD: ETS	DATE: 3-08-07
APPD: AEB	DATE: 3-08-07
SCALE:	AS SHOWN

WO 36025296-01

MONTOUR STEAM ELECTRIC STATION
SLOPE REPAIR - SOUTH SIDE
AND NW 1/8 AREAS OF BASIN #
PPL GENERATION, LLC
WASHINGTONVILLE, PENNSYLVANIA

PPL CORP.

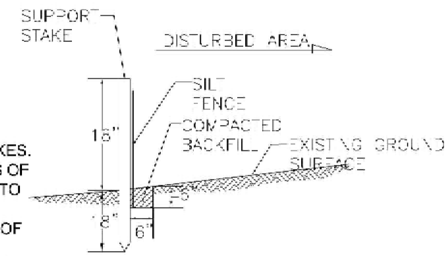
PPL DRAWING NO. D325534 SHEET NO. 3 REV. 1



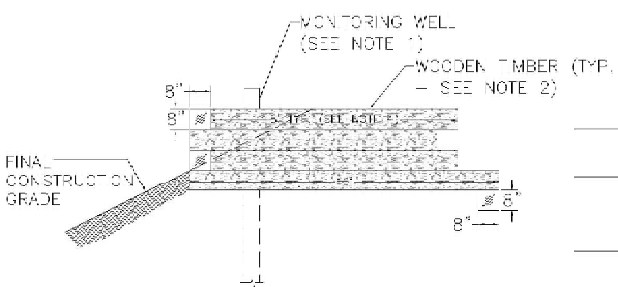
JOINING FENCE SECTIONS

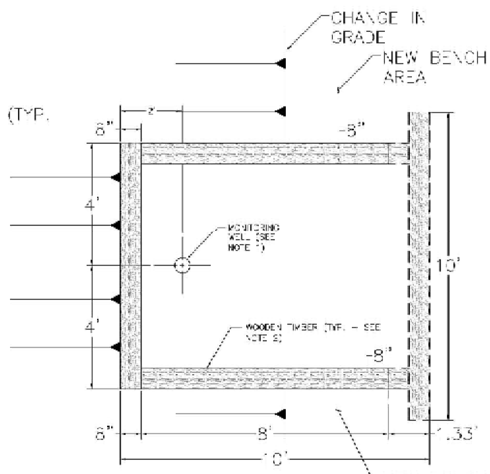
NOTES:

1. STAKES SPACED @ 8' MAXIMUM. USE 2" X 2" WOOD OR EQUIVALENT STEEL STAKES.
2. SILT FENCE MUST BE PLACED AT OR NEAR LEVEL EXISTING GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.
3. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FENCE.
4. ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPAIRED.

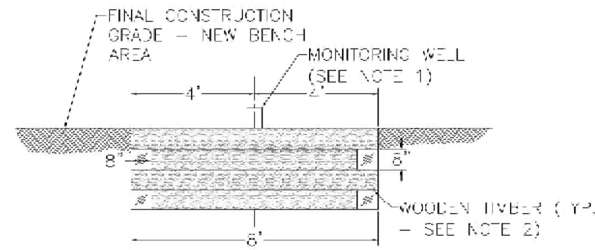


SILT FENCE DETAIL (1 / C003)
NOT TO SCALE





PLAN VIEW



WELL PLATFORM DETAIL (2 / C003)
NOT TO SCALE

NOTES:

1. WELL PZ-107 TO BE EXTENDED VERTICALLY 8.5' FROM EXISTING ELEVATION BY OTHERS.
2. 8"x8" ACQ (ALKALINE COPPER QUATERNARY) TREATED TIMBERS.
3. 3/8" GALVANIZED SPIKES WITH MINIMUM 4 SPIKES PER 8' TIMBER AND 2 SPIKES AT INTERSECTS.
4. TIMBERS WILL BE 8' LENGTH UNLESS OTHERWISE NOTED.

ISH, INC.
RALEIGH, NORTH CAROLINA

KEY ENVIRONMENTAL INCORPORATED

WO 36025296-01

MONTOUR STEAM ELECTRIC STATION
SLOPE REPAIR - SOUTH SIDE
AND NW - HE AREAS OF BASIN #
PPL GENERATION, LLC
WASHINGTONVILLE, PENNSYLVANIA

PPL CORP.

D325534 4 0

CONSTRUCTION SEQUENCE

1. Mobilize equipment and personnel to site;
2. Extend monitoring well PZ-107D well casing (PZ-205 location only);
3. Install Erosion and Sediment Control (E&SC) appurtenances in accordance with the E&SC Plan;
4. Field-demarcate limits of proposed fill placement;
5. Remove and stockpile vegetative matter from within limits of proposed fill placement;
6. Place coarse aggregate on outside face of proposed fill placement area (PZ-205 location only);
7. Place and compact shale borrow material obtained from on-property stockpile;
8. Place stockpiled vegetative matter (to the extent available) on surface of compacted shale;
9. Seed and mulch the fill areas and other disturbed areas;
10. Install Erosion Control Matting (ECM) on revegetated sideslope areas;
11. Construct access platform around extended monitoring well PZ-107D well casing (PZ-205 location only);
12. Survey final conditions as required to prepare as-built report;
13. Continue inspection of E&SC appurtenances until vegetation is established; and,
14. Remove E&SC appurtenances, after 70% vegetative coverage has been re-established.

CONSTRUCTION SPECIFICATIONS

Monitoring Well Extension (PZ-205 location only): Existing monitoring well PZ-107D shall be extended by 8.5 feet to provide for adjacent fill placement around the well. The outer steel casing shall be extended by welding additional steel casing segments to the existing casing. The inner PVC casing shall be extended by attaching additional PVC segments with physical (i.e., unglued) couplers. A locking protective steel cover shall be replaced on top of the extended steel casing.

Erosion and sediment controls: Erosion and Sediment Control (E&SC) appurtenances shall be installed in accordance with the requirements of these Drawings. Silt fences shall also be installed adjacent to the downslope limits of stockpiles created in association with site preparation activities described below.

Site Preparation: Site preparation shall consist of the removal of all vegetative matter, including roots, within proposed construction areas as specified and as indicated on these Drawings, or as otherwise directed by the Owner's Representative, to properly execute the work. Roots and attached soil shall be placed in stockpiles for subsequent replacement on the fill surface; other vegetative matter shall be disposed in accordance with applicable regulations. Stockpiles sideslopes shall not exceed 3 horizontal to 1 vertical.

Coarse Aggregate Fill:

- Coarse Aggregate Fill shall be placed to the lines and grades shown on these Drawings.
- Coarse Aggregate Fill shall be AASHTO #3 aggregate or Engineer-approved equal.
- There is no compaction or lift thickness requirement for placement of Coarse Aggregate Fill.

Shale Fill:

- Shale Fill shall be placed to the lines and grades shown on these drawings.
- Shale Fill shall be comprised of semi-competent shale fragments obtained from an existing on-site source. The material shall not contain more than 10 percent fragments greater than 12 inches in any dimension, and shall be generally free of debris, wood and vegetative matter. Spreading, re-working, and/or compaction shall be acceptable methods of particle size reduction, if required.
- Shale Fill shall be spread in lifts not exceeding 12 inches in loose thickness, and compacted by a minimum of three (3) passes of a sheepsfoot roller or other Engineer-approved compaction equipment. Efforts shall be taken to minimize the slope of each lift: placement should be parallel to the existing slope to the maximum extent practical. Shale Fill shall not be placed in water or on frozen soil. The surface of each lift shall be scarified to the extent practical prior to placing the next lift, to affect adequate bonding of the lifts.
- Care shall be taken during placement of Shale Fill around extended monitoring well casing (PZ-107D) to preclude damage to the casing. Compaction around the monitoring well casing shall be performed utilizing a hand-operated tamper or similar device.

Seeding and mulching:

- A 10-20-20 (N-P-K) analysis fertilizer shall be applied at a minimum rate of 140 pounds per 1000 square yards of seedbed. Method of application shall be in accordance with the supplier's recommendations.
- Grass seed shall be Formula B or D (or Engineer-approved equal) as identified in the Pennsylvania Department of Transportation Publication 408.
- Seeding shall be performed between March 15 and June 1 or between August 1 and October 15.
- Seed shall be applied at a minimum rate of 21 pounds per 1000 square yards.
- An ECM shall be installed over the seedbed on revegetated sideslope areas. ECM shall be "ECS-2" double-net straw product as manufactured by East Coast Erosion Blankets (1-800-582-4005), or Engineer-approved equal. Installation shall be in accordance with the manufacturer's recommendations.

Monitoring Well Access Platform: a monitoring well access platform shall be constructed around the extended monitoring well casing at monitoring well PZ-107D. The platform shall be constructed of the materials specified and to the lines and grades shown on these Drawings.

EROSION AND SEDIMENT CONTROL PLAN

An Erosion and Sediment Control (E&SC) Plan is required for this project because the anticipated area of disturbance (approximately 34,000 square feet (SF)) will exceed 5,000 SF. Nonetheless, the anticipated area of disturbance is less than one (1) acre such that a NPDES permit will not be required. This E&SC Plan was prepared in accordance with PADEP's Erosion and Sediment Pollution Control Program Manual (Manual). Per the Manual, there are 11 factors that must be considered when developing an E&SC Plan for earth disturbance activities. The following discussion, which describes the 11 factors, and the drawings comprise the plan for the implementation and maintenance of erosion and sediment control BMPs. These BMPs have been selected to minimize the potential for accelerated erosion and sedimentation at the project during and after implementation of the construction activities.

Existing Topographic Features: existing topographic features of the abatement areas are presented on Drawing G001. Both abatement areas are located on the sideslope of an ash impoundment berm.

Site Soils: surface soils within the disturbance area primarily composed of stiff silty clay (fill) with some shale fragments.

Characteristics of Earth Disturbance Activity: the abatement areas will be cleared and grubbed to remove existing vegetation, and fill materials will be placed in lifts to construct an earthen buttress in each area.

Stormwater Runoff: runoff from the disturbed areas will pass through BMPs and subsequently discharged into existing nearby watercourses. Permanent stormwater provisions/modifications are not required.

Location/Classification of Waters of the Commonwealth: runoff from the site (the portion of the site addressed by this E&SC Plan) will be conveyed to Chillisquaque Creek via an unnamed tributary. The tributary discharges into a stormwater detention basin prior to discharge into Chillisquaque Creek. Chillisquaque Creek ultimately discharges into the West Branch of the Susquehanna River. Per the stream classifications found in 25 Pennsylvania Code Chapter 93, Chillisquaque Creek and its sources are designated as protected use classification "Warm Water Fishes (WWF)".

Best Management Practices: E&SC appurtenances for this project will include silt fences, at the location shown on Drawing C001, and constructed in accordance with the detail shown on Drawing C003. The disturbed areas will be accessed from existing site haul roads that are routed over an existing rock construction entrance near Strawberry Ridge Road. Therefore, additional rock construction entrances will not be required. Upon completion of the earth disturbance activities, all disturbed areas will be seeded and mulched, or otherwise stabilized by permanent placement of aggregate over the exposed surface.

Sequence of BMP Installation and Removal: see "Construction Sequence", this sheet, for information regarding sequence of BMP installation and removal.

Supporting Calculations: no calculations were required for design of the proposed BMPs.

Plan Drawings: various aspects of the proposed BMPs are depicted on Drawings C001 and C003.

Maintenance Program: maintenance activities associated with the proposed BMPs are provided on this sheet.

Recycling/Disposal of Materials: The only excess materials expected to result from construction are removed vegetation and associated soils. These materials, to the extent available, will be spread on the buttress surface, to augment future vegetative growth.

Formula and Species	% By Weight	Minimum % Purity	Minimum % Germination	Max % Weed Seed	Seeding Rate, Lbs. Per 1000 SY
Formula B					**21.0 Total**
Perennial Ryegrass Mixture (Lolium perenne). A combination of improved certified varieties with no one variety exceeding 50% of the total Ryegrass component.	20	98	90	0.15	4
Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6
Kentucky Bluegrass Mixture (Poa pratensis). A combination of improved certified varieties with no one variety exceeding 25% of the total Bluegrass component.	50	98	80	0.2	11
Formula D					**21.0 Total**
Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	15
Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6

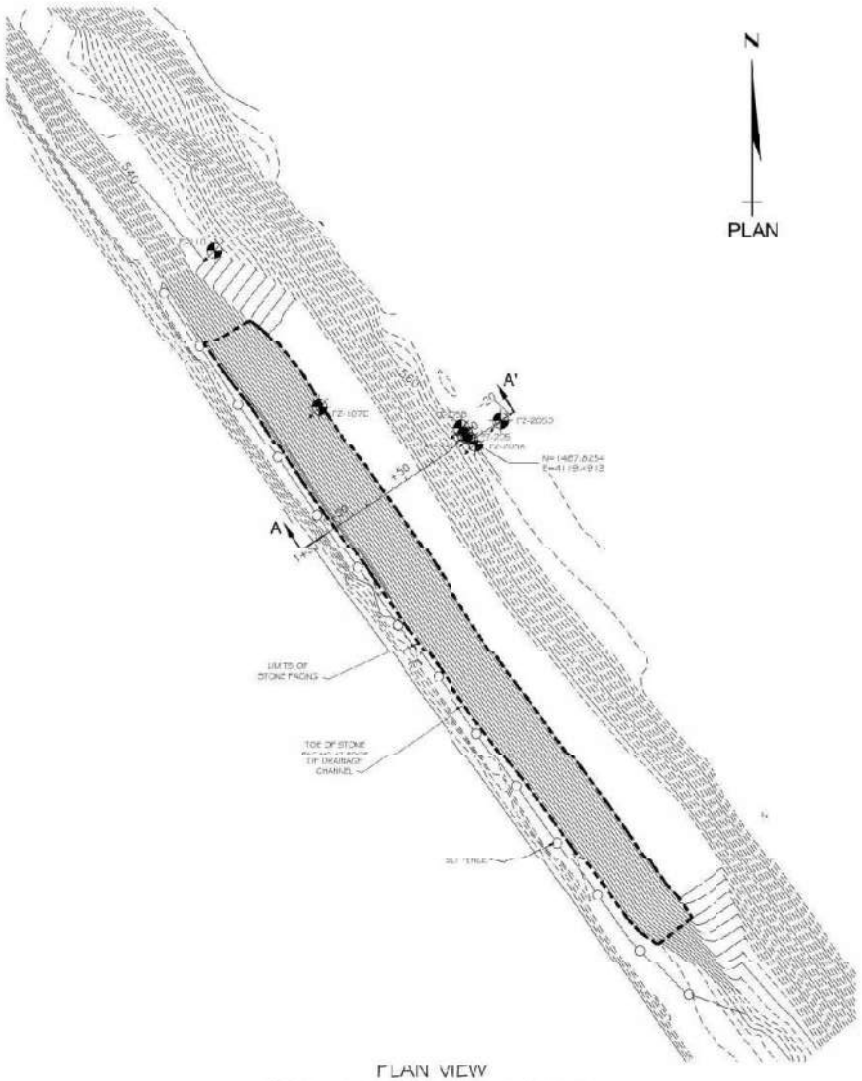
ISH, INC.
RALEIGH, NORTH CAROLINA

KEY ENVIRONMENTAL INCORPORATED

MONTOUR STEAM ELECTRIC STATION
SLOPE REPAIR - SOUTH SIDE
AND MW 1-6 AREAS OF BASIN #1
PPL GENERATION, LLC
WASHINGTONVILLE, PENNSYLVANIA

PPL CORP.

D325534 | SHEET 5 | REV. 0



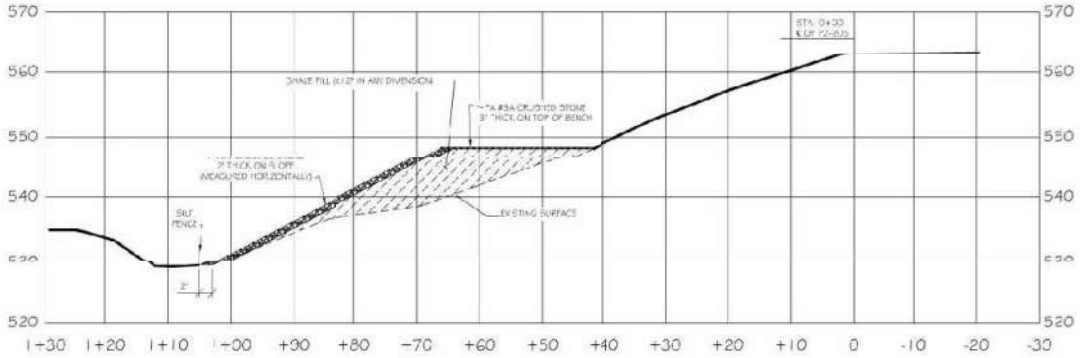
PLAN VIEW

SOUTH DIKE STABILIZING BERM

0 40 80 FEET

N

PLAN



SECTION A-A'

V: 0 10 20 FEET

H: 0 10 20 FEET

LEGEND

- SUPER SILT FENCE OR EQUIV. MULCH LOG
- PIEZOMETER
- 540 EXISTING CONTOURS
- 540 EXISTING CONTOURS ON BERM

ACCT: 3500.1355
SCALE: as shown
BY: jbr

MONTOUR S.E.S.
ASH BASIN #1
SOUTH DIKE STABILIZING BERM
STONE FACE

DERRY TOWNSHIP, MONTOUR COUNTY, PA.

APPROVED ANDREW D. STEAR DATE 3/5/20 0

PPL CORP.

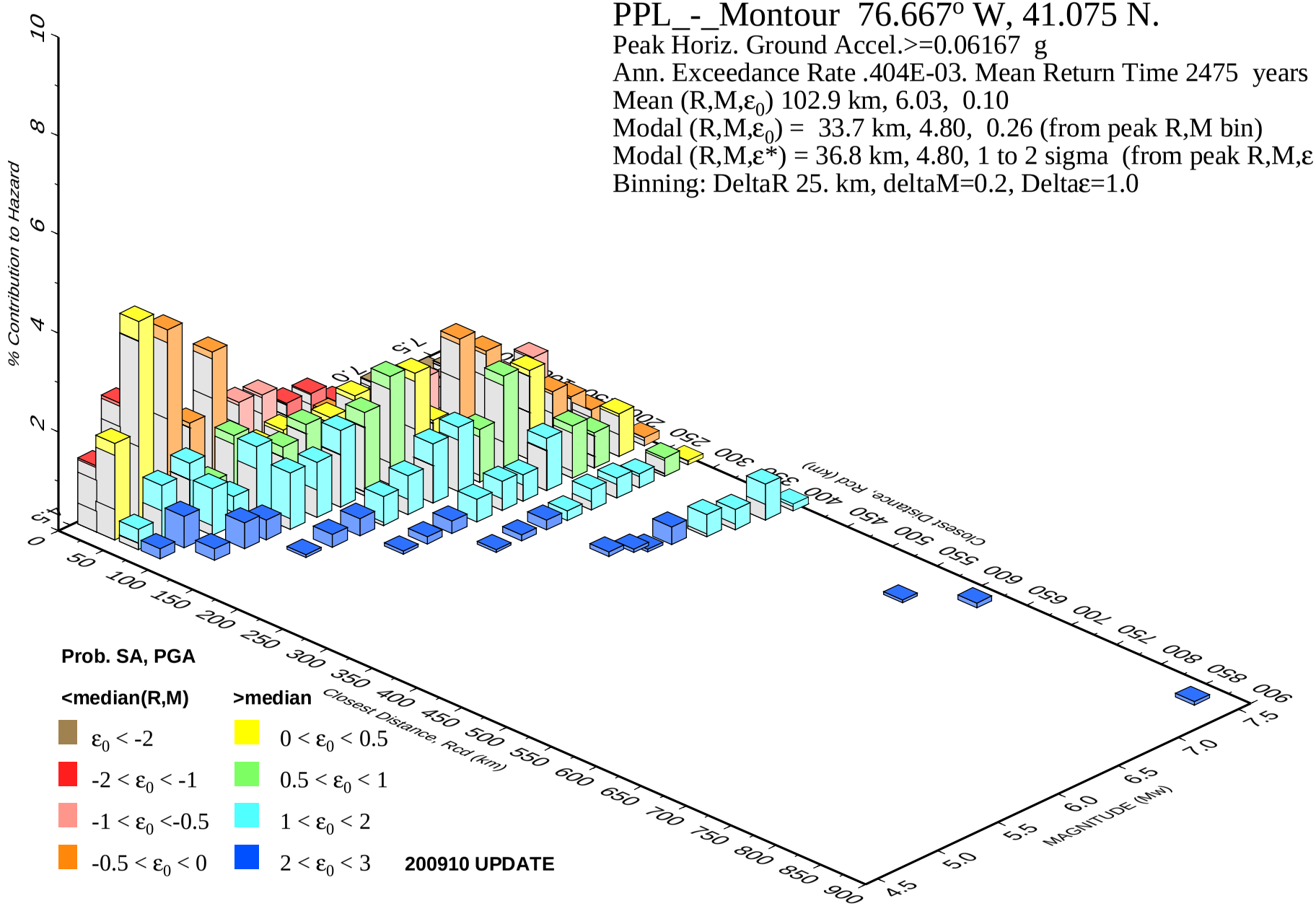
PPL DRAWING NO. D327369 SHEET NO. 1 of 1 REV. 1 0

ATTACHMENT G

SEISMIC COEFFICIENT

PSH Deaggregation on NEHRP BC rock
PPL_-_Montour 76.667º W, 41.075 N.

Peak Horiz. Ground Accel.>=0.06167 g
Ann. Exceedance Rate .404E-03. Mean Return Time 2475 years
Mean (R,M,ε_0) 102.9 km, 6.03, 0.10
Modal (R,M,ε_0) = 33.7 km, 4.80, 0.26 (from peak R,M bin)
Modal (R,M,ε*) = 36.8 km, 4.80, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 25. km, deltaM=0.2, Deltaε=1.0



ATTACHMENT H

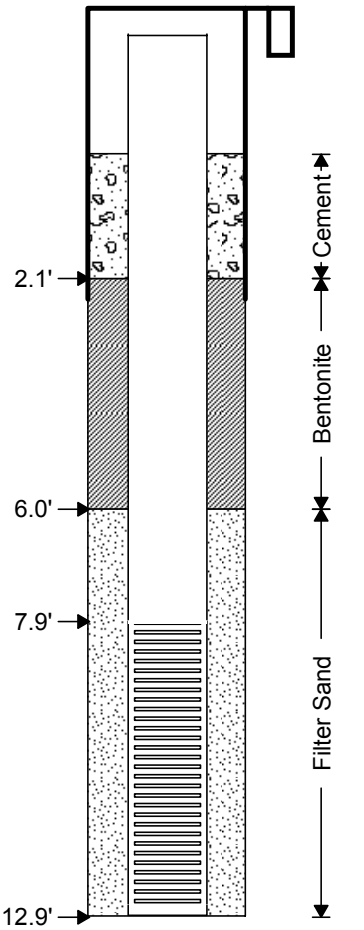
RELEVANT PREVIOUSLY DRILLED TEST BORING LOGS

Piezometer: PZ-205A

Client: **PPL Montour, LLC**	***Ground Elevation (Ft. MLSL):*** **Not Surveyed**
Site Location: **Montour, PA**	***Top of Casing Elevation (Ft. MLSL):*** **Not Surveyed**
Date Started: **8/24/2006**	***Northing:*** **Not Surveyed**
Date Completed: **8/24/2006**	***Easting:*** **Not Surveyed**
Logged by: **M. Ferlin**	***Total Well Depth (Ft.):*** **13**
Drilled by: **Eichelburgers, Inc.**	***Drilling Method:*** **4.25" Hollow Stem Auger**

Depth (feet)	Elevation	Recovery (feet/feet)	Blows (per 0.5 foot)	Symbol	Lithologic Description
-3					
-1	0.00				Ground Surface
1					0-5 ft: Clay and bottom ash, augered through clay and bottom ash
3	-5.00				
5		1.0/2.0	2,2,2,1		5-10.7 ft: Gray, clay and bottom ash, moist to wet
7		0.2/2.0	0,2,2,2		
9		0.6/20.	1,1,2,2		
11	-10.70	1.0/2.0	2,2,3,3		10.7-12.4 ft: Light brown clay with orange iron staining, dry
13	-12.40 -13.00				12.4-13 ft: Dark brown clay and weathered shale pieces with a little bottom ash
15					**Lithologic log from Ish Inc./ META Environmental, August 2005**
17	-17.00				

Well Diagram



Piezometer constructed of 2-inch ID schedule 40 PVC, 4 feet of screen with 0.01-inch openings

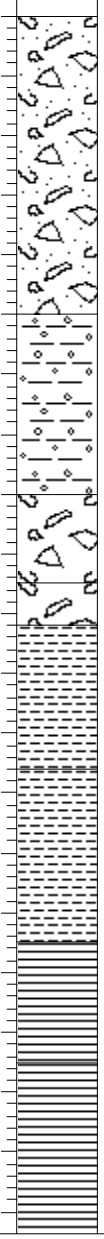
MTR

MO-SB107

PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 10/28/2004
DATE COMPLETED: 10/28/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER: JJ
DRILLING METHOD: 4 1/4" ID Hollow stem auger
SAMPLE METHOD: 2" by 24" Split spoon sampler

GROUND ELEVATION:
PROTECTIVE CASING ELEVATION:
WELL ELEVATION:
DEPTH TO WATER:
BOREHOLE DEPTH: 58.0 ft. below grade
X-COORDINATE:
Y-COORDINATE:
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION
					Ground Surface
					Silt and Rock Augered through silt and rock
5-7	2,1,1,4	60			**Clay** Wet, black clay and rock pieces, wood in shoe
7-9	4,4,3,3	50			
					Wood and Rock Wet, black wood and rock pieces, clay in shoe.
9-11	3,4,4,4	75			
					Rocky fill Wet, angular, broken rock pieces
11-13	1,1,6,5	60			**Clay** Moist, brown clay with a little orange iron staining
13-15	7,11,14,32	65			**Clay** Dry, brown clay and weathered shale with orange iron staining
15-17	10,26,30,36	75			
					Weathered Shale and Clay Moist, black weathered shale and clay with red iron staining and horizontal bedding
17-17.5	50,50/0	60			
					Run 1 - RQD=0% Weathered Black Shale with a few competent pieces Horizontal fracture (HF)



MO-SB107

PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 10/28/2004
DATE COMPLETED: 10/28/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER: JJ
DRILLING METHOD: 4 1/4" ID Hollow stem auger
SAMPLE METHOD: 2" by 24" Split spoon sampler

GROUND ELEVATION:
PROTECTIVE CASING ELEVATION:
WELL ELEVATION:
DEPTH TO WATER:
BOREHOLE DEPTH: 58.0 ft. below grade
X-COORDINATE:
Y-COORDINATE:
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION	DEPTH (ft.)	LITHOLOGY	WELL CONSTRUCTION	REMARKS
					Run 1 - RQD=0% Weathered Black Shale with a few competent pieces HF HF HF HF HF	21 22 23			
					Run 2 - RQD=40% Massive Black Shale HF and Vertical fracture (VF) HF HF HF HF HF HF HF	24 25 26 27			
					Run 3 - RQD=61% Massive Black Shale HF Calcite deposit Calcite and pyrite deposits Pyrite deposit	28 29 30 31 32 33 34 35 36			
					Run 4 - RQD=68% Massive Black Shale Circular pyrite deposits Calcite deposit	37 38 39 40			

MO-SB107

PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 10/28/2004
DATE COMPLETED: 10/28/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER: JJ
DRILLING METHOD: 4 1/4" ID Hollow stem auger
SAMPLE METHOD: 2" by 24" Split spoon sampler

GROUND ELEVATION:
PROTECTIVE CASING ELEVATION:
WELL ELEVATION:
DEPTH TO WATER:
BOREHOLE DEPTH: 58.0 ft. below grade
X-COORDINATE:
Y-COORDINATE:
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION	DEPTH (ft.)	LITHOLOGY	WELL CONSTRUCTION	REMARKS
					Run 5 Massive Black Shale VF with calcite deposit Pyrite deposit Circular pyrite deposits Pyrite deposit HF Calcite veins VF along pyrite deposit **Run 6** Massive Black Shale HF and pyrite deposit Pyrite and calcite deposits Pyrite and calcite deposits Pyrite and calcite deposits End Log	41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60			

MO-PZ107D

PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 10/28/2004
DATE COMPLETED: 10/28/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER: JJ
DRILLING METHOD: 4 1/4" ID Hollow stem auger
SAMPLE METHOD: 2" by 24" Split spoon sampler

GROUND ELEVATION: 538.550 ft. above MSL
PROTECTIVE CASING ELEVATION: 541.879 ft above MSL
WELL ELEVATION: 541.333 ft. above MSL
DEPTH TO WATER:
BOREHOLE DEPTH: 17.0 ft. below grade
X-COORDINATE: 2268873.623
Y-COORDINATE: 332506.728
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION	DEPTH (ft.)	LITHOLOGY	WELL CONSTRUCTION	REMARKS
					Ground Surface See MO-SB107 Augered to 17 ft. below grade to set well	0			Artesian Conditions
						1			
						2			
						3			
						4			
						5			
						6			Bentonite Seal
						7			
						8			
						9			
						10			
						11			
						12			Sand screen pack
						13			
						14			
						15			
						16			
					End Log	17			
						18			
						19			
						20			

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

WELL NUMBER MB-23/MPZ-7

CLIENT PPL Montour Station
PROJECT NAME Basin Wide Hydrogeologic and Risk Assessment
PROJECT NUMBER 132-065.0030
PROJECT LOCATION Washingtonville,PA
DATE STARTED 2/13/14 **COMPLETED** 2/13/14
ELEVATION 565.69 ft **CASING ELEVATION** 568.79 ft
DRILLING CONTRACTOR Eichelbergers
WELL INSTALLED Yes **STICKUP** 3.1 ft above
DRILLING METHOD Hollow Stem Auger
OUTER CASING 2", PVC
DRILLER Chris Chronister **CEC REP** BLS
DEVELOPMENT METHOD surging
DIAMETER 4" **CORE SIZE**
RESULTS clear
BACKFILL 2" PVC monitoring well
YIELD 25 gal
MONITORING EQUIPMENT
NORTHING 334317.61 **EASTING** 2268170.57
KEY #
WATER LEVELS
NOTES Material Description from MB-23/MPZ-7S; No Samples Collected.
CCR - Coal Combustion Residuals
Horizontal Coordinates are expressed in State Plane NAD83 North
and Elevations are expressed in NAVD '88
BEFORE CORING ---
AT END OF DRILLING ---
AFTER DRILLING ---
WELL ON 4/1/2014 6.3 ft / Elev 559.4 ft

DEPTH (ft)	MATERIAL DESCRIPTION		WELL DIAGRAM
0	Black and dark gray SILT, CLAY AND SAND, moist-, hard, **(FILL)**		
1.0		564.7	2" PVC Riser
	Dark gray to black silty to medium SAND, moist-, hard, **(CCR)**		Hydrated Bentonite Hole Plug
5			
5.0		560.7	
	Gray silty to medium SAND, moist- to wet, soft, **(CCR)**		
10			
10.0		555.7	Clean Quartz Sand
	Dark gray to black medium to coarse SAND, wet, very soft, **(CCR)**		
15			
16.0		549.7	2" PVC 0.01" Slot Screen
	Gray to black silty to medium SAND, wet, **(CCR)**		
20			
20.0		545.7	

CEC GENERAL BH / TP / WELL PPL MONTOUR INVESTIGATION.GPJ NEW CEC.GPJ 12/29/14

(Continued Next Page)

Civil & Environmental Consultants, Inc.
333 Baldwin Road
Pittsburgh, PA 15205

WELL NUMBER MB-23/MPZ-7

CLIENT PPL Montour Station **PROJECT NAME** Basin Wide Hydrogeologic and Risk Assessment

PROJECT NUMBER 132-065.0030 **PROJECT LOCATION** Washingtonville,PA

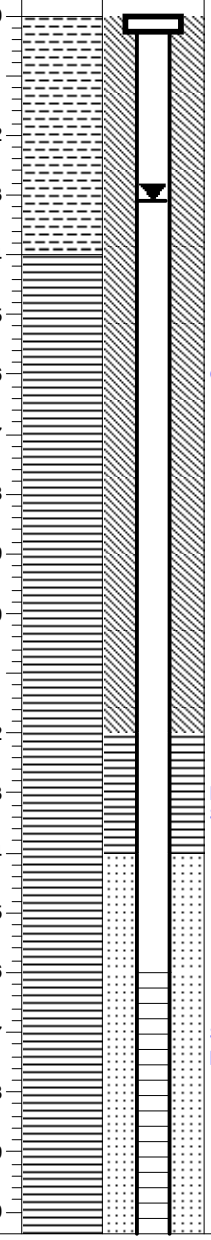
DEPTH (ft)	SAMPLE TYPE	SAMPLE ID	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
20				Dark gray to black medium to coarse SAND, wet, **(CCR)**	Clean Quartz Sand
25				25.0 — 540.7 Black silty to medium SAND, wet, **(CCR)**	2" PVC 0.01" Slot Screen
30				30.0 — 535.7 Bottom of boring at 30.0 feet.	

MO-PZ11

PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 11/11/2004
DATE COMPLETED: 11/11/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER:
DRILLING METHOD: Air Rotary
SAMPLE METHOD:

GROUND ELEVATION: 549.143 ft. above MSL
PROTECTIVE CASING ELEVATION: 552.243 ft. above MSL
WELL ELEVATION: 552.022 ft. above MSL
DEPTH TO WATER: 3.1 ft. below TOC
BOREHOLE DEPTH: 26 ft. below grade
X-COORDINATE: 2270969.165
Y-COORDINATE: 333053.123
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION
					Ground Surface **Overburden** Clay and weathered shale **Shale** Black massive shale

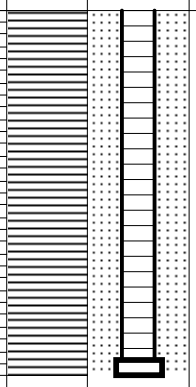


MO-PZ11

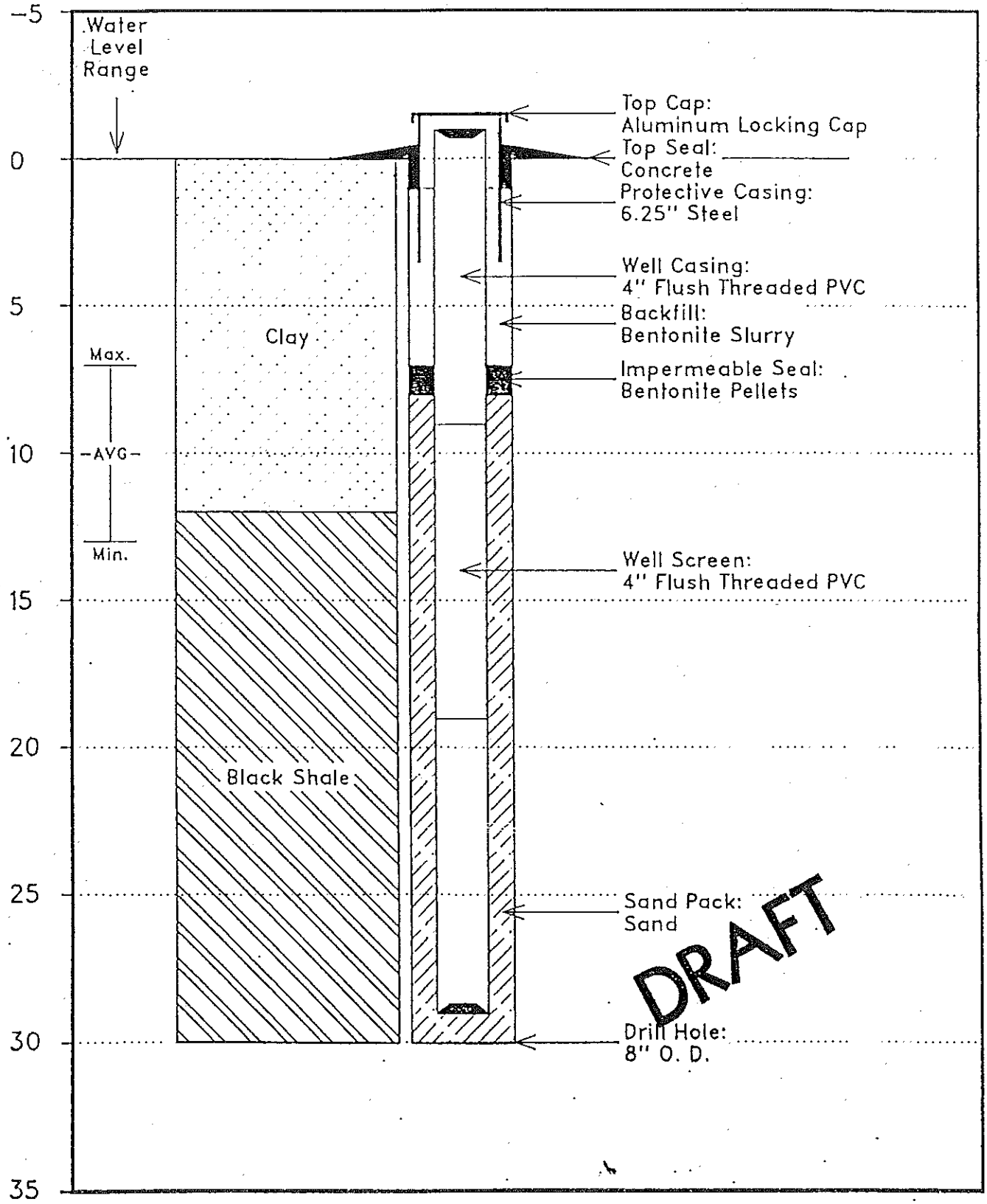
PROJECT: Montour Ash Basin
PROJECT NO: I03035
LOCATION: Washingtonville, PA
DATE STARTED: 11/11/2004
DATE COMPLETED: 11/11/2004
DRILLING CONTRACTOR: Eichelberger
DRILLER:
DRILLING METHOD: Air Rotary
SAMPLE METHOD:

GROUND ELEVATION: 549.143 ft. above MSL
PROTECTIVE CASING ELEVATION: 552.243 ft. above MSL
WELL ELEVATION: 552.022 ft. above MSL
DEPTH TO WATER: 3.1 ft. below TOC
BOREHOLE DEPTH: 26 ft. below grade
X-COORDINATE: 2270969.165
Y-COORDINATE: 333053.123
WEATHER:
GEOLOGIST/OBSERVER: Lara Gray
ENTERED BY: Lara Gray

SPLIT SPOON INTERVAL (ft.)	BLOWS PER 0.5 ft.	% RECOVERY	OMV (PPM)	SAMPLE	SOIL DESCRIPTION	DEPTH (ft.)	LITHOLOGY	WELL CONSTRUCTION	REMARKS
					End Log	21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40			



PP&L
MONTOUR S.E.S.
MONITORING WELL CONSTRUCTION DETAIL
GWMW 1-3



DRAFT

Installation Date: 3/27/85

Monitoring Well Installation Data Sheet

Site: Montour SES
Facility: Basin No. 1
Number: MW 1-5
PP&L Supervisor: Craig S. Shamory/David Stoner

Drilling Company: Bellview Pump Sales
Driller: Keith Lorah

Drilling Log

Date: 6/4/87

Interval (ft)	Strata Characteristics	Comments
0 - 9	Brown and black clay/fill	moist
9 - 20	Black shale	water @ 16 ft. (<1/2 gpm)

Water developed for 30 minutes; air developed for 10 minutes.

Completion Details

Date: 6/5/87

Hole open to 19 ft.
Water level @ 1 ft.
Fill hole with sand from 19 to 13 ft.
Install 10 ft. of 4" PVC screen of size 0.02" with bottom cap.
Install 5 ft. of 4" PVC solid pipe with top cap.
Sandpack from 13 to 2.5 ft.
Seal annulus from 2.5 to 1 ft with bentonite pellets and from 1 to surface pad (1 ft above original ground level) with cement.
Install 5 ft. of 6" steel protective casing with locking cap.
Stick up - 1.70 ft.

Date: 6/24/87

Total depth from top of PVC casing - 15.0 ft.
Total depth from top of steel casing - 15.4 ft.
Depth to Water from top of steel casing - 2.62 ft.