

UNDERWOOD ENGINEERING COMPANY

143 HARDING AVE.
BELLMAWR, NJ 08031

856-933-1818

William R. Underwood, P. E.

Fax 856-933-3123

CLIENT:	KS Engineers, P.C. 35 S. Third Street Philadelphia, PA 19106
PROJECT:	Lankenau High School 201 Spring Lane Philadelphia, PA
REQUIREMENT:	Professional Engineering Services
LOCATION:	Proposed Stormwater Management and Asphalt Borings
DATE:	6/15/2017
UE REF. NO.:	4242-12573-1
ATTENTION:	Sean Marzolf Email: smarzolf@kseng.com

PURPOSE

The purpose of this report is to present the findings and conclusions of the field investigation performed at the above-referenced project on Wednesday June 14, 2017. The investigation conducted was to perform soil borings in the existing paved areas and soil permeability testing in the proposed stormwater basin area.

INVESTIGATION

Eight (8) soil borings to 8 feet were performed to record the thickness of asphalt and base in the existing paved driveway and parking areas.

Two (2) test pits were excavated with a rented rubber-tire backhoe in the proposed stormwater basin.

Soils were logged with respect to color, type, and depth to groundwater features.

Infiltration rates were tested using a double-ring infiltrometer (DRI) in accordance with ASTM D-3385.

Locations are presented in Appendix A.

FINDINGS & CONCLUSIONS

Soil borings are presented in Appendix B.

Soil gradation analysis are presented in Appendix C.

Test pit logs and infiltration data are as follows:

TP-1

<u>Depth (in.)</u>	<u>Soils</u>
0-7	Topsoil
7-72	Brown f. Sand, some Silt, Micaceous with boulder size concrete, wood and brick debris

DRI Testing @ 72"

Estimated Seasonal High Water Table (ESHWT) not encountered

Groundwater was not encountered

TP-2

<u>Depth (in.)</u>	<u>Soils</u>
0-3	Topsoil
3-96	Brown f. Sand, some Silt, Micaceous with boulder size concrete debris @ 48" a concrete structure on the southeast side of the test pit.

DRI Testing @ 72" and 96"

Estimated Seasonal High Water Table (ESHWT) not encountered

Groundwater was not encountered

Infiltration test data for the tests performed are contained in the table below.

Location	Rate (in/hr)
TP-1 @ 72"	0
TP-2 @ 72"	3.0
TP-2 @ 96"	3.0

QUALIFICATIONS

The findings and conclusions presented in this report are based solely on the above investigation. No conclusions are to be drawn other than those specifically stated herein.

Respectfully submitted,

UNDERWOOD ENGINEERING COMPANY



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Appendix A Location Plan

Appendix B Boring Logs

CLIENT: KS Engineering, P.C.
 PROJECT: Lankenau High School
 201 Spring Lane
 Philadelphia, PA

DATE: 6/14/17

BORING No.: TB-1

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Ph.# 856.933.1818 Fx.# 856.933.3121

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GROUND SURFACE ELEVATION: N/A

GROUNDWATER DATA	
DEPTH	Hours After Completion
DRY	N/A

METHOD OF ADVANCING BORING	DEPTH (FT.)
CONTINUOUS SPLIT SPOON SAMPLE	0 to 8'
AUGERS	
2" O.D. SPLIT SPOON	

Depth (ft)	Groundwater	Sampling Interval	Sample #	Blows	N-Values	Lithology	Soil Description*	Notes:
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0							ASPHALT: 1"	
							STONE: 3"	
			S-1	14-9-7			SAND: Light Brown m.f. SAND (s) Silt (l) Gravel	
			S-2	10-6-11-12			SAND: Gray Brown m.f. SAND (s) Silt (tr) Gravel	
5			S-3	14-8-7-7			SAND: Light Brown m.f. SAND (s) Silt (tr) Gravel	
			S-4	9-17-34-40			SAND: Gray Brown m.f. SAND (s) Silt (tr) Gravel	

*FIELD CLASSIFICATION ONLY. SOIL CLASSIFICATION FOR PARTICULAR USES SHOULD BE ASCERTAINED BY LABORATORY TESTS.

CLIENT: KS Engineering, P.C.
 PROJECT: Lankenau High School
 201 Spring Lane
 Philadelphia, PA
 DATE: 6/14/17
 BORING No.: TB-2

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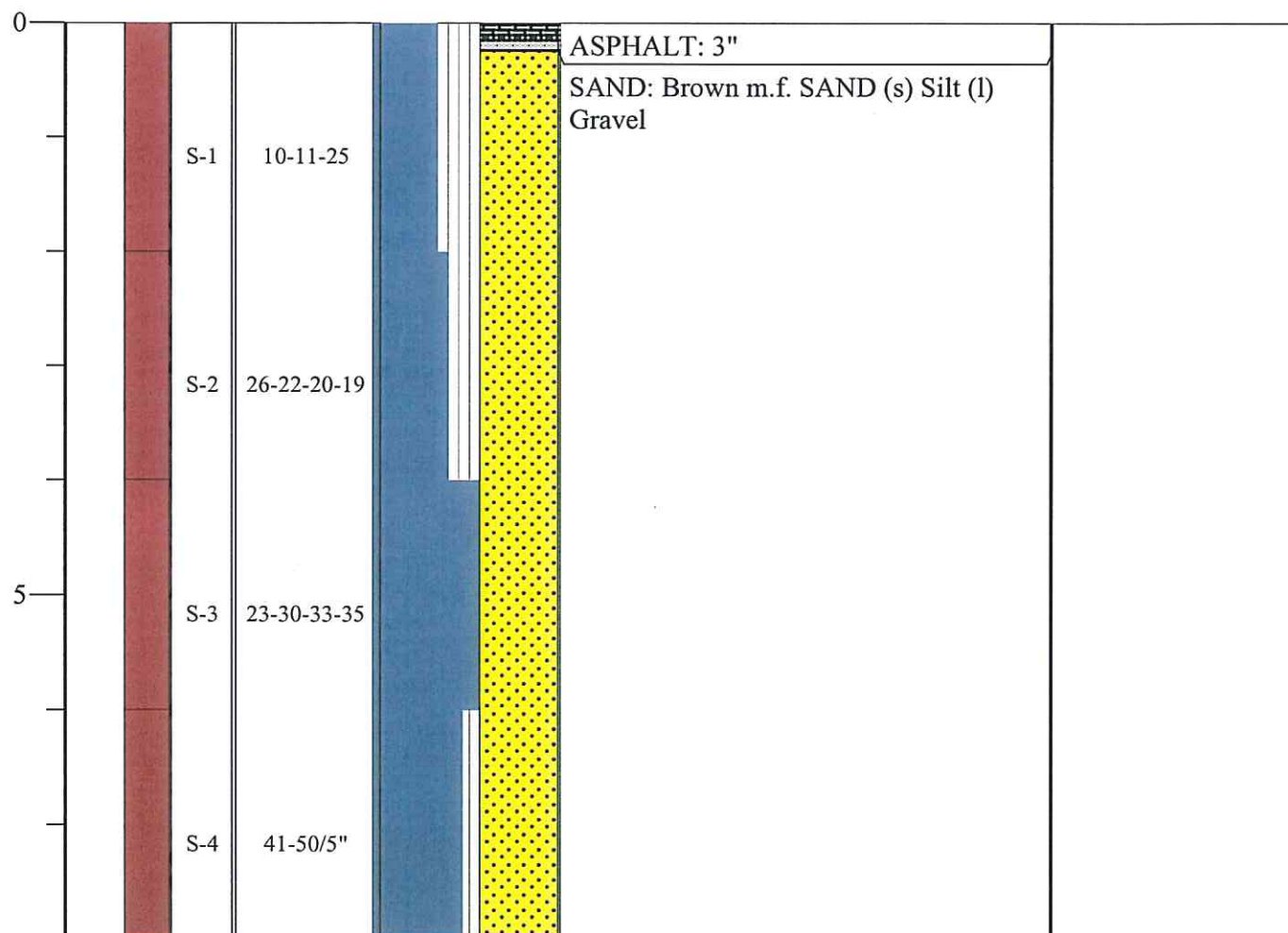
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GROUND SURFACE ELEVATION: N/A

GROUNDWATER DATA	
DEPTH	Hours After Completion
DRY	N/A

METHOD OF ADVANCING BORING	DEPTH (FT.)
CONTINUOUS SPLIT SPOON SAMPLE	0 to 8'
AUGERS	
2" O.D. SPLIT SPOON	

Depth (ft)	Groundwater	Sampling Interval	Sample #	Blows	N-Values	Lithology	Soil Description*	Notes:
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CLIENT: KS Engineering, P.C.
 PROJECT: Lankenau High School
 201 Spring Lane
 Philadelphia, PA

DATE: 6/14/17
 BORING No.: TB-3

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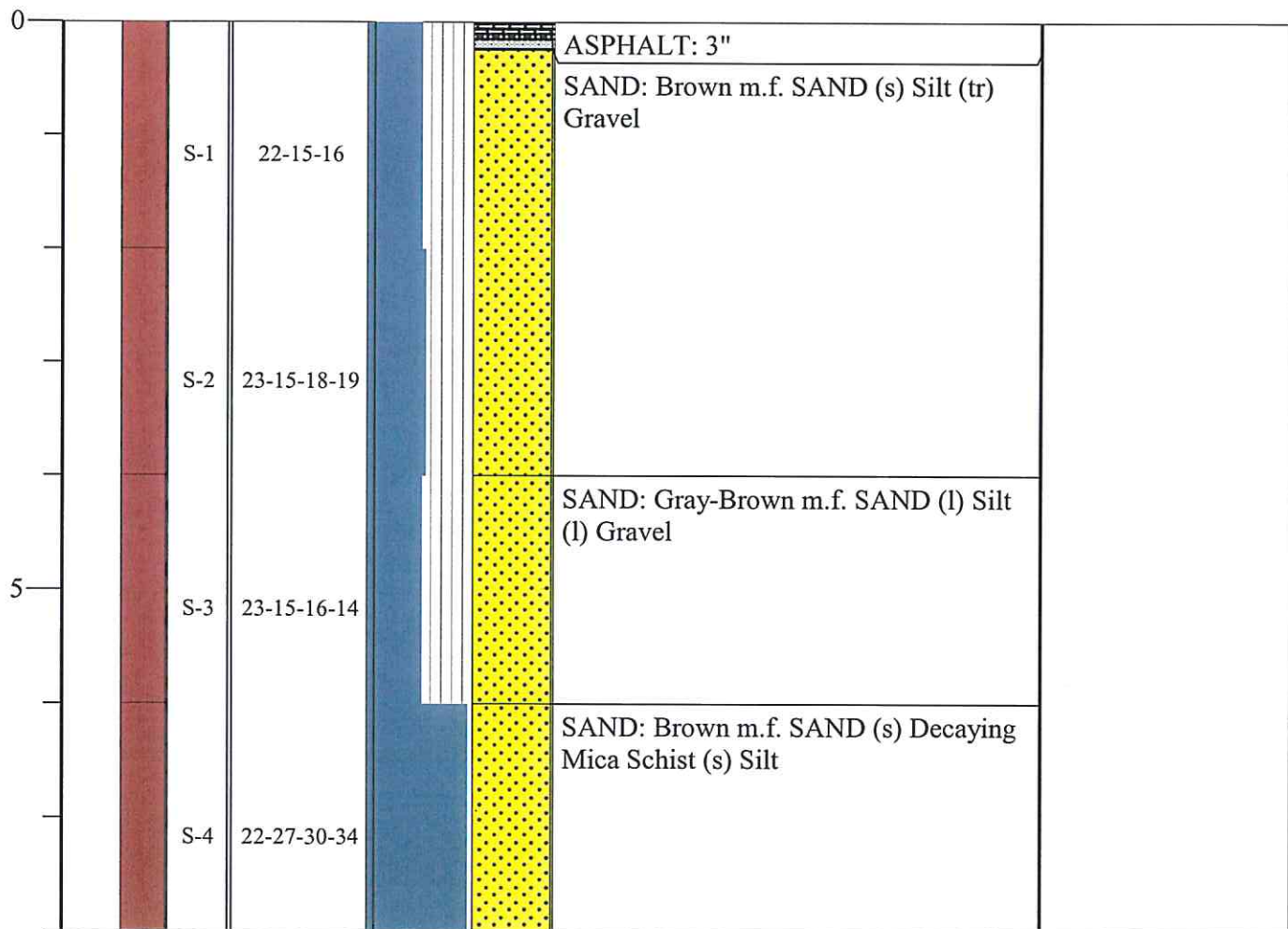
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GROUND SURFACE ELEVATION: N/A

GROUNDWATER DATA	
DEPTH	Hours After Completion
DRY	N/A

METHOD OF ADVANCING BORING	DEPTH (FT.)
CONTINUOUS SPLIT SPOON SAMPLE	0 to 8'
AUGERS	
2" O.D. SPLIT SPOON	

Depth (ft)	Groundwater	Sampling Interval	Sample #	Blows	N-Values	Lithology	Soil Description*	Notes:
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CLIENT: KS Engineering, P.C.
 PROJECT: Lankenau High School
 201 Spring Lane
 Philadelphia, PA
 DATE: 6/14/17
 BORING No.: TB-4

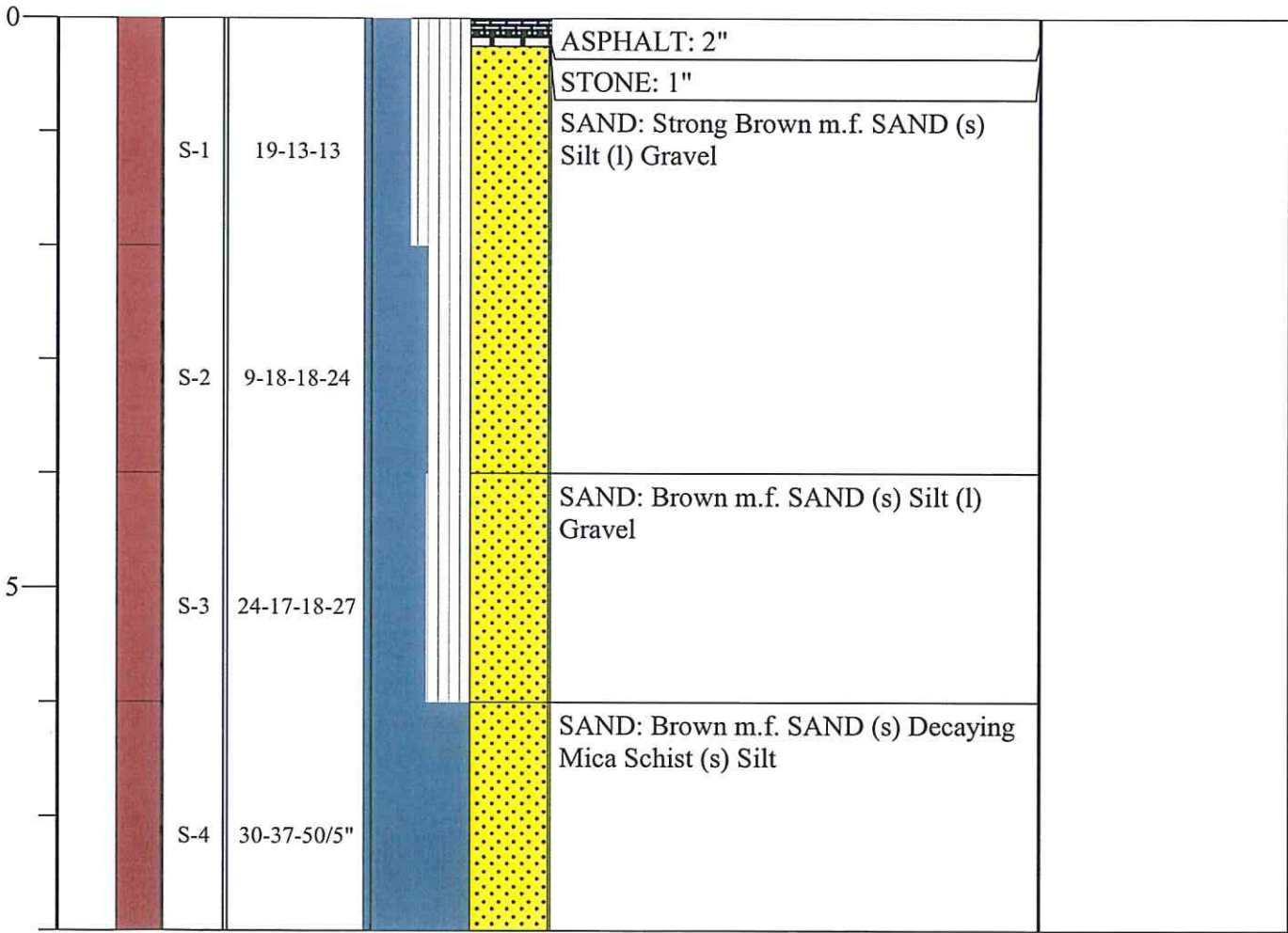
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GROUND SURFACE ELEVATION: N/A

GROUNDWATER DATA	
DEPTH	Hours After Completion
DRY	N/A

METHOD OF ADVANCING BORING	DEPTH (FT.)
CONTINUOUS SPLIT SPOON SAMPLE	0 to 8'
AUGERS	
2" O.D. SPLIT SPOON	

Depth (ft)	Groundwater	Sampling Interval	Sample #	Blows	N-Values	Lithology	Soil Description*	Notes:
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CLIENT: KS Engineering, P.C.
 PROJECT: Lankenau High School
 201 Spring Lane
 Philadelphia, PA
 DATE: 6/14/17
 BORING No.: TB-5

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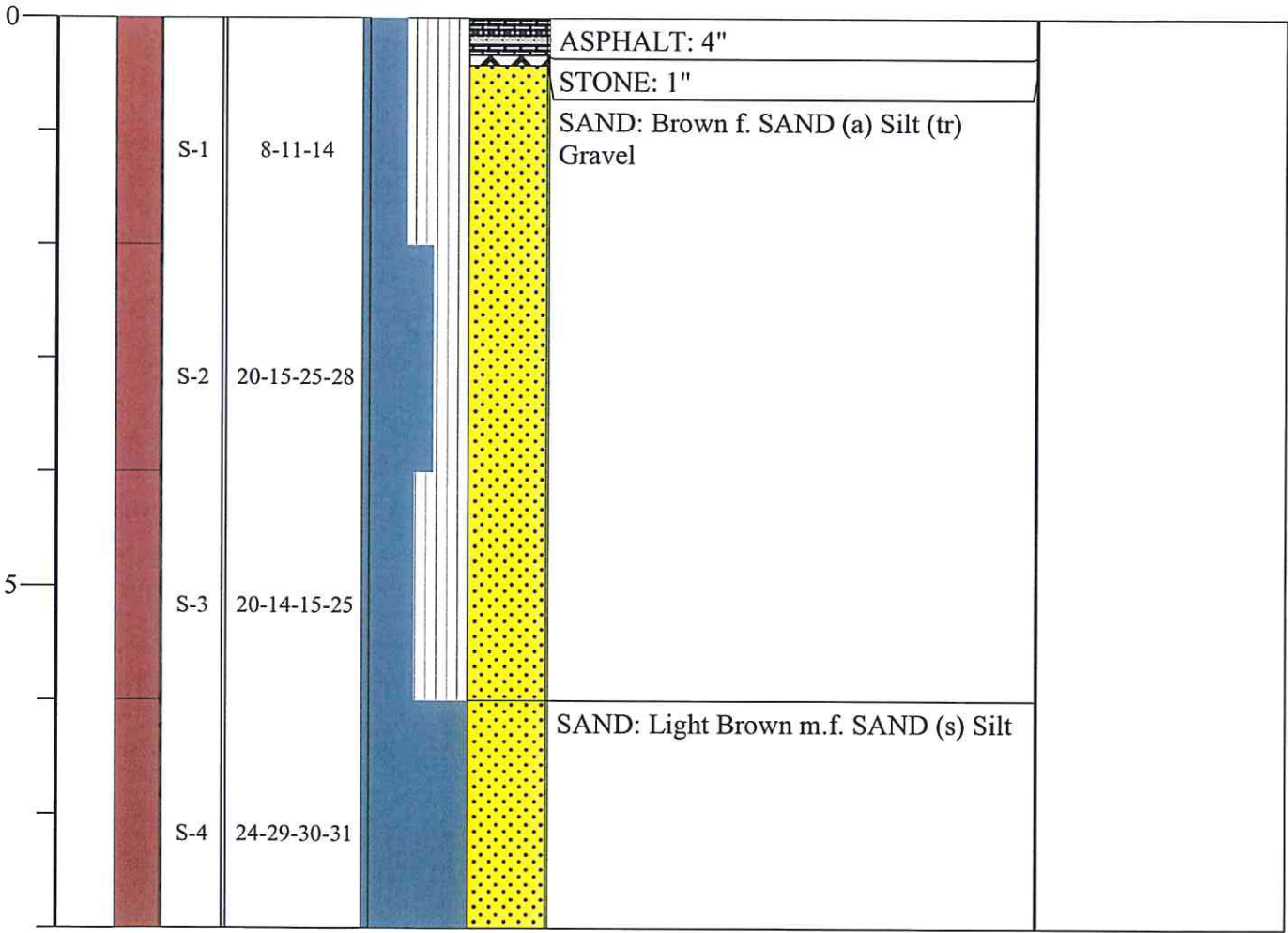
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GROUND SURFACE ELEVATION: N/A

GROUNDWATER DATA	
DEPTH	Hours After Completion
DRY	N/A

METHOD OF ADVANCING BORING	DEPTH (FT.)
CONTINUOUS SPLIT SPOON SAMPLE	0 to 8'
AUGERS	
2" O.D. SPLIT SPOON	

Depth (ft)	Groundwater	Sampling Interval	Sample #	Blows	N-Values	Lithology	Soil Description*	Notes:
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*FIELD CLASSIFICATION ONLY. SOIL CLASSIFICATION FOR PARTICULAR USES SHOULD BE ASCERTAINED BY LABORATORY TESTS.

Appendix C

Gradation Analysis

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William R. Underwood, P.E., President

(856) 933-1818 • Fax (215) 259-2372

CLIENT: K.S. Engineers, P.C.
PROJECT: Lankenau High School
REQUIREMENT: Gradations
DATE PERFORMED: 6/23/2017

SIEVE SIZE	PERCENT PASSING
2"	100.0
3/4'	100.0
#4	89.0
#10	71.8
#40	53.6
#50	48.7
#100	35.6
#200	21.8

Soil Type: Brown c.f. SAND (s) f. Gravel (l) Silt and Clay

Sample Location: B - 4

Sample Depth: 4' - 6'

Moisture Content as Received: 8.6 %

Permeability Rate: N/A in/hour

Respectfully submitted,
**Underwood Engineering
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CLIENT: K.S. Engineers, P.C.
PROJECT: Lankenau High School
REQUIREMENT: Gradations
DATE PERFORMED: 6/23/2017

SIEVE SIZE	PERCENT PASSING
2"	100.0
3/4'	95.5
#4	80.3
#10	70.7
#40	58.2
#50	54.9
#100	46.3
#200	36.4

Soil Type: Brown c.f. SAND (a) Silt and Clay (s) m.f. Gravel

Sample Location: B - 1

Sample Depth: 6' - 8'

Moisture Content as Received: 5.3 %

Permeability Rate: N/A in/hour

Respectfully submitted,
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(856) 933-1818 • Fax (215) 259-2372

CLIENT: K.S. Engineers, P.C.
PROJECT: Lankenau High School
REQUIREMENT: Gradations
DATE PERFORMED: 6/23/2017

SIEVE SIZE	PERCENT PASSING
2"	100.0
3/4"	88.1
#4	73.2
#10	65.5
#40	44.8
#50	38.5
#100	27.8
#200	22.1

Soil Type: Brown c.f. SAND (s) m.f. Gravel (l) Silt and Clay

Sample Location: TP-1

Sample Depth: 72"

Moisture Content as Received: 10.5 %

Permeability Rate: N/A in/hour

Respectfully submitted,
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Testing Co., Inc..**

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