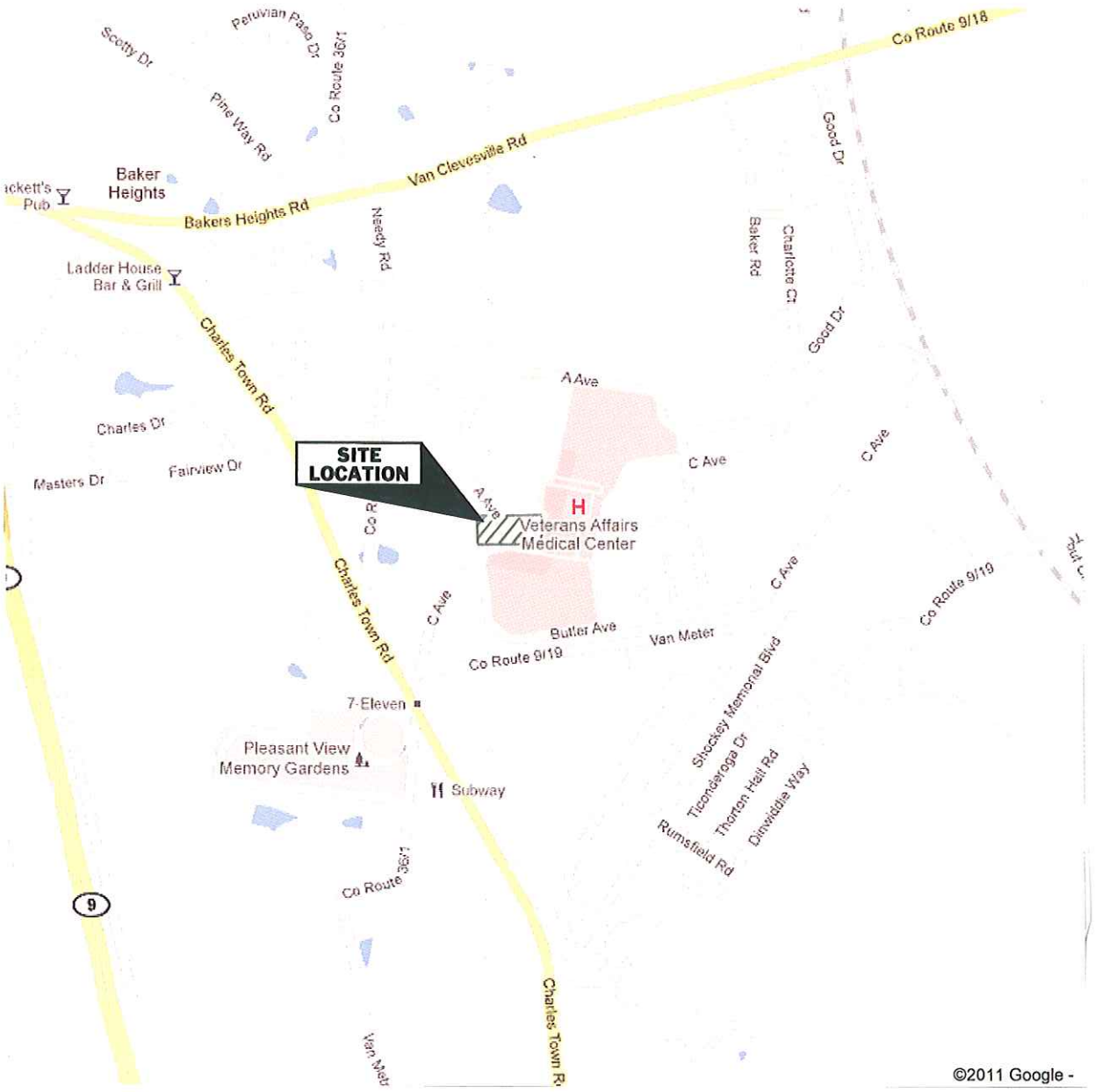
APPENDIX A

FIGURES



N

FIGURE 1

HARDIN-KIGHT ASSOCIATES, INC.
Consulting Engineers

7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061
(410) 553-0802
Fax (410) 553-0808

VA MARTINSBURG, WV

SITE LOCATION MAP

BERKELEY COUNTY, WEST VIRGINIA

SCALE	DATE	SOURCE	REVIEWED BY	PROJECT NO.
NTS	AUG. 2011	GOOGLE MAPS	JAF	11174

SCALE: 1"=50'

Hardin-Kight Associates, Inc.

Consulting Engineers

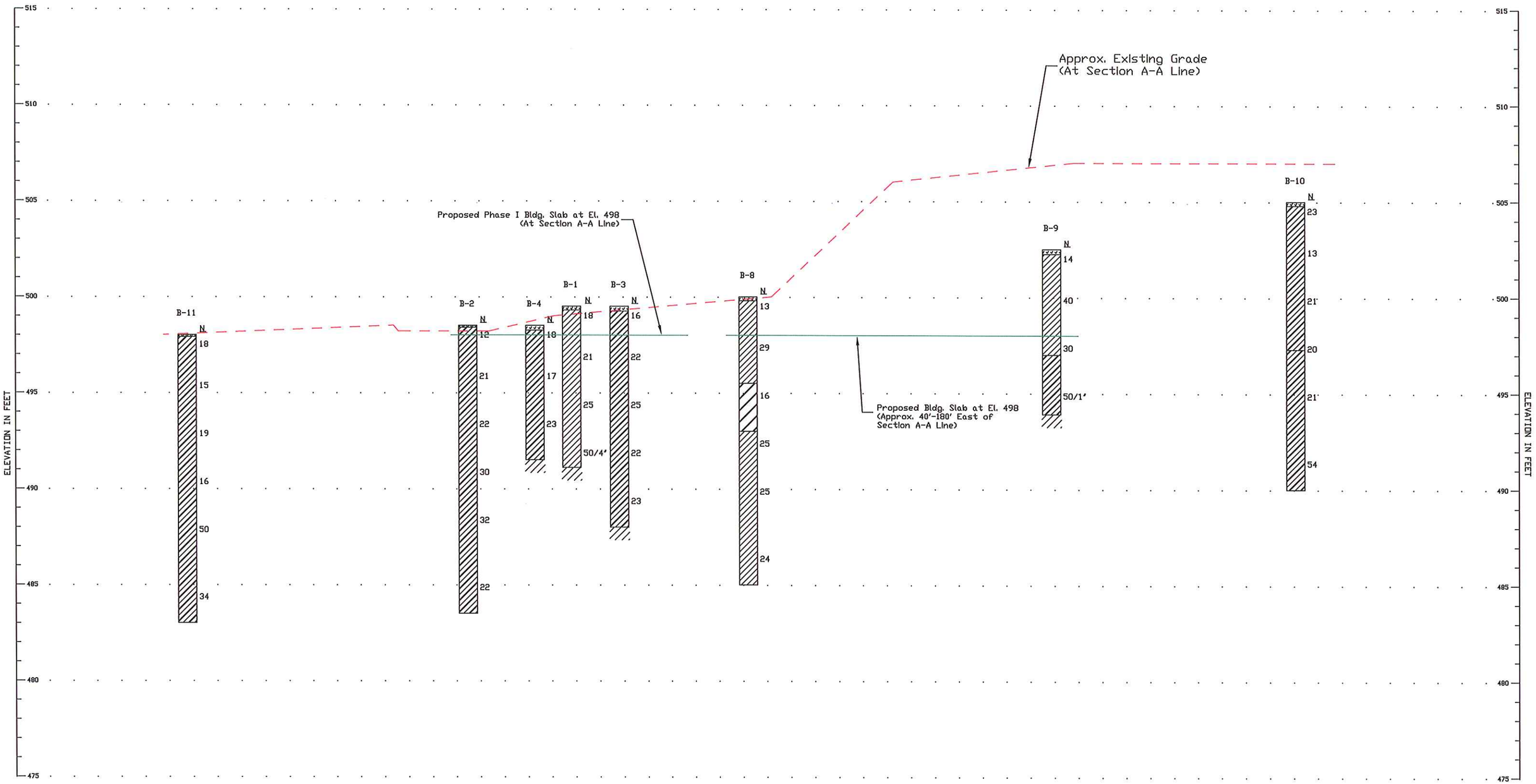
7524 WB&A ROAD, SUITE 100 GLEN BURNIE, MARYLAND 21061

PHONE: (410) 553-0802 FAX: (410) 553-0808 HKAI@HARDIN-KIGHTASSOCIATES.COM

VA MARTINSBURG, WV
BORING LOCATION PLAN

BERKELEY COUNTY, WEST VIRGINIA

FIGURE 2
August 2, 2011



Topsoil

Low-high plasticity clays

Medium plasticity clay

High plasticity clay

- Auger Refusal on Rock

- Water Level Encountered During Drilling

- Water Level at Completion

- 24 hr. Water Reading

SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=5'

Hardin-Kight Associates, Inc.

Consulting Engineers

7524 WB&A ROAD, SUITE 100 GLEN BURNIE, MARYLAND 21061

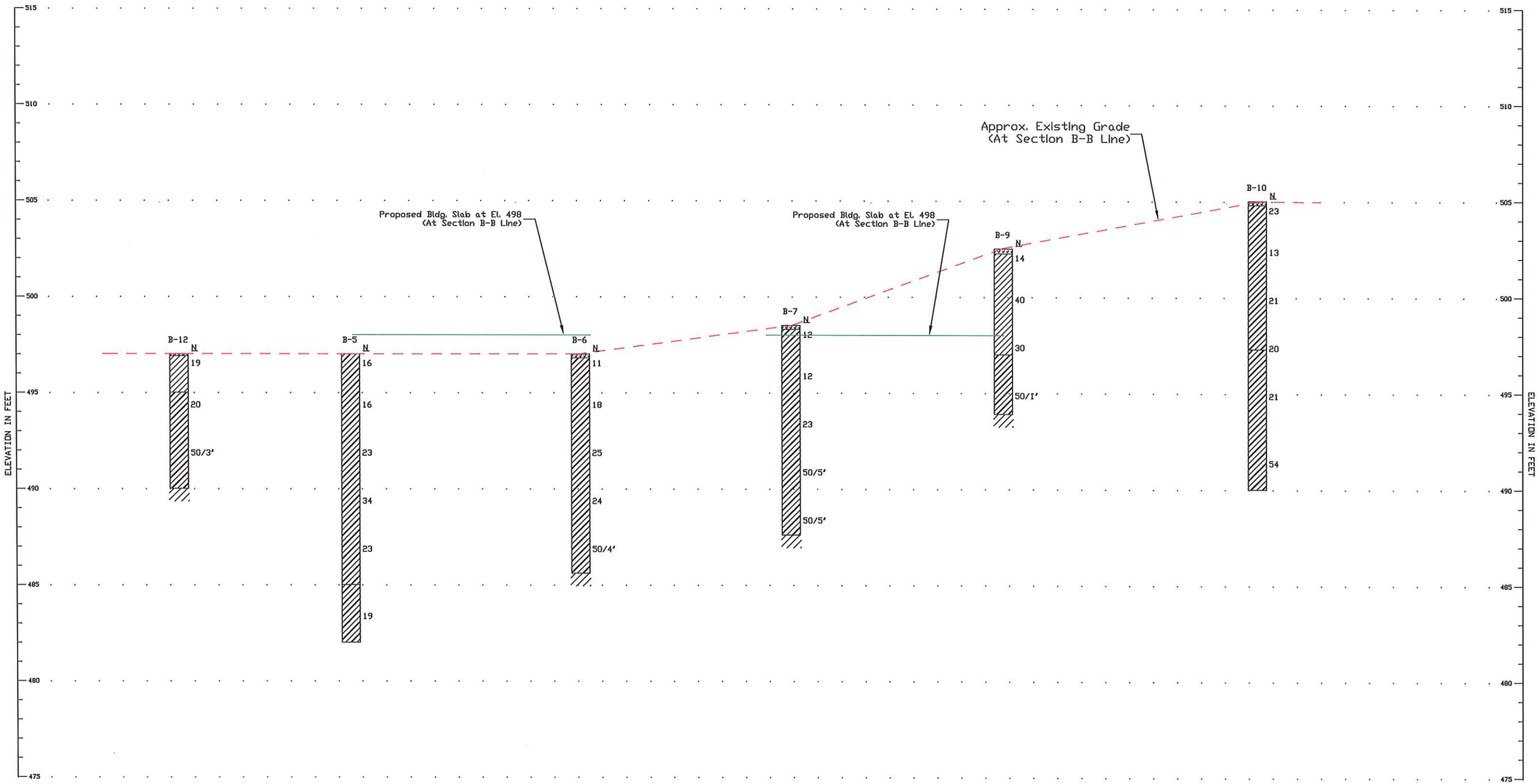
PHONE: (410) 553-0802 FAX: (410) 553-0808 HKAI@HARDIN-KIGHTASSOCIATES.COM

VA MARTINSBURG, WV

SECTON A-A

BERKELEY COUNTY, WEST VIRGINIA

FIGURE 3
August 2, 2011



Topsoil

Medium plasticity clay

Low-high plasticity clays

- Auger Refusal on Rock

- Water Level Encountered During Drilling

- Water Level at Completion

- 24 hr. Water Reading

SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=5'

Hardin-Kight Associates, Inc.

Consulting Engineers

7524 WB&A ROAD, SUITE 100 GLEN BURNIE, MARYLAND 21061

PHONE: (410) 553-0802 FAX: (410) 553-0808 HKAI@HARDIN-KIGHTASSOCIATES.COM

VA MARTINSBURG, WV

SECTON B-B

BERKELEY COUNTY, WEST VIRGINIA

FIGURE 4
August 2, 2011

APPENDIX B

SOIL BORING LOGS

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337801.883 E: 2416657.54

BORING NO. **B-1**
JOB NO. 11174

Surf. Elev.: 499.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 499.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	Topsoil (0.0–0.2)	0						
498	Brown, moist, very stiff to hard, medium plastic, silty lean CLAY, trace sand and rock fragments USC: (CL)*			7 9 9	1	11		
		3		8 8 13	2	9		
495	--- tan to yellow brown			10 10 15	3	18		
		6						
492				45 50/4	4	2		Hard drilling
	Boring Terminated at 8.4 Ft. Refusal at 8.4 Ft.	9						
489								
		12						
486								
		15						
483								
		18						
480								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at 24 hrs	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337739.284 E: 2416642.79

BORING NO. **B-2**
JOB NO. 11174

Surf. Elev.: 498.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-14-11
Date Finished: 7-14-11

Elev. 498.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	Topsoil (0.0–0.1)	0		4 6 6	1	15		
498	Brown, moist, stiff to very stiff, medium to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*							
		3		7 10 11	2	11		
495								
	---, mottled gray	6		6 9 13	3	12		
492								
		9		6 13 17	4	18		
489	---, mottled black, hard, lean to fat CLAY, little sand and rock fragments			10 13 19	5	18		
		12						
486	---, very stiff			6 9 13	6	16		
	Boring Terminated at 15 Ft. (15.0)	15						
483								
		18						
480								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337799.024 E: 2416746.64

BORING NO. **B-3**
JOB NO. 11174

Surf. Elev.: 499.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 499.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	Topsoil (0.0–0.3)	0		5 7 9	1	12		
498	Brown, moist, stiff to very stiff, medium plastic to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*	3		11 9 13	2	18		
495	---, orange brown, mottled gray	6		7 10 15	3	12		
492		9		8 8 14	4	18		
489	(11.5) Boring Terminated at 11.5 Ft. Refusal at 11.5 Ft.	12		12 11 12	5	18		
486		15						
483		18						
480								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at 24 hrs	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337731.402 E: 2416795.39

BORING NO. **B-4**
JOB NO. 11174

Surf. Elev.: 498.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 498.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Topsoil 0.3	0		4 9 9	1	8		
498	Brown, moist, very stiff, medium to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*							
		3		8 8 9	2	18		
495								
				7 9 14	3	15		
		6						
492	7.0 Boring Terminated at 7 Ft. Refusal at 7 Ft.							
		9						
489								
		12						
486								
		15						
483								
		18						
480								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

	Water	Caved
Encountered		
Completion	Dry	
On at 24 hrs	BOC	
On at		

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337636.338 E: 2416867.65

BORING NO. **B-5**
JOB NO. 11174

Surf. Elev.: 497±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 497.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Brown, moist, very stiff, medium to highly plastic, lean to fat CLAY, trace sand and rock fragments USC: (CL-CH)*	0		5 8 8	1	10		
495		3		7 8 8	2	12		
492		6		8 9 14	3	12		
489		9		8 13 21	4	18		
486				8 10 13	5	12		Temporary water monitoring pipe installed to 11.0'
	12.0 Brown, very moist, very stiff, medium to highly plastic, sandy lean to fat CLAY, little rock fragments USC: (CL-CH)*	12						
483				4 9 10	6	10		Layer of dark gray rock fragments from 13.1 - 13.2
	15.0 Boring Terminated at 15 Ft.	15						
480		18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T

	Water	Caved
Encountered		
Completion	Dry	
On at 24 hrs		Pipe
On at		

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337727.518 E: 2416898.99

BORING NO. **B-6**
JOB NO. 11174

Surf. Elev.: 497±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 497.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Topsoil 0.2	0						
	Brown, moist, stiff to very stiff, medium to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*			5 5 6	1	11	I	
495		3		9 9 9	2	7	I	
492		6		9 10 15	3	1	L	
489		9		8 12 12	4	10		
486	---, hard 11.4			10 21 50/4	5			
	Boring Terminated at 11.4 Ft. Refusal at 11.4 Ft.	12						
483		15						
480		18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at 24 hrs	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337811.434 E: 2416926.27

BORING NO. **B-7**
JOB NO. 11174

Surf. Elev.: 498.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 498.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Topsoil 0.2	0						
498	Brown, moist, stiff to very stiff, medium to highly plastic, lean to fat CLAY, trace sand and rock fragments USC: (CL-CH)*			3 5 7	1	13		
495		3		5 5 7	2	11		
492		6		5 10 13	3	10		
489	---, mottled gray, hard	9		10 11 50/5	4	17		
	10.9 Boring Terminated at 10.9 Ft. Refusal at 10.9 Ft.			22 50/5	5	14		Layer of gray rock fragments 10.7'-10.9'
486		12						
483		15						
480		18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T

	Water	Caved
Encountered		
Completion	Dry	
On at 24 hrs	Dry	
On at		

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337825.749 E: 2416803.62

BORING NO. **B-8**
JOB NO. 11174

Surf. Elev.: 500±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 500.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	Topsoil (0.0 – 0.2)	0		5 6 7	1	6		
498	Brown, moist, stiff to very stiff, medium plastic, silty lean CLAY, trace sand and rock fragments USC: (CL)*	3		11 15 14	2	12		
495	Tan, brown, mottled black, moist, very stiff, highly plastic, fat CLAY, trace sand USC: (CH)* (4.5 – 7.0)	6		5 6 10	3	7		
492	Brown, moist, very stiff, medium plastic, lean CLAY, trace to little sand and rock fragments USC: (CL)*	9		12 12 13	4	18		Layer of rock fragments from 8.3' - 8.5'
489		12		10 11 14	5	14		
486		15		10 12 12	6	18		
483	Boring Terminated at 15 Ft. (15.0)	18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T

		Water	Caved
Encountered			
Completion		Dry	
On	at 24 hrs	Dry	9.3'
On	at		

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337905.998 E: 2416910.64

BORING NO. **B-9**
JOB NO. 11174

Surf. Elev.: 502.5±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-14-11
Date Finished: 7-14-11

Elev. 502.5	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Topsoil 0.3	0		5 7 7	1	14		Offset 10' North Auger Refusal @ 7.8'
501	Brown, moist, stiff to hard, medium plastic, lean CLAY, trace to little sand and rock fragments (FILL) USC: (CL)*	3		5 21 19	2	16		
498	5.5 Brown to light brown, moist, hard, medium to highly plastic, lean to fat CLAY, trace sand and rock fragments, trace organics at 5.5' USC: (CL-CH)*	6		10 15 15	3	11		
495				15 30 50/1	4	2		
	Boring Terminated at 8.6 Ft. Refusal at 8.6 Ft.	9						
492		12						
489		15						
486		18						
483								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

	Water	Caved
Encountered		
Completion	Dry	
On at	BOC	
On at		

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 338007.122 E: 2416943.44

BORING NO. **B-10**
JOB NO. 11174

Surf. Elev.: 505±	Hammer Wt. 140	Rock Core Dia.:	Foreman: RK
Elev. from: TOPO	Hammer Drop: 30	Hole Diameter: 8 in.	Inspector: JAF
Offset Elev:	Sampler Size:	Boring Method: HSA	Date Started: 7-14-11
Offset Dist.:	Offset Direction:		Date Finished: 7-14-11

Elev. 505.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	0.0 Topsoil 0.2	0						
504	Brown, moist, very stiff to stiff, medium to highly plastic, lean to fat CLAY, trace sand and rock fragments (FILL) USC: (CL-CH)*			5 9 14	1	15		
		3		5 6 7	2	14		
501								
		6		6 7 14	3	17		
498	---, 1" bituminous concrete layer							
	---, organic layer from 7.5' to 7.7' 7.7			8 8 12	4	14		
	Brown, mottled black, moist, very stiff, medium to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*	9						
495				6 9 12	5	18		
		12						
492								
	---, hard, little sand and rock fragments			10 28 26	6	15		
	---, dark gray layer of rock fragments from 14.7' to 14.8' 15.0	15						
489	Boring Terminated at 15 Ft.							
		18						
486								

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at 24 hrs	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337624.326 E: 2416682.59

BORING NO. **B-11**
JOB NO. 11174

Surf. Elev.: 498±	Hammer Wt. 140	Rock Core Dia.:	Foreman: RK
Elev. from: TOPO	Hammer Drop: 30	Hole Diameter: 8 in.	Inspector: JAF
Offset Elev:	Sampler Size:	Boring Method: HSA	Date Started: 7-14-11
Offset Dist.:	Offset Direction:		Date Finished: 7-14-11

Elev. 498.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
498	0.0 Topsoil 0.1	0						
	Brown, moist, very stiff, medium to highly plastic, lean to fat CLAY, trace sand USC: (CL-CH)*			6 8 10	1	13		
495		3		6 7 8	2	12		
	---, mottled black			4 7 12	3	13		
492		6						
	---, mottled gray			6 6 10	4	17		
489		9						
	---, hard			5 50/0	5	6		
486		12						
	---, very moist, little gray rock fragments			19 21 13	6	15		
483	15.0 Boring Terminated at 15 Ft.	15						
480		18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

Water	Caved
Encountered	
Completion	Dry
On at 24 hrs	BOC
On at	

Hardin-Kight Associates, Inc.
7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Office: (410) 553-0802
Fax #: (410) 553-0808

Record of Soil Exploration

Project Name: VA Martinsburg, WV
Contracted With: EMH & T
Project Location: Berkeley County, WV
Boring Location: N: 337569.051 E: 2416841.43

BORING NO. **B-12**
JOB NO. 11174

Surf. Elev.: 497±
Elev. from: TOPO
Offset Elev:
Offset Dist.:

Hammer Wt. 140
Hammer Drop: 30
Sampler Size:
Offset Direction:

Rock Core Dia.:
Hole Diameter: 8 in.
Boring Method: HSA

Foreman: RK
Inspector: JAF
Date Started: 7-13-11
Date Finished: 7-13-11

Elev. 497.0	Soil Description (Color, Moisture, Density, Plasticity, Size Proportions)	Depth	Sample Data: Type	Blow Counts	#	Recovery	Condition	Boring & Sample Notes
	Topsoil (0.0–0.1)	0		5 7 12	1	14		Offset 10' South Auger Refusal @ 7.0'
495	Brown to gray, slightly moist, very stiff, medium plastic, lean CLAY, trace sand and rock fragments (FILL) (2.0) USC: (CL)*							
	Brown, moist, very stiff, medium to highly plastic, lean to fat CLAY, trace sand and rock fragments USC: (CL-CH)*	3		7 10 10	2	14		
492	---, hard	6		24 50/3	3	4		
	Boring Terminated at 7 Ft. Refusal at 7 Ft. (7.0)							
489		9						
486		12						
483		15						
480		18						

* Visual Description - in general accordance with ASTM D 2488

Notes: Surface Elevation estimated from topographic map provided by EMH & T
BOC - Boring backfilled upon completion of drilling

	Water	Caved
Encountered		
Completion	Dry	
On at		
On at		

KEY TO SYMBOLS

Symbol Description

Strata symbols

Topsoil

Medium plasticity clay

Low-high plasticity clays

High plasticity clay

Soil Samplers

Standard penetration test

Monitor Well Details

temporary pipe backfilled with assorted cuttings

no pipe, natural material

Notes:

1. Borings were drilled on July 13 & 14, 2011.

2. Groundwater was not observed in the borings.

APPENDIX C

LABORATORY TEST RESULTS

Summary of Laboratory Moisture Testing

Project: VA Martinsburg, WV
Job #: 11174

Samples Taken: 7/14/2011
Report Date: 7/23/2011
Report Status: Final

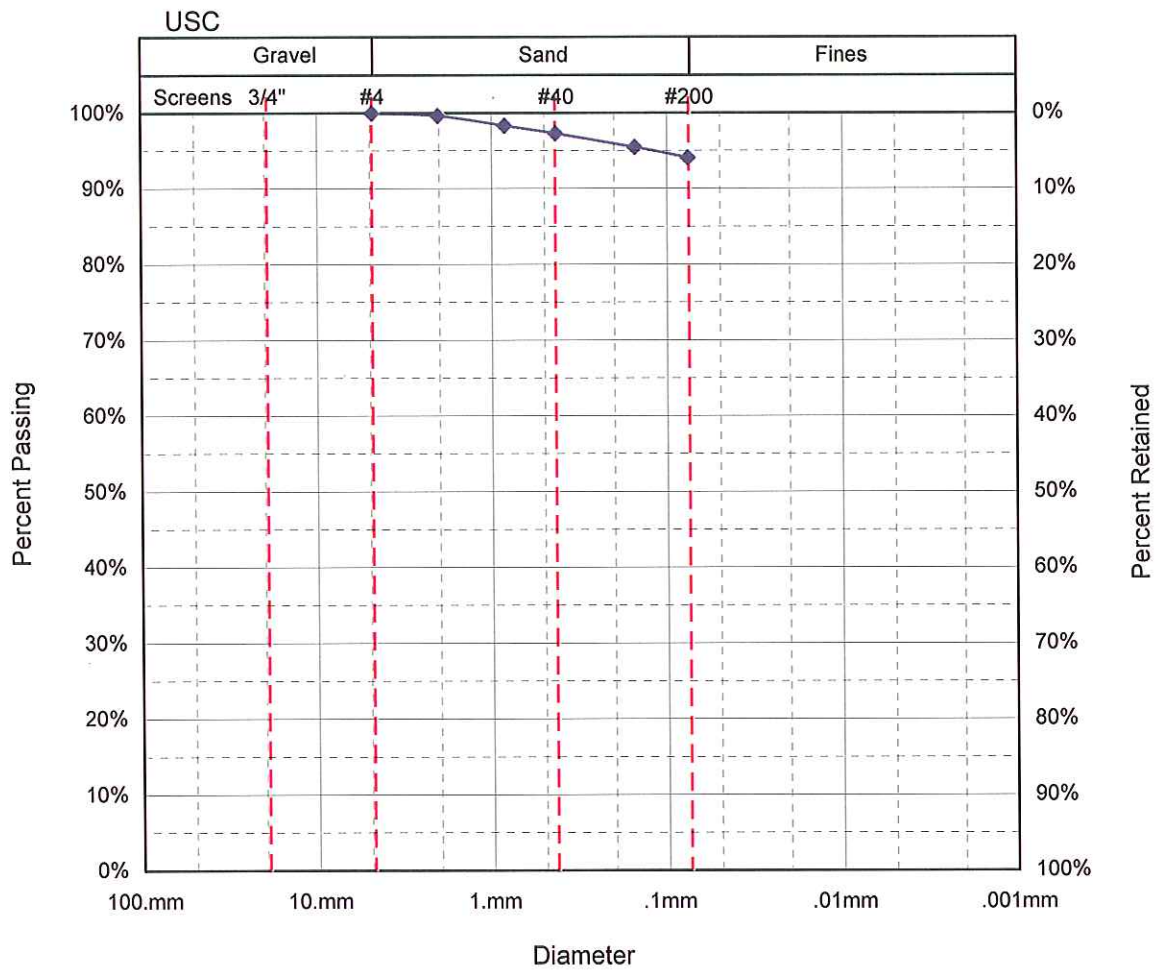
Lab Number	Boring	Sample	Depth	Moisture Content	Notes
110048	B-1	S-1	0.0'-1.5'	17.5%	
110049	B-1	S-2	2.5'-4.0'	22.5%	
110042	B-1	S-3	5.0'-6.5'	30.7%	

Project: VA Martinsburg, WV
Identification: B-3, S-2, 2.5'-4.0'
Description: Brownish yellow, highly plastic Clay, trace sand

Job #: 11174
Lab #: 110181
Report Date: 7/22/2011
Report Status: Final

Received: 7/15/2011

Laboratory Analysis



Test Methods	Soil Properties	
Moisture Content: ASTM D2216 Grain Size Analysis: ASTM D422 Liquid & Plastic Limits: ASTM D4318	Moisture Content 29.7% Liquid Limit: 85 Plastic Limit: 33 Plasticity Index: 52 A-Line: 47.5	

USDA Gradation

	Total	Corrected
Gravel		
Sand		
Silt		
Clay		

Note:

Classification
USC: CH

Checked By:

Tested By:

Hardin-Kight Associates, Inc.
Glen Burnie, Maryland

Form: MAL.xls
Rev.: 4/20/11

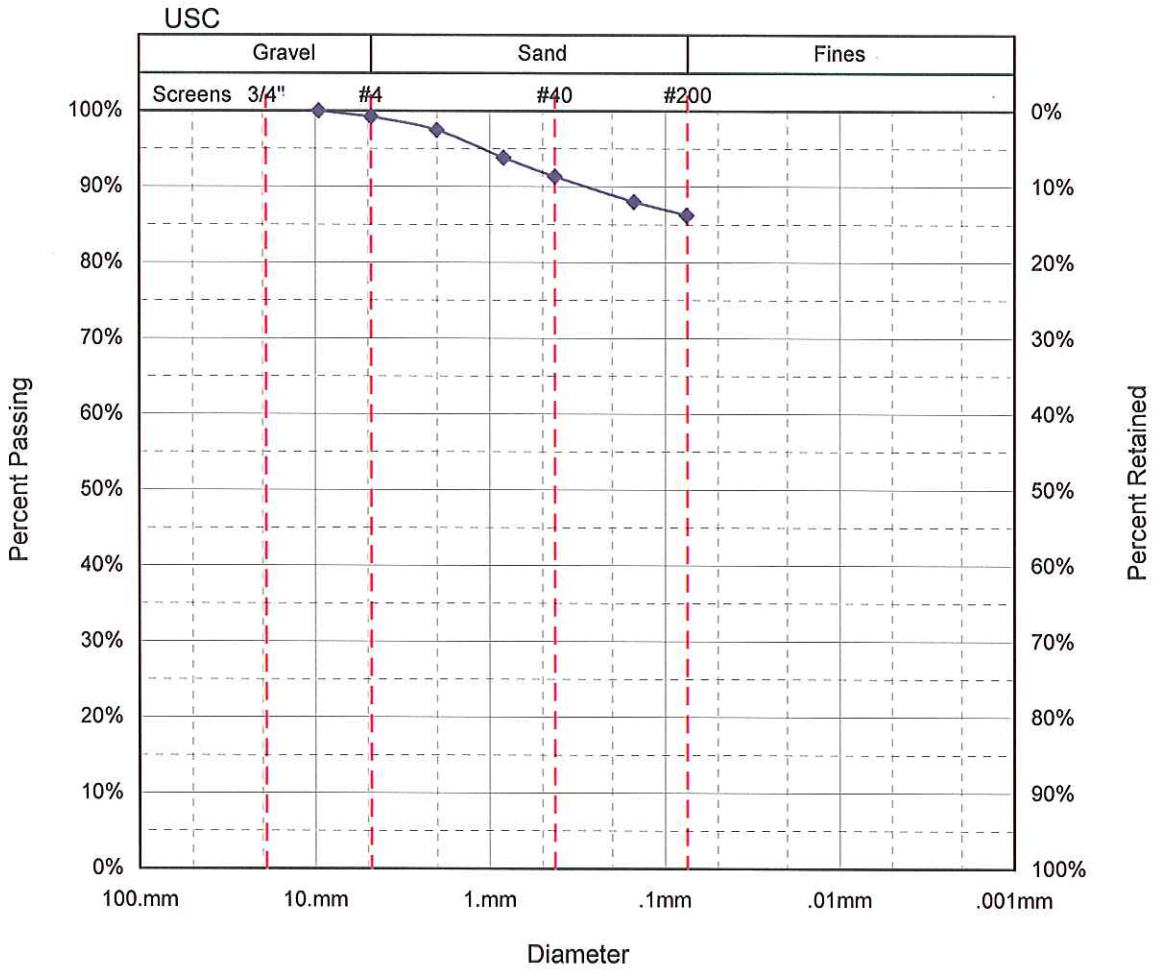
C:\Lab Testing\11\
110181MAL.xls
Printed: 7/22/2011

Project: VA Martinsburg, WV
Identification: B-6, S-2, 2.5'-4.0'
Description: Dark yellowish brown, lean Clay with trace sand

Job #: 11174
Lab #: 110182
Report Date: 7/23/2011
Report Status: Final

Received: 7/15/2011

Laboratory Analysis



Test Methods	Soil Properties	
Moisture Content: ASTM D2216 Grain Size Analysis: ASTM D422 Liquid & Plastic Limits: ASTM D4318	Moisture Content 20.0% Liquid Limit: 45 Plastic Limit: 23 Plasticity Index: 22 A-Line: 18.3	

USDA Gradation	Total	Corrected
Gravel		
Sand		
Silt		
Clay		

Note:

Classification
USC: CL

Checked By:

Tested By:

Hardin-Kight Associates, Inc.
Glen Burnie, Maryland

Form: MAL.xls
Rev.: 4/20/11

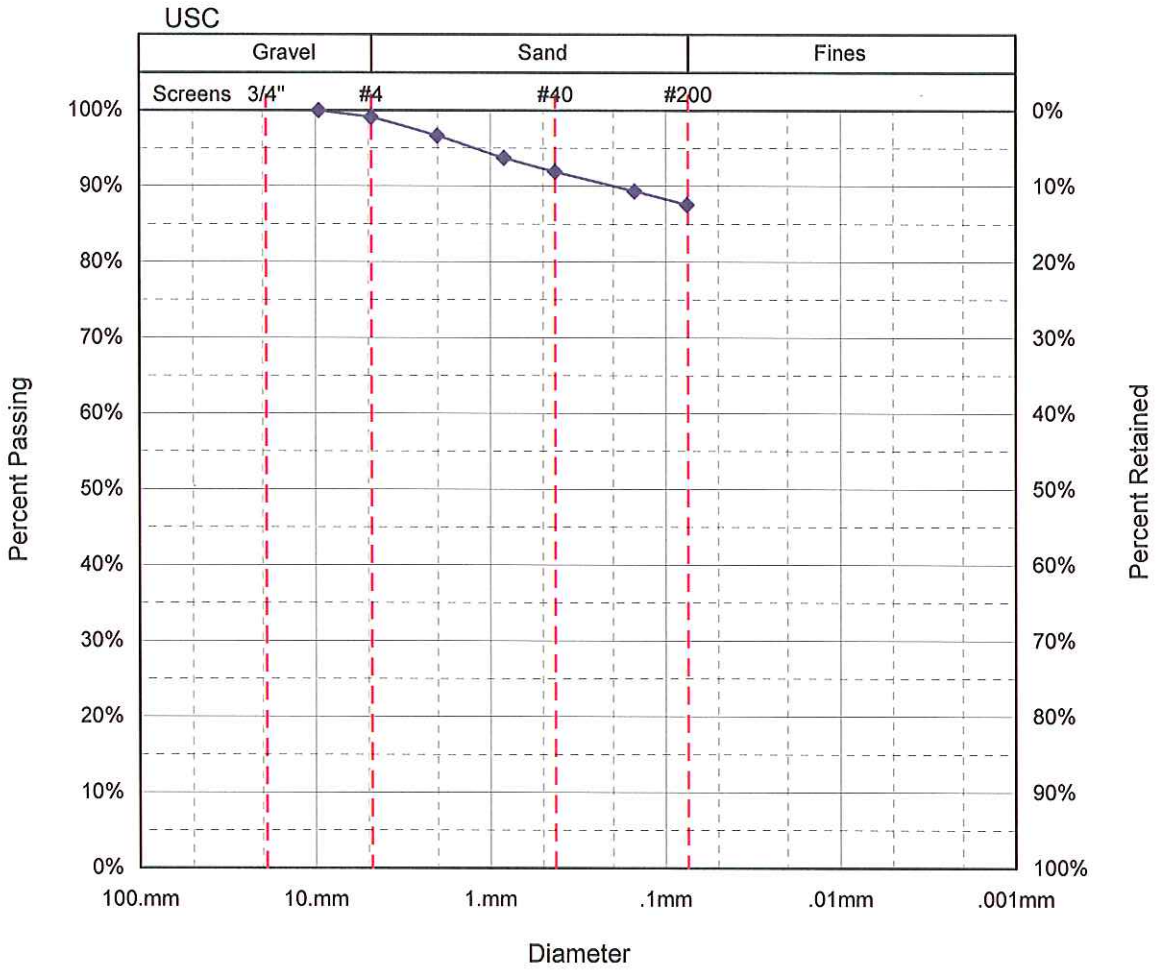
C:\Lab Testing\11\
110182MAL.xls
Printed: 8/3/2011

Project: VA Martinsburg, WV
Identification: B-8, S-3, 5.0'-6.5'
Description: Olive yellow, highly plastic Clay with trace sand

Job #: 11174
Lab #: 110183
Report Date: 7/23/2011
Report Status: Final

Received: 7/15/2011

Laboratory Analysis



Test Methods	Soil Properties	
Moisture Content: ASTM D2216 Grain Size Analysis: ASTM D422 Liquid & Plastic Limits: ASTM D4318	Moisture Content 22.9% Liquid Limit: 61 Plastic Limit: 28 Plasticity Index: 33 A-Line: 29.9	

USDA Gradation

	Total	Corrected
Gravel		
Sand		
Silt		
Clay		

Note:

Classification
USC: CH

Checked By:

Tested By:

Hardin-Kight Associates, Inc.
Glen Burnie, Maryland

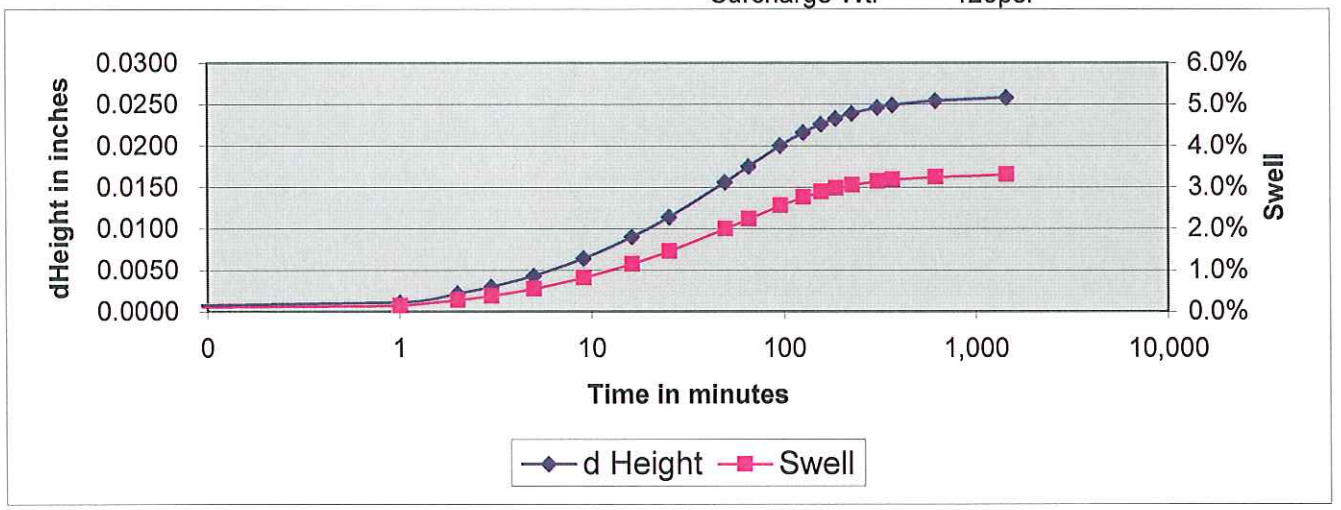
Form: MAL.xls
Rev.: 4/20/11

C:\Lab Testing\11\
110183MAL.xls
Printed: 8/3/2011

			Date	By
Project:	VA Martinsburg, WV	Taken:		
Job Number:	11174	Received:	15-Jul	JAF
Lab Number:	110193	Set Up:	4-Aug	JGP
Identification:	B-3, S-3, 5.0'-6.5'	Completed:	5-Aug	JGP
Description:	Brownish yellow, highly plastic Clay, trace sand	Report:	6-Aug	JGP
USC Class.:	Visual (CH)	Status:	Final	

	Initial	Final
Diameter:	2.4995	2.4995
Sample Len:	0.7790	0.8049
Volume:	0.002212	0.002286
Wet Wt:	116.78	121.32

	Initial	Final
Moisture Content:	28.2%	33.2%
Wet Density:	116.4pcf	117.0pcf
Dry Density:	90.8pcf	87.8pcf
Target Wet Density:	116.5pcf	
Surcharge Wt:	125psf	

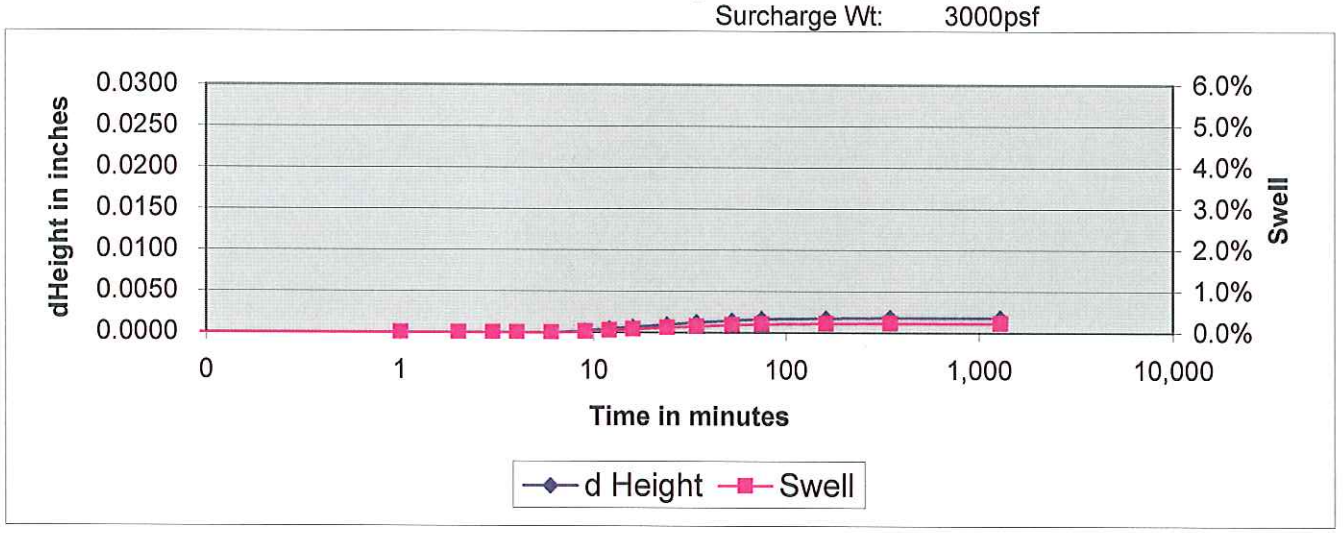


Date	Time	Reading	dt in Min.	dH in inches	% Swell
8/4/2011	8:39	0.1852	0	0.0000	0.0%
8/4/2011	8:40	0.1840	1	0.0012	0.15%
8/4/2011	8:41	0.1829	2	0.0023	0.30%
8/4/2011	8:42	0.1821	3	0.0031	0.40%
8/4/2011	8:44	0.1808	5	0.0044	0.56%
8/4/2011	8:48	0.1787	9	0.0065	0.83%
8/4/2011	8:55	0.1761	16	0.0091	1.17%
8/4/2011	9:04	0.1737	25	0.0115	1.48%
8/4/2011	9:28	0.1695	49	0.0157	2.02%
8/4/2011	9:44	0.1676	65	0.0176	2.26%
8/4/2011	10:14	0.1651	95	0.0201	2.58%
8/4/2011	10:44	0.1635	125	0.0217	2.79%
8/4/2011	11:14	0.1625	155	0.0227	2.91%
8/4/2011	11:44	0.1618	185	0.0234	3.00%
8/4/2011	12:24	0.1612	225	0.0240	3.08%
8/4/2011	13:44	0.1605	305	0.0247	3.17%
8/4/2011	14:44	0.1602	365	0.0250	3.21%
8/4/2011	18:54	0.1597	615	0.0255	3.27%
8/5/2011	8:39	0.1593	1,440	0.0259	3.32%

			Date	By
Project:	VA Martinsburg, WV	Taken:		
Job Number:	11174	Received:	15-Jul	JAF
Lab Number:	110193	Set Up:	7-Aug	JGP
Identification:	B-3, S-3, 5.0'-6.5'	Completed:	8-Aug	JGP
Description:	Brownish yellow, highly plastic Clay, trace sand	Report:	9-Aug	JGP
USC Class.:	Visual (CH)	Status:	Final	

	Initial	Final
Diameter:	2.4995	2.4995
Sample Len:	0.7790	0.7809
Volume:	0.002212	0.002217
Wet Wt:	116.89	121.41
	0.7790	

	Initial	Final
Moisture Content:	28.3%	31.6%
Wet Density:	116.5pcf	120.7pcf
Dry Density:	90.8pcf	91.7pcf
Target Wet Density:	116.5pcf	
Surcharge Wt:	3000psf	



Date	Time	Reading	dt in Min.	dH in inches	% Swell	Notes
8/7/2011	11:16	0.1893	0	0.0000	0.0%	Added Water
8/7/2011	11:17	0.1887	1	0.0000	0.00%	Removed Support
8/7/2011	11:18	0.1957	2	0.0000	0.00%	
8/7/2011	11:19	0.1959	3	0.0000	0.00%	
8/7/2011	11:20	0.1961	4	0.0000	0.00%	
8/7/2011	11:22	0.1962	6	-	0.00%	
8/7/2011	11:25	0.1960	9	0.0003	0.03%	
8/7/2011	11:28	0.1957	12	0.0005	0.06%	
8/7/2011	11:32	0.1955	16	0.0007	0.09%	
8/7/2011	11:40	0.1952	24	0.0010	0.13%	
8/7/2011	11:50	0.1949	34	0.0013	0.17%	
8/7/2011	12:08	0.1947	52	0.0015	0.19%	
8/7/2011	12:30	0.1945	74	0.0017	0.22%	
8/7/2011	13:56	0.1944	160	0.0018	0.23%	
8/7/2011	17:00	0.1944	344	0.0019	0.24%	
8/8/2011	8:30	0.1944	1,274	0.0019	0.24%	