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MEMORANDUM

24 May 2012 File No. 39579-003

TO:	Beacon Architectural Associates J. Michael Sullivan, A.I.A LEED AP
FROM:	Haley & Aldrich, Inc. Todd R. Butler, P.E., Bryan P. Sweeney, P.E.
SUBJECT:	Summary of Subsurface Explorations and Geotechnical Design Recommendations Proposed Multipurpose Synthetic Athletic Field Xaverian Brother's High School 800 Clapboardtree Street Westwood, MA

This memorandum summarizes the results of subsurface explorations, provides recommendations for geotechnical design and comments on geotechnical-related construction considerations for a new multipurpose synthetic turf athletic field. This work was undertaken in accordance with our proposal 30 April 2012 and your subsequent written authorization.

EXECUTIVE SUMMARY

Site preparation activities will require the following activities:

- Significant rock excavation, with controlled blasting as a likely requirement.
- Excavation and off-site disposal of miscellaneous materials including septic system, tanks, trash and debris.
- Off-site disposal of soils and other materials will likely require chemical analysis by the receiving facility. These chemical analyses may result in identifying reportable conditions to the Massachusetts Department of Environmental Protection.

The volume of rock excavation may be reduced by raising the field. However, this will require more filling in other areas and some design changes (e.g., grading and walls).

SITE CONDITIONS

The proposed field site is currently a wooded area southeast of the existing football field on the campus of Xaverian Brothers High School in Westwood, Massachusetts. Ground surface elevations at the site range from approximately El 139 to El. 155 (1929 NGVD).

PROPOSED CONSTRUCTION

Our understanding of the project is based on conversations with the project design team including Beacon Architectural Associates (BAA), Activitas, Nitsch Engineering, and The Cecile Croup as well as preliminary drawings included in the Notification Intent Submission to the town of Westwood dated 1 May 2013. A new synthetic turf field and ancillary sport structures (bleachers and dugouts) are proposed to be located within the limits of the site with finish grades within the field ranging from approximately El. 146.5 to El. 148. Support structures currently planned consist of dugouts and grandstand seating.

SUBSURFACE EXPLORATIONS

A total of fifteen (15) test pit explorations (TP-13 through TP-25, including TP-16A and TP-21A) were completed by Earthwork Industries, Inc. of Plainville, Massachusetts on 13 May and 14 May 2013. Conditions encountered at each test pit location were monitored and documented by a Haley & Aldrich geologist. The designations and approximate locations of the test pits are shown on Figure 2, Site and Subsurface Exploration Location Plan.

Table I provides a summary of the near surface soil units we identified based on soil conditions encountered in the test pits. Detailed descriptions of the subsurface conditions encountered at each test pit location are provided on the Test Pit Logs included in Appendix A. Also included in Appendix A are photographs taken at several of the completed test pits.

Soil Conditions

Subsurface strata encountered in the recently completed test pits are described below, generally in order of occurrence below ground surface. At some locations, strata may be absent or in a different sequence.

- <u>Forest Mat</u> A surficial layer of forest mat was encountered in the test pits within the wooded portions of the site and consisted of dark brown, organic soil with sand, roots and forest mat debris. Where encountered, the thickness of the forest mat ranged from 0.8 to 1.5 ft.
- <u>Fill</u> A layer of fill soil was encountered below ground surface in test pits TP-13, TP-14, TP-16, TP-18, TP-19, TP-21, TP-21A, TP-23 and TP-25. Where encountered, the thickness of the fill ranged from 1 to 6 ft. Fill soils varied from dark brown SAND with organic silt; to brown silty SAND with gravel. Numerous cobbles and boulders were present across the site.

A large area (approximately 8,000 SF) of nested boulder/cobble fill exists at the site as shown on the attached Figure 2. Test Pits TP-18 and TP-25 were excavated in this boulder/cobble fill area of the site. Fill in this area is primarily cobbles and boulders, with a little organic soil, and brown silty sand. Large quantities of cobbles and boulders were also observed in the fill at other locations such as TP-14 and TP-19.

An area (approximately 2,500 SF) of fill containing a large percentage of miscellaneous trash and debris exists at the site in the area indicated on the attached Figure 2. Test Pits TP-21 and TP-23 were conducted in this area of the site. Fill in this area includes broken glass, glass bottles and miscellaneous metal debris. Additionally, large quantities of concrete, asphalt, and metal debris were observed in TP-



16. The area around TP-16 and TP-16A has metal debris, tires and other trash located at ground surface. Miscellaneous trash was observed intermittently at ground surface throughout the site.

- <u>Loess</u> A layer of Loess underlies the Forest Mat (where encountered) or fill and consisted of orangebrown SILT or sandy Silt. Where encountered, the thickness of the loess ranged from 1.2 to 2.7 ft.
- <u>Glacial Till</u> Glacial till was observed in eleven (11) test pits below the fill or loess deposits. Glacial till was typically described as dense, well bonded, olive-gray silty SAND with gravel, cobbles and boulders. Excavation with a backhoe in the glacial till was difficult due to the density of the material and the presence of gravel, cobbles, and boulders.
- <u>Geotechnical Laboratory Results</u> Grain Size Distribution tests were performed in general accordance with ASTM D 422-63. The tests were conducted on representative soil samples within the Glacial Till Deposits from test pits TP-13 and TP-19 at depths ranging from about 3 ft. to 8.5 ft. below existing grades. Additionally, grain size distribution tests and compaction testing were performed in accordance with ASTM 422 and D1557, respectively, on a composite soil sample of the Glacial Till collected from TP-13, TP-19, and TP-22 from depths ranging from 3 ft. to 8.5 ft. below ground surface Results are included in Appendix B.

Bedrock

Bedrock was encountered in Test Pits TP-14, TP-17, TP-18, TP-21, TP-21A, and TP-23 through TP-25. Encountered bedrock consists of pink-gray GRANITE. The top of bedrock varied considerably within individual test pits from El. 146.1 to El. 155.0. Based on previous explorations conducted on other parts of the school campus localized intrusions of very hard DIABASE are present in the GRANITE.

Groundwater Conditions

No observation wells were installed during the investigation program. Groundwater was not encountered in the test pits at the time they were conducted. However, during periods of precipitation, groundwater will be present below existing grades.

Groundwater levels will fluctuate with seasons, precipitation, and snowmelt, nearby construction activities, leakage into and out of utilities, and other factors. Groundwater levels encountered during construction may vary from those encountered during the exploration program.

GEOTECHNICAL DESIGN RECOMMENDATIONS

Synthetic Turf Field

A new synthetic turf field is proposed to be located within the limits of the site with proposed finish grades within the footprint of the field ranging from approximately El. 146.5 in the outfield to El. 148 at the pitcher's mound. The subgrade for the field will be approximately 1 ft below finished grades, except in areas where rock is present (2 ft in those areas). Current ground surface elevations at the site range from approximately El 139 to El. 155.



We recommend the field sub-drainage system design be comprised of a minimum 9 inch layer of doublewashed, 3/4-in. crushed stone with perforated HDPE pipes (sized by the Project Civil Engineer) embedded within the crushed stone to collect and transport water that filters through the turf playing surface to an appropriately sized on-site collection/groundwater recharge system (or direct discharge into a permitted storm drain). Prior to placing the crushed stone and perforated piping, a nonwoven geotextile fabric (Mirafi 160N or similar) is recommended to be placed on top of the prepared and approved subgrade.

The following Work shall be conducted in connection with preparing the subgrade for the field and other proposed improvements.

- Excavation/stripping and removal of unsuitable subgrade materials (Topsoil, Forest Mat, Fill and Loess) is required in all areas of proposed construction (e.g., limits of the field, bleachers, landscaping, etc.).
- All debris and manmade materials exposed at or located below subgrade shall be excavated and replaced with compacted backfill. This includes removal of existing pavements, concrete pads, former foundations, septic systems, tanks and other remnants of previous site developments.
- Existing site grades and localized excavations to remove unsuitable materials (including topsoil, loess and debris) will require up to 7 ft or more of compacted fill.
- Rock excavation (controlled blasting and/or mechanical excavation, e.g., hoe-ramming) will be required to achieve subgrade. Rock, boulders and cobbles must be over-excavated and replaced with compacted backfill to provide a minimum of 12 inches of soil below proposed subgrade elevations. Non-woven Geotextile (Filter fabric) shall be placed over any exposed rock surfaces prior to placement of soil above to prevent the migration of fine grained soils.

We assume that the Civil Engineer will design and detail a stormwater runoff collection and management system. Anticipated subsurface conditions at and/or within shallow depths of the anticipated design subgrade level for the new synthetic turf field are likely to consist of fine-grained soils and rock that have poor drainage characteristics – vertically and laterally. Design of any sub-turf drainage systems must consider the effect these relatively impermeable subgrade conditions can have on the field's drainage capacity.

Ancillary Support Structures

Proposed site improvements include the construction of dugouts and grandstands. Foundation elements for proposed support structures should be designed to bear on naturally deposited glacial soils or compacted granular fill following removal of unsuitable soils. Foundation elements can be designed using a bearing pressure of 2 kips per square foot (ksf) for naturally deposited glacial soils of granular fill. Footings need to bear a minimum of 4 ft. below adjacent site grades for frost protection.

CONSTRUCTION CONSIDERATIONS

The primary purpose of this section is to comment on items related to foundation construction and related geotechnical engineering aspects of the proposed construction. Prospective contractors for the project should evaluate potential construction problems on the basis of their own knowledge and experience, taking into account their own proposed construction methods and procedures.



In addition to the construction guidelines and recommendations made herein, all construction activities should conform to the requirements of OSHA and all other applicable municipal and state regulatory agencies.

General Excavation

Excavation includes the removal of dense soils, cobbles, boulders, trash, rock and other miscellaneous debris. This will require large excavators and the machines will have wear and tear that require replacement of backhoe teeth, etc.

Excavation to achieve subgrades for the proposed field will require rock excavation. Rock excavation can consist of mechanical removal with the use of pneumatic hammers (hoe-ram) or controlled blasting. Based on our experience, controlled blasting would be the more efficient than hoe-ramming. Numerous State and local regulations must be followed, including pre-blast condition surveys on all houses, buildings and other structures located within 250 ft. of the blast zone. Vibration monitoring should also be conducted at and adjacent to structures. These surveys and vibration monitoring can be conducted by either the blasting contractor or the Owner. The blasting contractor should have a current license in the State of Massachusetts.

Conventional blasting mats should be used during blasting to prevent fly rock. The Contractor is required to obtain all necessary local, state, and federal permits prior to blasting.

Rock excavation should be observed by a qualified representative of the Owner to assess if bedrock excavation is being conducted in accordance with the Contract Documents and the contractor's approved submittals. We propose to prepare a Controlled Blasting Specification Section for the contract documents. Additional information pertaining to controlled blasting will be included in the contract specifications.

Construction Dewatering

We recommend dewatering and surface water control be implemented to maintain a dry and undisturbed design subgrade. Temporary re-grading should be conducted so as to divert possible surface runoff away from the work areas.

Dewatering should be performed as necessary to allow all final excavation and backfilling to be conducted in the dry. The Contractor should control the flow of surface water and seepage water into the excavation at all times. Dewatering procedures should be conducted in a manner that protects exposed field and footing subgrades and in-place compacted fill and that avoids pumping of fines. Dewatering can likely be performed using shallow sumping and drainage trenches.

Dewatering effluent should be recharged on-site in temporary recharge pits constructed by the contractor away from the work area. This may not be feasible due to the low permeability of on-site soils. Dewatering effluent cannot be allowed to enter site drainage system without a permit.



Reuse of Excavated Soil/Blasted Rock Materials

We recommend that excavated materials be reused on site to the extent possible to reduce off-site disposal costs. This may require on site processing and reuse in landscaped areas as common fill. Reuse below the field will require that gradation and compaction requirements be achieved. The Topsoil, Forest Mat and Loess are not suitable for reuse as fill material below the new field or other site improvements. These materials may be suitable for reuse in landscape areas outside the limits of the synthetic field.

Fill and glacial soils may be reused as fill following screening, processing/mixing and removal of 6 in. plus cobbles and boulders. Blast rock, boulders and cobbles could be processed on site by crushing. Processing on site soils and rock materials together would improve the usability and quality of on-site soils for reuse. On-site processing will require an area for segregating, processing and stockpiling excavated soils.

Re-use of excavated soils is dependent upon the physical properties (e.g., grain size distribution and cobble size) and degree of compaction that can be achieved in the field.

Off-Site Disposal and Trash/Debris Removal

If the onsite soils, cobbles, and boulders cannot be reused on site, off-site disposal will require management of these materials in compliance with all applicable federal, state, and local laws and regulations. This will likely include chemical testing of soils by receiving facilities. Chemical testing may result in regulatory reporting requirements and other issues.

There are areas on the site where trash/debris are present as shown on Figure 2. These materials are recommended to be excavated and legally disposed off-site prior to general excavation and earthwork to reduce mixing with other materials. The facility that receives these materials will likely require the collection and chemical analysis of samples prior to accepting the materials. The process of sampling, testing and acceptance may take up to 8 weeks from the time to the samples are collected to arrange for off-site disposition of the materials.

Backfilling and Subgrade Preparation

Backfill shall consist of well graded granular materials. Backfill placed to raise grades to the design subgrade elevation shall be compacted to 95% of the material's maximum dry unit weight (determined in accordance with ASTM D1557). As a minimum, each layer of fill should receive four complete coverages with suitable compaction equipment.

The field subgrade will generally consist of glacial till or compacted fill after removing unsuitable materials and rock. The glacial soils and other in situ soils are very susceptible to disturbance due to moisture, construction traffic and freezing and thawing temperatures.

The following measures are recommended:

- Final excavations should be made by hand or using smooth-bladed equipment to remove all soft or disturbed soil.
- Back-blading to smooth the surface should not be permitted.



• The exposed subgrade should be compacted with a roller. Compaction should be discontinued if disturbance occurs due to the presence of water. If, during proof compaction of the subgrades pumping, or weaving conditions are observed, alternate compaction techniques may be required and/or additional subgrade preparation may be recommended (e.g., removal and replacement of soft, compressible soils).

Plan and Specification Review

It is recommended that Haley & Aldrich be provided the opportunity to review geotechnical aspects of the final plans and specifications in order to confirm that the recommendations made in this report were interpreted and implemented as intended.

Additional Explorations

We recommend that additional subsurface explorations be conducted to further define areas of rock excavation. This work may consist of explorations on a grid pattern to collect additional top of rock information. Explorations would consist of drill holes conducted with an air track drill rig or test pits conducted with and excavator. Substantial site clearing would be required to conduct this work prior to construction.

Construction Monitoring

A geotechnical engineer or technician qualified by training and experience is highly recommended to be present during construction to provide monitoring. The field representative should be present to monitor the following construction activities and facilitate problem resolution:

- Excavation of site soils and rock, including Controlled Blasting if conducted and processing of site material.
- Monitor preparation of field and foundation surfaces including removal of existing unsuitable materials, and to confirm the character of the material encountered at bearing levels.
- Confirm that fill and backfill materials meet the requirements of the project plans and specifications, and make judgments regarding the suitability of excavated soils for reuse as fill;
- Observe placement and test compaction of compacted fills.
- Conduct vibration monitoring activities during controlled blasting and other earthwork activities.

It is recommended that Haley & Aldrich be retained to perform full-time field observations of the geotechnical aspects of construction based on familiarity with the subsurface conditions, design concepts, and specifications. Field observations are intended to confirm compliance with the design concepts and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction.



LIMITATIONS

The scope of work undertaken for this report does not include environmental consulting services to assess the need for cost contingencies associated with handling and disposal of excavated soil materials. If excess soils will be generated for off-site disposal, we recommend that Haley & Aldrich conduct a program to characterize excavated soil for off-site disposal. We would be happy to provide a proposal for these services if the need arises.

This report has been prepared for specific application to the proposed multipurpose athletic field site at Xaverian Brothers High School in Westwood, Massachusetts. The recommendations contained in this report are based, in part, on information obtained from subsurface explorations and information that was provided to us by BAA. The nature and extent of variations in the subsurface conditions between explorations may not become evident until construction, and the project design may change from our current understanding. Any additional information pertaining to the project that becomes available should be provided to Haley & Aldrich, Inc., so that our conclusions and recommendations can be reviewed and modified, as necessary.

Please do not hesitate to contact us should you have any questions or require additional information.

Enclosures:

Table I – Summary of Test Pit Explorations Figure 1 – Site and Subsurface Exploration Location Plan Appendix A – Test Pit Reports and Photographs Appendix B – Geotechnical Laboratory Analysis Test Results

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TABLE I - SUMMARY OF TEST PIT DATA

XAVERIAN BROTHERS HIGH SCHOOL 800 CLAPBOARDTREE STREET WESTWOOD, MASSACHUSETTS 39579-003

		Ground		Bottom of	Fores	st Mat	F	ill	Loess D	eposits	Glaci	al Till	Bedrock*
Test Boring ID	Date	Surface El. [ft]	Total Test Pit Depth [ft]	Test Pit Elevation [ft]	Top Elevation [ft]	Thickness [ft]	Top Elevation [ft]						
TP-13	5/13/2013	155.5	8.5	147.0	NE	NE	155.5	3.0	NE	NE	152.5	NP	-
TP-14	5/14/2013	155.0	7.0	148.0	NE	NE	155.0	6.0	NE	NE	NE	NE	-
TP-15	5/14/2013	148.5	4.0	144.5	148.5	0.8	NE	NE	147.8	1.2	146.5	NP	-
TP-16	5/13/2013	153.0	5.8	147.3	NE	NE	153.0	1.6	NE	NE	151.4	NP	-
TP-16A	5/13/2013	153.5	6.0	147.5	153.5	1.5	NE	NE	152.0	1.5	150.5	NP	-
TP-17	5/14/2013	155.0	4.0	151.0	155.0	0.8	NE	NE	154.3	1.2	153.0	2.0	151 to 155
TP-18	5/14/2013	150.5	4.5	146.0	NE	NE	150.5	4.5	NE	NE	NE	NE	146.5 to 150
TP-19	5/13/2013	151.5	7.0	144.5	NE	NE	151.5	3.0	NE	NE	148.5	NP	-
TP-20	5/13/2013	152.0	7.0	145.0	152.0	1.0	NE	NE	151.0	1.0	150.0	NP	-
TP-21	5/14/2013	150.0	3.9	146.1	NE	NE	150.0	1.0	149.0	2.7	146.3	0.2	146.1 to 148.5
TP-21A	5/14/2013	154.5	3.0	151.5	NE	NE	154.5	1.5	NE	NE	NE	NE	151.5 to 153
TP-22	5/13/2013	152.7	8.0	144.7	152.7	1.5	NE	NE	151.2	1.5	149.7	NP	-
TP-23	5/14/2013	151.0	4.0	147.0	NE	NE	151.0	1.5	149.5	2.0	147.5	0.3	147.3
TP-24	5/14/2013	155.0	0.9	154.1	155.0	0.9	NE	NE	NE	NE	NE	NE	154.1
TP-25	5/14/2013	152.0	3.0	149.0	NE	NE	152	1.5	150.5	1.3	149.3	0.2	149.0

NOTES:

1. NE = Not Encountered

2. Elevations are in feet and reference National Geodetic Vertical Datum of 1929 (NGVD 1929).

3. NP = Not penetrated

4. * indicates includes weathered rock.





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APPENDIX A

Test Pit Photos and Logs



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1-1-0		Standing W	later in C	<u>s</u> Approx Vol (cu.ft)		Te	est I	Pit [Dim	ensi	ons	<u>(ft)</u>						
ESTPIT-	at o me	depth not easured after	encount	=	Pit Pit	Leng	gth : oth (xW ft)	idth	(ft) 7.	11.: 0	5 x 4	4.5					
HA TE		NO	TE: Soil	identific	ation based on vi	sual-manual methods of the) ne USCS	system as practiced by	Hale	y & A	Aldri	ch, I	nc.		-			



[H/ AI	Same Statution 1 1 2 146.5 3 1 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5 4 144.5			Т	est	t P	it l	No		Т	P-1	5							
ľ	Proje	ect X	STREET PIT LOG SAVERIAN BROTHERS HIGH SCHOOL- BASEBALL FIELD. WESTWOOD, MA XAVERIAN BROTHERS HIGH SCHOOL. XAVERIAN BROTHERS HIGH SCHOOL. Test manual school sc										39	579	-003					
	Loca	tion W	VESTWO	DOD, MA	A				ня	2.A F	2on		С	. Su	lliva	n				
	Clien	nt X	AVERIA	AN BRO	THERS HIGH S				ωp					-						
	Cont	tractor E	EARTHW	VORKS I	NDUSTRIES, I		Da	te			14]	May	201	3						
	Equi	pment Used	Bo		We	eath	er	5	Suni	ny,	55°	F								
	Grou	Ind El.: 148.5	5 (est.)	indwater depths/entry	rate	s (in	./mi	in.)	: 1	١E										
	El. Da	atum: NGV	'D 1929			1														
	(#)		d EL: 148.5 (est.) Location: See Plan Groundwater depth um: NGVD 1929 VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION Sample ID Stratum Change Elev, IG(t) USCS Symbol Jongeting USCS (color, natural grain size and artificial component percentage estimate particle size, manual test properties, structure, odors, moist other descriptions and observations June Symbol Dark brown silty SAND with trace gravel (SM), mps 1 in., n forest mat, roots throughout -FOREST MAT- 147.8 0.8 ML Orange-brown sandy SILT with gravel (ML), mps 1.5 in., nc no odor, moist 146.5 2.0 SM Olive-gray silty SAND (SM) with gravel, mps 4 in., well bot odor, moist Note: Difficult to excavate. -GLACIAL TILL DEPOSIT- -GLACIAL TILL DEPOSIT-										Sand E			Field	Tests	\$		
	Depth	Sample ID	SAVERIAN BROTHERS HIGH SCHOOL tert EARTHWORKS INDUSTRIES, INC. tert Bobcat E45 El: 148.5 (est.) Location: See Plan Groundwater depths m: NGVD 1929 VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION Sample Stratum Change USCS Symbol VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (color, natural grain size and artificial component percentage estimate particle size, manual test properties, Structure, doors, moist other descriptions and observations (EOLOGIC INTERPRETATION) Sample SM Dark brown sitty SAND with trace gravel (SM), mps 1 in., m forest mat, roots throughout -FOREST MAT- 147.8 ML Orange-brown sandy SILT with gravel (ML), mps 1.5 in., no no odor, moist -LOESS DEPOSIT- 146.5 SM Olive-gray silty SAND (SM) with gravel, mps 4 in., well bon odor, moist Note: Difficult to excavate. -GLACIAL TILL DEPOSIT-										% Mediu	% Fine	% FINES	Toughne	Plasticity	Strength		
Ī	-0			M), mps 1 in., no struc -	ture,	5	5		10	50 3	30									
		tion WESTWOOD, MA t XAVERIAN BROTHERS HIGH SCHOOL. ractor EARTHWORKS INDUSTRIES, INC. ment Used Bobcat E45 nd EL: 148.5 (est.) Location: See Plan Groundwater depths/entry turn: NGVD 1929 Sample Change USCS Symbol Change Symbol Color, natural grain size and artificial component percentage estimates, max particle size, maxual test properties, structure, doors, moisture, other descriptions and observations GCOLOGIC INTERPRETATION) 147.8 0.8 ML Orange-brown sandy SILT with gravel (ML), mps 1 in., no struct no odor, moist -LOESS DEPOSIT- 146.5 2.0 SM Olive-gray silty SAND (SM) with gravel, mps 4 in., well bonded, n odor, moist Note: Difficult to excavate. 144.5 4.0 BOTTOM OF EXPLORATION 4.0 FT								5	5		5	40 4	15					
-	- 1 -	ISOTT LOOG ISOTT LOOG ISOTT LOOG dect XAVERIAN BROTHERS HIGH SCHOOL. BASEBALL FIELD tractor EARTHWORKS INDUSTRIES, INC. ipment Used Bobcat E45 Groundwater depths/entry atum: NGVD 1929 Colspan= Colspan= Colspan= Colspan="2">Colspan= Colspan= Colspan="2">Colspan="2" Sample Simple Visual-MANUAL IDENTIFICATION AND DESCRIPTION Sample Colspan="2" Visual-MANUAL IDENTIFICATION AND DESCRIPTION Sample Colspan="2" Visual-MANUAL IDENTIFICATION AND DESCRIPTION Sample <th <="" colspan="2" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th>							<td></td>											
						-LOES	S DEPOSI	Γ-												
May 21, 13	2 -		146.5 2.0	SM	Olive-gray sili odor, moist Note: Difficul	ty SAND (SM) with It to excavate.	gravel, mj	ps 4 in., well bonded, n	0	5	5	5	15	40 3	30					
FIELD/GINT\39579-003_TP.GPJ	- 3 -					-GLACIAL	TILL DEF	POSIT-												
79\003 - BASEBALL	- 4 -		144.5 4.0			BOTTOM OF EX	XPLORAT	ION 4.0 FT												
TP07-1.GDT G:\395																				
В. НА	Ohstri	ictions:	[Fi	eld T	ests							<u> </u>							
HA-LIB07-1-BOS.GL				Dilatancy Toughness Plasticity N - Dry Strength N - None	R L- Nonpl eL-L	- Rap Low astic ow N	id M L - 1 - M	S - - Me Low ediu	Slow ediun / M um H	v N n H -Me H-Hi	I - No I - Hi dium gh V	ne gh H - H - Ver	ligh y Higl	h						
IT-07-1	at c	Standing W	later in C	Complete	ed Pit	<u>a</u> Approx. Vol. (cu.ft)	Pit	<u>Te</u>	est l	Pit x \^	Dim Vidt	hens	ions	<u>5 (ft)</u>) x ⊿	.0					
TESTPI	me	easured after			hours elapsed	=	Pit	Dep	oth (ft)		4	.0	, л 1						
Ă		NO	TE: Soil	/ Hale	y & A	\ldri	ch,	Inc.												

	H/ AI	ALEY& LDRICH			TES	ST PIT LOG			Те	est	: Pi	it I	No.		TI	P-1	6	
ľ	Proje	ect X	AVERL	AN BRO	OTHERS HIGH	SCHOOL- BASE	BALL FI	ELD	File	No) .		39:	579-	003			
	Loca	ition V	VESTWO	DOD, M	A				Н&/	A R	lep		C.	Sul	livaı	1		
	Clien	nt X	AVERI.	AN BRC	THERS HIGH	SCHOOL			Date	e			13 N	May	201	3		
	Eaui	pment Use	BARING BO	bcat E45	5	INC.			Woo	oth	or	s	Sunr	.v 5	5° ₽	7		
╞	Grou	und El · 153 () (est.)		Location: Se	e Dlan	Grou	ndwater depths/entry	rates	(in	./mi	n.):		19, 5 16	5 1			
	El. Da	atum: _{NGV}	D 1929							`		,	1,	Ľ				
ľ	(ft)		Stratum		VIS	SUAL-MANUAL IDENTI	FICATION A	ND DESCRIPTION		Gra	vel	S	and		F	ield ⁻	<u>Fest</u>	3
	Depth	Sample ID	Change Elev./ Depth (ft)	USCS Symbo	(color, natural g	grain size and artificial c le size, manual test proj other descriptio GEOLOGIC II	component p perties, structures, structure	ercentage estimates, maxir cture, odors, moisture, ervations ATION)	num	% Coarse	% Fine	% Coarse	% Mediun	% Fine % Fines	Dilatancy	Toughnes	Plasticity	Strength
	- 0 -			SM	Dark brown s aluminum car	silty SAND (SM), mp as throughout, mps of	os 0.5 in., f asphalt is	pieces of asphalt, concre 10 in., no odor, moist	ete,		5		10 5	50 3	5			
	- 1 -	-				-]	FILL-											
			151.4 1.6	SM	Olive-brown	to tan-brown silty SA	ND with g	gravel (SM), mps 12 in.,		5	5	5	10 4	15 3	2	-	\vdash	
	- 2 -	-			well bonded Note: Difficu	It to excavate.												
-	- 3 -	-																
1ay 21, 1	- 4 -	_				-GLACIAL	TILL DEP	POSIT-										
2																		
3_TP.G																		
39579-00	- 5 -	-																
D/GINT/;			147.2															
ILL FIELI			147.3 5.8		Notes: Refue	BOTTOM OF EX	PLORATI	ON 5.75 FT				\square	+		+	+	+	-
BASEB₽					Area a out trash barr	round test pit appear els, old water heater.	s to be old asphalt ar	dumping spot with rustend concrete.	d									
79/003 -																		
G:\395;																		
1.GDT																		
IA-TP07-																		
GLB F	Obstru	uctions:	147.3 BOTTOM OF EXPLORATION 5.75 FT 5.8 Notes: Refusal on dense till. Area around test pit appears to be old dumping spot with out trash barrels, old water heater, asphalt and concrete. ctions: Remarks: Dilatancy Toughness Plasticity															
7-1-BOS.								Dilatancy Toughness	R - I L - Lo	Rapi ow	id M -	S - Me	Slow	N H	- Nor - Hig	ie h		
HA-LIB0;								Plasticity N - I Dry Strength N - None	Nonplas	stic w_M	L - I I - Me	Low ediu	M - m H	Med - Hig	ium h V	H - ⊢ ∙ Very	ligh <u>y H</u> igl	h
1-1		Standing V	later in C	Complete	ed Pit	Diameter (in.)	Boulder Number	<u>s</u> Approx. Vol. (cu.ft)	D''' '	Te	est F	Pit I	Dim	ensi	ons	(ft)		
TESTPIT	at o me	depth not easured after	encount	=	Pit L Pit D	.eng Dept	gth : t <u>h (</u> 1	x W ft)	ridth	1 (tt) 5.	6.0 8	x 5.	.0					
HA		NO	TE: Soil	identifica	tion based on vis	ual-manual methods	of the USC	S system as practiced by	Haley	& A	Idrie	ch, I	Inc.					



	H Al	ALEY& LDRICH			TES		Т	est	P	it N	lo.	7	ГР-	16	A		
	Proje	ect X	AVERI	AN BRO	OTHERS HIGH	I SCHOOL- BASH	EBALL FII	ELD	Fil	e No) .		395	79-0	03		
	Loca	ition W	VESTWO	DOD, M	IA				Н8	A R	lep		C.	Sull	ivan		
	Clier	nt X	AVERIA	AN BRO	OTHERS HIGH	SCHOOL			Da	ito	•		13 N	[av 2	2013		
	Con	nment User	ARIHV	bcat E4	INDUSTRIES, 1 5	INC.				4 .		c		, 54	от • с		
╞	Crow				Lesstion: 0	DI	Grou	ndwator donthe/ontr	vve vrato		er /mi	د in ۱۰	N	7, 55) F		
	El. Da	atum: NGV	D 1929		Location. Se	e Plan	Ciou		Tato	5 (iii	.,		INI	L			
ľ	lf)		Stratum		VIS	SUAL-MANUAL IDENT	IFICATION A	ND DESCRIPTION		Gra	vel	S	and		Fie	eld T	ests
	Depth (Sample ID	Change Elev./ Depth (ft)	USCS Symbo	6 (color, natural g 6 particl	grain size and artificial le size, manual test pro other descripti GEOLOGIC	component poperties, structions and obseted INTERPRET	ercentage estimates, maxi cture, odors, moisture, rvations ATION)	mum	% Coarse	% Fine	% Coarse	% Medium % Fine	% Fines	Dilatancy	Toughness	Plasticity Strength
Ē	- 0 -		(,	SM	Dark brown s	silty SAND (SM), m	ps 0.75 in.,	, no structure, no odor,	000	5	5	5	10 4	0 35	<u> </u>	•	
-	- 1 -		152.0														
			1.5	ML	no structure, no odor,		5	5		10 2	0 60						
-	2 -			Γ-													
	- 3 -		I), mps 4 in., no oversiz	ze	5	5		10 5	0 30								
May 21, 13	- 4 -	-		djacent to	7		~		App Stee Exp Refe	roxir el Sti osec er to	nate ructu d in 1 Pho	Lin ire Fest tos	nits of Pit.				
GPJ						-GLACIAL	. TILL DEP	OSIT-	00000								
L FIELD\GINT\39579-003_TP.	- 5 -		147.5		Note: Test pit of the ground disturbed.	t excavated next to o l. Soil immediately a	old steel stru adjacent to s	ecture, partly protruding teel structure appears	out								
ASEBALI	6 -	-	6.0			BOTTOM OF E	XPLORATI	ON 6.0 FT						+			
HA-TP07-1.GDT G:\39579\003 - B/																	
S.GLB	Obstru	uctions:		Re	marks:		Fie	eld To	ests	;							
HA-LIB07-1-BOS		04			Dilatancy Toughness Plasticity N - Dry Strength N - None	R L-I Nonpl e L-L	- Rapi Low astic ow M	id M - L - I - M	S - S - Me Low ediu	Slow dium M - m H -	N - H - Mediu - High	None High um H	H - H Very	igh ' High			
olT-07-1	ato	Standing W depth not	t encount	complet ered	ft	Diameter (in.)	Number	Approx. Vol. (cu.ft)	Pit	<u>Te</u> Lend	e <mark>st l</mark> gth :	Pit [x W	Dime 'idth	ensio (ft)	ons (7.0 :	ft) x 4.	5
A TESTF	me	easured after	TE: C	der:41	hours elapsed	12 to 24 over 24	-		Pit	Dep	<u>th (</u>	ft)		6.0)		
Η		NO	TE: Soil	identifica	ation based on vis	ual-manual methods	of the USCS	S system as practiced by	/ Hale	y & A	ldri	ch, I	nc.				



	H/ AI	ALEY& DRICH	Ī		TES		Т	est	t P	it I	٩N	•	7	ГР-	17		
ľ	Proje	ect 2	XAVERL	AN BRO	THERS HIGH	SCHOOL- BASEBA	LL FIELD	Fil	e No) .		39	9579)-0 C)3		
	Loca	tion	WESTWO	DOD, MA				Н	A R	lep		С	. Si	alliv	/an		
	Clien	nt 2	XAVERI	AN BROT	THERS HIGH	SCHOOL				1-		14	M		112		
	Cont	ractor	EARTHV	VORKS IN	NDUSTRIES, I	INC.		Da	ite			14.	May	<i>y</i> 20)15		
	Equi	pment Use	a Bo	bcat E45			1	We	eath	er	S	Sun	ny,	53°	° F		
	Grou El. Da	nd El.: 155. atum: _{NG}	0 (est.) VD 1929	I	_ocation : See	e Plan	Groundwater depths/entry	rate	s (in	./mi	in.):	1	NE				
Γ	(Ħ)		Stratum		VIS	UAL-MANUAL IDENTIFICA	TION AND DESCRIPTION		Gra	vel	S	and	ł		Fiel	d Tes	sts
	Depth (Sample ID	Change Elev./ Depth (ft)	onent percentage estimates, maxi es, structure, odors, moisture, ind observations RPRETATION)	mum	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughnes:	Strength			
	- 0 -		.5 in., no structure, roots t MAT-		5	5		10	45	35							
			s 2 in., no structure, no odor, v	wet	5	5		10	30	50	-	_	-				
-	- 1 -																
						-LOESS DI	EPOSIT-										
	2 -		2.0	SM	Olive-gray sili odor, moist, n Note: Difficul	ty SAND with gravel (S to oversize It to excavate	M), mps 8 in., well bonded, n	0	10	15	10	10	25	30			
3PJ May 21, 13					Approximate Surface Exp Refer to Pho	e Limits of Bedrock bosed in Test Pit.											
579-003_TP.G	- 3 -					-GLACIAI	L TILL-										
EBALL FIELD/GINT/39																	
G:\39579\003 - BASE	- 4 -		151.0 4.0		Note: Refusal	BOTTOM OF EXPL on BEDROCK (granite -BEDRO	ORATION 4.0 FT). DCK-	<u>``</u>									
TP07-1.GDT																	
B HA-	Obotr	uctions:			C:		aeto										
BOS.GLI	UDSTIL	ICTIONS:		Dilatancy	R	- Rap	id	s - :	Slov	v I	N - N	lone					
HA-LIB07-1-E				Toughness Plasticity N - Dry Strength N - None	L - Nonpl L - L	Low astic ow_N	M - L - I - M	- Me Low lediu	diun M m H	m - M∈ <u>H -</u> H	H - H ediur ligh	High n H <u>V-</u> V	- Higł ery H	ו ligh			
-07-1		Standing \	Nater in C	Complete	d Pit	Diameter (in.) Num	oulders nber Approx. Vol. (cu.ft)		Te	est l	Pit I	Dim	nens	sior	ns (f)	
ESTPIT	at c me	depth no asured after	ot encount	ered fi h	ours elapsed	12 to 24 -	= _	Pit Pit	Leng	gth : th (i	x W ft)	/idtl	n (ft ∠) 2 1.0	0.0	κ 5	
HA TI		N	DTE: Soil	identificati	on based on visu	ual-manual methods of th	e USCS system as practiced by	Hale	y & A	ldri	ch,	Inc.					



PHOTOGRAPHS OF TEST PIT TP-18

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

G:\39579\003 - Baseball Field\Geotech Memo\Appendix A - Test Pit Photos and Logs\[2013 0515-TP Photographs.xls]Photos

FILE NO. 39579-003

	H Al	ALEY& LDRICH			TES	ST PIT LOG			т	est	t Pi	it N	0.		TP	-18	8
ŀ	Proje	ect X	AVERL	AN BRO	OTHERS HIGH	I SCHOOL- BASEB	ALL FIE	CLD	File	e No) .		3957	79-0	03		
	Loca	tion V	VESTWO	DOD, M	A				Н8	AR	Rep		C. \$	Sulli	van		
	Clier	nt X	AVERI	AN BRO	OTHERS HIGH	SCHOOL				4	1-	1	4 M		012		
	Cont		EARTHV	VORKS	INDUSTRIES, 1	INC.				te		1	4 101	ay 2	.015		
-	Equi	pment Used	a Bo	bcat E4:	5				We	ath	er	Sı	inny	, 53	°F		
	Grou El. Da	atum: NGV	5 (est.) 7D 1929		Location: See	e Plan	Groui	ndwater depths/entry	rates	s (in	./mi	n.):	NE				
	(ŧ		Stratum		VIS	SUAL-MANUAL IDENTIFI	CATION AI	ND DESCRIPTION		Gra	vel	Sa	nd =	-	Fie	eld T	ests
	Depth	Sample ID	Elev./ Depth (ft)	Symbo	(color, natural g (color, natural g (color, natural g (color, natural g	grain size and artificial co le size, manual test prope other description GEOLOGIC IN	mponent pe erties, struc s and obse FERPRETA	ercentage estimates, maxi ture, odors, moisture, rvations (TION)	mum	% Coarse	% Fine	% Coarse	% Fine	% Fines	Dilatancy	Toughne	Plasticity Strength
	- 0 -			SM	Loose cobble	and boulder fill mixed	l in with b	lack organic TOPSOIL	,								
-	- 1 -				Note: Bedroc	ck starts at 1.0 ft and	slopes to	the east.									
	- 2 -	-															
						-BOULDER-0	COBBLE	FILL-									
-	- 3 -						\sim										
3					Approximat Surface Ex Refer to Ph	te Limits of Bedrock posed in Test Pit.	7										
lay 21, 1	- 4 -																
N N			146.0			POTTOM OF EVI		ON 4 5 ET	` \								
ALL FIELD\GINT\39579-003_TP.G			т.5		Note: Refusal	l at BEDROCK (grani -BED	re). ROCK-										
TP07-1.GDT G:\39579\003 - BASEB																	
B HA	Ohater	untions:			Eiz	JA T											
BOS.GL	obstru			Dilatancy	R-	Rap	id	S - S	low	N -	None	;					
HA-LIB07-1-			L - L Nonpla : L - Lo	_ow astic ow N	- M L - I 1 - Me	- Med Low ediun	ium M-N 1 H-	H - Nediu High	High Im F V-	I - Hi Very	gh High						
IT-07-1	atr	Standing V	later in C	Complet	ed Pit	Diameter (in.) N	Boulders	<u>s</u> Approx. Vol. (cu.ft)	Pit	<u>Te</u> Lenr	e <mark>st F</mark> ath s	Pit D x Wi	imei dth (nsio (ft)	ons (7.5.3	ft) x 4	5
TESTPI	me	easured after			n hours elapsed	12 to 24 over 24	100 = 10 =	=	Pit	Dep	th (1	ft)	au (4.5		. 7	
ΨH		NO	TE: Soil	identifica	tion based on visi	ual-manual methods of	the USCS	system as practiced by	Haley	y & A	Idrie	ch, Ir	IC.				



	H/ AI	ALEY& DRICH	[т	est	P	it l	No).	,	ТР	-19)				
ľ	Proje	ect X	KAVERL	AN BRO	THERS HIGH	SCHOOL- BASI	EBALL FI	ELD	File	e No) .		39	9579	9-00	03			
	Loca	tion V	VESTWO	DOD, MA	A				Н8	AR	lep		C	2. S	ulli	van			
	Clien	it X	(AVERI	AN BRO	THERS HIGH	SCHOOL			D o	••	•		13	Ма	v 2	013			
	Cont			VORKS I	NDUSTRIES, I	INC.				le			15	ivia	.y 2	015 0 F			
	Equi						0.1		We	ath	er		Sun	ny,	22	° F			
	Grou El. Da	nd El.: 151.: atum: NGV	5 (est.) /D 1929		Location: See	e Plan	Grou	ndwater deptns/entry	rates	s (in	./m	in.)	:]	NE					
	(ŧ		Stratum	11000	VIS	SUAL-MANUAL IDENT	IFICATION A	ND DESCRIPTION		Gra	vel	S	and E	k		Fie	eld T	ests	;
	Depth	Contractor EARTHWORKS INDUSTRIES, INC. quipment Used Bobcat E45 Fround EL: 151.5 (est.) Location: See Plan Groundwater depths/er 3. Datum: NGVD 1929 VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION Nobel Contractions Coortinatural grain size and artificial component percentage estimates. In particle size, manual test properties, structure, structure, structure, structure, no odor, moist, nots throughout, area appears to be fill with blast rock or similar 1 -									% Fine	% Coarse	% Mediur	% Fine	% Fines	Dilatancy	Toughnes	Plasticity	Strength
	- 0 -	Ground EI: 151.5 (est.) Location: See Plan Groundwater depths/entry EI. Datum: NGVD 1929 VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION Sample Stratum Change Depth (ft) USCS Symbol VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION Colspan="2">Colspan="2">OUT Colspan="2">Groundwater depths/entry Sample Stratum Change Depth (ft) USCS Symbol VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION O Sample Site Symbol Color, natural grain size and artificial component percentage estimates, maximal test properties, structure, dots mostervations GEOLOGIC INTERPRETATION) 0 SM Dark brown sitty SAND (SM) constined with boulders, mps 24 in., structure, no odor, moist, roots throughout, area appears to be filled with blast rock or similar 1 Iso.0 Iso.0 Iso.0 1.5 ML Orange-brown sandy SILT (ML) with boulders commingled into stra mps 20 in., no structure, no odor, appears to be disturbed 3 Iso.0 SM Olive-gray silty SAND with gravel and boulders (SM), mps 24 in., v bonded, no odor, moist 4 SM SM Olive-gray silty SAND with gravel and boulders (SM), mps 24 in., v 5 GLACIAL TILL DEPOSIT- 6 SM Olive-gray silty SAND									10		10	35	35				
		Sample Stratum Change ID Stratum Change (betwind Depth (ft) USCS Symbol VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (color, natural grain size and artificial component percentage estimates, me particle size, manual test properties, structure, dors, moisture, other descriptions and observations GEOLOGIC INTERPRETATION) Image: Symbol (ft) SM Dark brown silty SAND (SM) combined with boulders, mps 24 in structure, no odor, moist, roots throughout, area appears to be fill with blast rock or similar Image: Simon (ft) Image: Simon Situe Orange-brown sandy SILT (ML) with boulders commingled into si mps 20 in., no structure, no odor, appears to be disturbed -FILL- Image: Situe Image: Situe -FILL- Image: Situe Image: Situe -FILL- Image: Situe SM Olive-gray silty SAND with gravel and boulders (SM), mps 24 in. Note: Difficult to excavate. Image: Situe -GLACIAL TILL DEPOSIT-																	
	- 1 -																		
		A. Datum: NGVD 1929 Sample Stratum (Darge Bev./ Depth (ft) USCS Symbol VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (color, natural grain size and artificial component percentage estimates, n particle size, manual test properties, structure, odors, moisture, other descriptions and observations GEOLOGIC INTERPRETATION) 0 SM Dark brown sitty SAND (SM) combined with boulders, mps 24 in structure, no odor, moist, roots throughout, area appears to be fill with blast rock or similar 1 ISO.0 ML Orange-brown sandy STLT (ML) with boulders commingled into in mps 20 in., no structure, no odor, appears to be disturbed 2 Itals.5 SM Olive-gray silty SAND with gravel and boulders (SM), mps 24 in bonded, no odor, moist Note: Difficult to excavate. 4 - GLACIAL TILL DEPOSIT-									10	5	5	30	45				
	- 2 -						-FILL-												
			148.5																
-	Contractor EARTHWORKS INDUSTRIES, INC. Equipment Used Bobcat E45 Ground EI: 151.5 (est.) Location: Scc Plan Groundwater depths/entry r EI. Datum: NGVD 1929 USCS VISUAL-MANUAL IDENTFICATION AND DESCRIPTION Colspan="2">Construction: Scc Plan Groundwater depths/entry r EI. Datum: NGVD 1929 USCS VISUAL-MANUAL IDENTFICATION AND DESCRIPTION Colspan="2">O Sample Structure, on out, mainal lest properties, structure, constructure, or out, mainal lest properties, structure, constructure, no out, most, notes throughout, area appears to be filled in with blast rock or similar 1 - - - - 2 - ML Orange-brown sandy SILT (ML) with boulders commingled into strate mps 20 in., no structure, no oddr, appears to be disturbed - 3 - 148,5 SM Olive-gray silly SAND with gravel and boulders (SM), mps 24 in., we bonded, no odor, moist - - 4 - - - - - - - 5 - - - - - - - <td>10</td> <td>10</td> <td>10</td> <td>30</td> <td>30</td> <td></td> <td></td> <td></td> <td></td>										10	10	10	30	30				
May 21, 13	- 4 -																		
79-003_TP.GPJ	- 5 -					-GLACIAI	. TILL DEP	OSIT-											
FIELD/GINT/395																			
13 - BASEBALL F	- 6 -																		
39579\00			144 -																
DT G:	- 7 -		144.5 7.0			BOTTOM OF E	XPLORATI	ION 7.0 FT											$\left \right $
-TP07-1.G																			
LB HA	Obstru	ictions:		Ren	narks:			1	Fie	eld To	ests								
-BOS.G			Dilatancy	R	- Rap	id	S-	Slov	N	N - I	None	;							
HA-LIB07-1			Toughness Plasticity N - I Dry Strength N - None	L - I Nonpla L - Lo	Low astic ow N	М - L - I - М	- Me Low ediu	ediui / M im	m - Me H - H	H - ediu Iigh	High m F V - '	1 - Hi Very	igh Higł	1					
T-07-1	at -	Standing V	Vater in C	Complete	<u>d Pit</u>	Diameter (in.)	Boulders Number	<u>s</u> Approx. Vol. (cu.ft)	Di+	<u>Te</u>	est l	Pit	Din /idt	nen	sio	<u>ns(</u> ≳ 5 -	<u>ft)</u> v ∕	5	
TESTPI	at o me	asured after	t encount	ierea	τ nours elapsed	12 to 24 over 24	15 9	=	Pit	Dep	th (۸ v\ ft)	ul	ן) דו. י	7.0	J.J 1	. 4.	5	
Ă		NC	DTE: Soil	identificat	ion based on visu	ual-manual methods	of the USC	S system as practiced by	Hale	y & A	ldri	ch,	Inc						



	H/ AI	ALEY& DRICH	Ī			т	est	t P	it	No).		TP	-20)				
	Proje	ect 2	XAVERL	AN BRO	THERS HIGH	SCHOOL- BASE	BALL FI	ELD	File	e No) .		39	957	9-0	03			
	Loca	tion	WESTWO	DOD, MA	1				Н&	AR	lep	,	C	c. s	ulli	van			
	Clien	it 2	XAVERIA	AN BROT	THERS HIGH S	SCHOOL					1-		12	Мо	ว	012			
	Cont	ractor	EARTHW	VORKS II	NDUSTRIES, I	INC.				te			15	wia	.y 2	015			
	Equi	pment Use	a Bo	bcat E45					We	ath	er	,	Sun	ny,	55	° F			
	Grou El. Da	nd El.: 152. atum: _{NG}	0 (est.) VD 1929		Location: See	e Plan	Grou	ndwater depths/entry	rates	s (in	./mi	in.)	:]	NE					
Ī	ft)		Stratum		VIS	SUAL-MANUAL IDENTIF	ICATION A	ND DESCRIPTION		Gra	vel	5	Sand	d		Fie	ld T	ests	;
	Depth (Sample ID	ercentage estimates, maxi cture, odors, moisture, ervations ATION)	mum	% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength					
	End of the stratum change lip USCS Symbol Color natural grain size and artificial component percentage estimates particle size, manual test properties, structure, odors, moistur other descriptions and observations GEOLOGIC INTERPRETATION) 0 SM Dark brown silty SAND (SM), mps 0.5 in., no structure, no or roots throughout 1 IS1.0 SM Dark brown silty SAND (SM), mps 0.5 in., no structure, no or roots throughout 2 IS1.0 ML Orange-brown sandy SILT (ML), mps 3 in., no structure, no or moist, trace roots 2 IS0.0 SM Tan-brown to olive-gray silty SAND with gravel (SM), mps 32 structure, no odor, moist. Cobbles and boulders throughout. 3 - - GLACIAL TILL DEPOSIT- 5 - - -											5	20	40	35		<u> </u>	_	
	- 1 -		151.0		Orange brown	n condy SILT (ML)	nno 2 in	no structure no odor		5	5		5	25	60				
	B ID Depth (ft) Orman Other descriptions and observations GEOLOGIC INTERPRETATION) 0 SM Dark brown silty SAND (SM), mps 0.5 in., no structure roots throughout -5 in., no structure 1 -1 -1 -1 1.0 ML Orange-brown sandy SILT (ML), mps 3 in., no structure moist, trace roots -2 - 150.0 2.0 SM Tan-brown to olive-gray silty SAND with gravel (SM), i structure, no odor, moist. Cobbles and boulders through -3 - -4 - -5 -									5	5		5	20	00				
			Γ-																
	- 2 -	1 - 151.0 ML Orange-brown sandy SILT (ML), mps 3 in., no structure, no odor, moist, trace roots 2 - 150.0 -LOESS DEPOSIT- 2 - 150.0 - 3 - - SM 4 - - -										15	15	30	20				
		1 - 151.0 -FOREST MAT- 1 - 151.0 -FOREST MAT- 2 - 150.0 -LOESS DEPOSIT- 2 - 150.0 -LOESS DEPOSIT- 3 - - SM 4 - - -GLACIAL TILL DEPOSIT- 5 - - -GLACIAL TILL DEPOSIT-											10		20				
May 21, 13	- 3 -																		
Γď						-GLACIAL 7	TILL DEP	OSIT-											
39579-003_TP.G	- 5 -																		
ALL FIELD/GINT'	- 6 -																		
79\003 - BASEB/	0																		
G:\3957	- 7 -		145.0			DOTTON													
77-1.GDT			7.0			BOTTOM OF EX	PLORATI	ion 7.0 FT											
HA-TP(
S.GLB	Obstru	ictions:		Rem		Fie	eld To	ests	3	<u> </u>									
HA-LIB07-1-BOX				Dilatancy Toughness Plasticity N - Dry Strength N - None	- R L - L Nonpla L - Lo	-Rapi ∟ow astic ow M	id M- L- 1- M	S - Me Low lediu	Slov ediu v M um	w m I - M H - H	N - I H - ediu High	None High m F V-	I - Hi Very	igh Higt	ı				
-07-1		Standing \	Vater in C	Complete	d Pit	Diameter (in) N	Boulder	s Approx, Vol. (cu.ft)		Te	st	Pit	Din	nen	sio	<u>ns (</u>	ft)		_
ESTPIT-	at o me	lepth no asured after	t encount	ered f	t nours elansed	12 to 24	8 1	=	Pit I Pit I	Leng	gth∶ th (xV ft)	Vidt	h (f	t) 9 7.0).0 x	٤.:	5	
HA TE	inc	NC	DTE: Soil	' identificati	on based on visu	ual-manual methods o	+ f the USC	S system as practiced by	Haley	y&A	ldri	ich,	Inc						



	H/ Al	HALEY& TEST PIT LOG								t P	it I	No.		TI	?-2	1	
ľ	Proje	ect y	KAVERL	AN BRO	THERS HIGH	SCHOOL- BASEBA	LL FIELD	File	e No) .		39:	579-	003			
	Loca	tion \	VESTWO	DOD, MA	L			Н8	AR	lep	I	C.	. Sul	livar	1		
	Clien	t 2	KAVERI/	AN BROT	THERS HIGH S	SCHOOL				1-		143	for	2012	,		
	Cont		EARTHW	ORKS II	NDUSTRIES, I	INC.		Da	te			14 r	viay	2013	,		
	Equi	pment Use	a Bo	bcat E45			1	We	ath	er	5	Sunn	ıy, 5	3° F	<u> </u>		_
	Grou El. Da	nd El.: 150.4 atum: NGV	0 (est.) 7D 1929	I	Location: See	e Plan	Groundwater depths/entry	rates	s (in	./mi	in.):	N	ΙE				
ſ	(ft)		Stratum		VIS	UAL-MANUAL IDENTIFICA	TION AND DESCRIPTION		Gra	vel	s	and		Fi		<u>Fests</u>	;
	Depth	Sample ID	Change Elev./ Depth (ft)	USCS Symbol	(color, natural g particle	rain size and artificial comp e size, manual test properti other descriptions a GEOLOGIC INTE	onent percentage estimates, maxi es, structure, odors, moisture, ind observations RPRETATION)	mum	% Coarse	% Fine	% Coarse	% Medium	% Fine % Fines	Dilatancy	Toughnes	Plasticity	Strength
	SM Dark brown silty SAND (SM), mps 0.5 in., no structure, no odor, moist, forest mat, debris throughout: glass bottles, 1942 license pla miscellaneous metal											15 4	40 3	5			
	-FILL-																
-	- 1 -		149.0 1.0	ML	Orange-brown	sandy SILT with trace	gravel (ML), mps 2 in., no		5	5	$\left \right $	10 4	10 4		\vdash	<u> </u>	-
					structure, no Note: Bedrock the west.	odor, moist, trace roots k at eastern edge of pit	(granite) at 1.5 ft and slopes	; to									
						`											
	- 2 -																
	-LOESS DEPOSIT-																
, 13																	
May 21																	
ЗРJ																	
03_TP.0	- 3 -			Appi Bedi	roximate Limits rock Surface	of											
39579-0				Expo Refe	osed in Test Pit. er to Photos												
D/GINT/						Ň	\setminus										
TT FIEL			146.3				\mathbf{x}										
BASEBA			3.7 146.1	SM	Tan-brown to well bonded, r	olive-gray silty SAND no odor, moist	with trace gravel (SM), mps 2	in.,	10	10		20 3	30 30)			
9/003 - E	- 4 -	4 3.9 Note: Difficult to excavate.															
G:\3957	BOTTOM OF EXPLORATION 3 FT 10 IN. Note: Refusal on BEDROCK (granite).																
GDT						-BEDRO	JCK-										
-TP07-1.																	
LB HA-	Obstru	ictions:		Rem	arks:			Fie	eld Te	ests							
BOS.GI	2.0000						Dilatancy	R-	Rapi	id	S -	Slow	N	- Non	e		_
-LIB07-1-							Toughness Plasticity N -	L - L Nonpla	Low astic	M - L -	- Me Low	dium M -	∙H -Med	- Higl ium	า H - H	ligh	
7-1 HA		Standing V	Vater in C	Complete	d Pit	B	oulders	; L-L(<u>Te</u>	est l	Pit I	Dim	ensi	ons	(ft)	- nıgr	<u>'</u>
STPIT-0	at c	lepth no	t encount	ered f	t	<u>Diameter (in.) Nun</u> 12 to 24 -	<u>Approx. Vol. (cu.ft)</u> = _	Pit I	Leng	gth	хW	/idth	n (ft) ⊿	5.0	x 4.	0	
HA TE	me	measured after hours elapsed Over 24 = Pit Depth (ft) 4.0 NOTE: Soil identification based on visual-manual methods of the USCS system as practiced by Haley & Aldrich, Inc.															



	H/ AI	HALEY& TEST PIT LOG						Т	est	t P	it I	No.	•	TI	P -2 1	A	
	Proje	ect y	KAVERI	AN BRO	THERS HIGH	I SCHOOL- BASEBA	LL FIELD	Fil	e No) .		39	579	-003	3		
	Loca	tion V	WESTWO	OOD, MA	L.			Н8	ka r	Rep		C.	. Su	lliva	an		
	Clien	it 2	XAVERIA	AN BROI	HERS HIGH	SCHOOL		Da	tο			14 N	Mav	20	13		
	Equi	pment Use	d Bol	bcat E45	NDUSTRIES,	INC.			oth.	~ "	ç	lunr		530	F		
	Grou	nd El • 154	5 (est.)		ocation: Sa	o Dion	Groundwater denths/entry	vve v rate	s (in	er /mi	in).		ту, . те	,,	1		
	El. Da	atum: NGV	VD 1929					Tuto		.,							
	ŧ		Stratum		VIS	SUAL-MANUAL IDENTIFIC	ATION AND DESCRIPTION		Gra	vel	S	and ⊢	_	-	Field	Test	s
	Depth	Sample ID	Elev./ Depth (ft)	Symbol	(color, natural g partic	grain size and artificial comp le size, manual test propert other descriptions a GEOLOGIC INTE	ponent percentage estimates, maxi ies, structure, odors, moisture, and observations RPRETATION)	mum	% Coarse	% Fine	% Coarse	% Mediur	% Fine	% Fines	Toughnee	Plasticity	Strength
Ē	- 0 -		()	SM	Brown TOPS	OIL (SM) with glass and	d debris throughout, roots, fore	est		-						+-	
					mat												
	ЕНТ																
						-FIL	.L-										
	- 1 -																
			153.0 1.5		Granite BEDI	ROCK sloping to southe	ast					+	-	+	+	-	+
13																	
May 21,						-BEDR	OCK-										
R																	
3_TP.G	- 3 -		151.5			DOTTOM OF EVDI	ODATION 2.0 ET										
39579-00			3.0			DOTION OF EXPL	JURATION 3.0 F1										
NGINT/3																	
L FIELD																	
ASEBAL																	
003 - B/																	
:\39579\																	
DT G																	
P07-1.G																	
HA-TI																	
OS.GLB	Obstru	ictions:		Rem	arks:		Dilatanov	Fi	eld To	ests	S-	Slow	/ N	_ N/	ne		
307-1-BI							Toughness Plasticity	L -	Low Low	.ч М.	- Me	dium	ייי ארי ארי	i - Hi H - Hi dium	igh H - I	Hiah	
HA-LIE							Dry Strength N - None	e L - L	ow N	L- 1- M	ediu	m H	I - Hi	gh ∖	/ - Ver	y Hig	h
T-07-1	ot d	Standing V	<u>Vater in C</u>	complete	<u>d Pit</u>	<u>B</u> <u>Diameter (in.)</u> <u>Nur</u>	ouiders nber <u>Approx. Vol. (cu.ft)</u>	Dit	<u>Te</u>	e <mark>st l</mark>	Pit x \^.	Dim /idth	ens	ion:	<u>s (ft)</u>) () v	8.0	
TESTPI	me	asured after		erea f	t Iours elapsed	12 to 24 - over 24 -	= _	Pit	Dep	th (1	۸ vv ft)	านเท	3	.0	X	0.0	
Η		NC	DTE: Soil i	dentificati	on based on vis	ual-manual methods of th	ne USCS system as practiced by	/ Hale	y & A	Idri	ch,	Inc.					



	H Al	HALEY& TEST PIT LOG							Те	est	P	it I	No).	,	ТР	-22	2	
	Proi	ect X	AVERL	AN BRO	OTHERS HIGH	I SCHOOL- BASE	BALL FI	ELD	File	No).		39	9579	9-00	03			
	Loca	tion V	VESTWO	DOD, M	[A						-		0	, C.					
	Clier	nt X	XAVERI	AN BRO	OTHERS HIGH	SCHOOL			H&/	AR	ер		C	. 3	um	van			
	Con	tractor E	EARTHV	VORKS	INDUSTRIES,	INC.			Dat	е			13	Ma	y 2	013			
	Equi	pment Used	d Bo	bcat E4	5				Wea	athe	ər	5	Sun	ny,	55	° F			
	Grou	Ind El.: 152.7	7 (est.)		Location: Se	e Plan	Grou	ndwater depths/entry	rates	(in.	/mi	i n.) :	: 1	NE					
╞	EI. D	atum: NGV	/D 1929											.					
	Jepth (ft)	Sample ID	Stratum Change Elev./ Depth	USCS Symbo	Color, natural g	grain size and artificial le size, manual test pro other descripti	component p pperties, strue ons and obse	IND DESCRIPTION rercentage estimates, maxir cture, odors, moisture, ervations	num _	Coarse	Fine a	Coarse	Medium	Fine	Fines	atancy H	ughness	asticity	ength
-	- 0 -		(ft)	SM	Dark brown s	GEOLOGIC	INTERPRET	ATION)		%	%	%	% 10	% 50	% 35	Ō	P	ä	ชี
		-FOREST MAT-									0			00	00				
-	- 2 -	2 151.2 1.5 ML Orange-brown sandy SILT (ML), mps 1.75 in., no structure, no odo moist, trace roots									5	5	10	45	30				
		-LOESS DEPOSIT-																	
		149.7Tan-brown to olive-gray silty SAND (SM) with gravel and boulders, mps 28 in., well bonded, no odor, moist								10	10	5	10	35	30				
-	- 4 -																		
		-GLACIAL TILL DEPOSIT-																	
TP.GPJ May 21, 13	- 6 -				Note: Concen	ntration of large boul	lders increa	sing with depth.											
79-003_			144.7																
INT/395	8 -	•	8.0			BOTTOM OF E	XPLORAT	ION 8.0 FT											
ASEBALL FIELD\G																			
:\\39579\003 - B																			
07-1.GDT G																			
HA-TF								1											
JS.GLB	Obstru	uctions:		Re	marks:			Dilatanov	Fiel	d Te	ests	- -	SIA		N 7	Nona			
HA-LIB07-1-BC								Toughness Plasticity N - I Dry Strength N - None	L - Lo Nonpla:	ow stic <u>w</u> M	M - L - I - M	- Me Low ediu	diur M	‴ ⊓ ∣- Me <u>H -</u> F	H - I H - ediu	High m F	I - Hi √ery	igh High	
-07-1		Standing W	Vater in C	Complet	ed Pit	Diameter (in)	Boulder Number	s Approx, Vol. (cu.ft)	_	Te	st F	Pit	Din	nen	sio	<u>ns (</u>	ft)		
ESTPIT-	at o me	depth not asured after	t encount	tered	ft hours elapsed	12 to 24	9	= _	Pit L Pit Г	.eng)enf	th : th (1	x W ft)	/idt	h (f	t) 8 8.0	3.0 2	(4.)	0	
HA TE	measured after hours elapsed over 24 4 = Pit Depth (ft) 8.0 NOTE: Soil identification based on visual-manual methods of the USCS system as practiced by Haley & Aldrich, Inc.																		



	H/ AI	ALEY& DRICH		Te	st F	Pit	No	•-	r	ГP	-23						
-	Proje Loca	ect X tion W	AVERI. VESTWO	AN BRO	OTHERS HIGH	I SCHOOL- BASEBA	LL FIE	ELD	File I	No.		39)57 <u>9</u>	9-00)3		
	Clien	nt X	AVERIA	AN BRO	THERS HIGH	SCHOOL			H&A	Rep)	C	. Si	ulliv	van		
	Cont	ractor E	ARTHW	VORKS	INDUSTRIES,	INC.			Date			14	Ma	y 20	013		
	Equi	pment Used	Bo	bcat E4:	5				Weat	her		Sun	ny,	53	° F		
ľ	Grou	nd El.: 151.0) (est.)		Location: Se	e Plan	Grour	ndwater depths/entry	rates (in./m	nin.)	: 1	NE				
╞	EI. Da	atum: NGV	'D 1929				<u> </u>										
	epth (ft)	Sample ID	Stratum Change Elev./ Depth	USCS Symbo	Color, natural (color, natural (partic	SUAL-MANUAL IDENTIFIC, grain size and artificial com le size, manual test propert other descriptions ;	ATION AI ponent pe ies, struc and obsei	ND DESCRIPTION ercentage estimates, maxin ture, odors, moisture, rvations	num g	ravel	Coarse 2	Medium	Fine	Fines	atancy	nghness	asticity sts
			(ft)	())(Don's heavy	GEOLOGIC INTE	RPRETA	TION)	8	× ×	%	%	%	%	ē	۴	Str Pi
	SM Dark brown silty SAND (SM) with roots and debris throughout, gla bottles, miscellaneous metal, mps 20 in., no structure, no odor, mo									5		15	40	35			
-	- 1 -	1FILL-															
-	- 2 -	2 - 149.5 ML Orange-brown sandy SILT (ML), mps 2 in., no structure, no odd moist										5	40	45			
VT\39579-003_TP.GPJ May 21, 13	-LOESS DEPOSIT-																
ELD/GIN			147.5	CM .	Tan brown to	olive grov silty SAND	(SM) w	ith group mps 4 in w	11 1	1 10	5	15	30	30			
BALL FI			147.3	21/1	bonded								50	50			
- BASE			3.8	Granit	Decomposed	granite rock fabric	REDE	OCK-]			T	T	
P07-1.GDT G:\39579\003	- 4 -	4 - 4.0 BOTTOM OF EXPLORATION 4.0 FT Note: Refusal at BEDROCK (granite). -BEDROCK-															
HA-T																	
DS.GLB	Obstru	ictions:		Re	marks:			Dilotopou	Field	Test	s	<u>01-</u>		NI *	Jer -		
IA-LIB07-1-BC								Dilatancy Toughness Plasticity N - N Dry Strength N - None	R - R: L - Lov Nonplast L - Low	apid v M ic L- M-N	- S I - M Lov /Iedii	Slov ediur v M um I	w m - Me H - H	N - N H - I ediur ligh	None High m H V - N	- Hiợ /ery l	gh High
7-1 - F		Standing W	later in C	Complet	ed Pit	Diamator (in)	oulders			Test	Pit	Din	nen	sio	ns (f	<u>t)</u>	<u> </u>
STPIT-0	at o	depth not	encount	ered	ft	12 to 24		=	Pit Le	ngth	x V	Vidt	h (f	t) 5	5.0 x	4.0)
HA TE	me	asureα atter NO	TE: Soil	identifica	ition based on vis	I over 24 (ual-manual methods of t) : ne USCS	= system as practiced by	Pit De Haley 8	a Aldr	(11) 'ich,	Inc.		+.0			



	H Al	TEST PIT LOG								r	ſes	t P	it	No).		ТР	-24	4	
ľ	Proj	ect X	KAVERL	AN BR	от	HERS HIGH SCHOOL- BAS	SEBAL	L FIE	LD	Fil	e N	0.		39	957	9-0	03			
	Loca	tion V	VESTWO	DOD, M	ſΑ					ня	2 A F	?en		C	. s	ulli	van			
	Clier	nt S	KAVERI	AN BRO	OT	HERS HIGH SCHOOL					×~ 1	veb	•			-				
	Cont	tractor I	EARTHV	VORKS	IN	DUSTRIES, INC.				Da	te			14	Ma	ıy 2	013			
	Equi	pment Use	d Bo	bcat E4	-5					We	eath	er		Lig	ht r	ain				
	Grou	Ind El.: 155.0	0 (est.)		L	ocation: See Plan		Groun	dwater depths/entry	rate	s (ir	ı./m	in.)):]	NE					
	EI. D	atum: NGV	VD 1929								_									
	(ff)		Stratum Change	USC	S	VISUAL-MANUAL IDE		TION AN	ID DESCRIPTION		Gra	avel	9 9	Sano ⊑	d		Fie >	eld T	ests	
	Depth	Sample ID	Elev./ Depth (ft)	Symb	ol	particle size, manual test other descri GEOLOGI	propertie ptions ar C INTER	nd obser	ure, odors, moisture, vations TION)	num	% Coars	% Fine	% Coars	% Mediu	% Fine	% Fines	Dilatanc	Toughne	Plasticity Strandth	oucinyui
	O SM Dark brown silty SAND (SM) with trace gravel, mps 0.5 in., no structure, no odor, moist, roots throughout, forest mat - 1 - 154.1 0.9 BOTTOM OF EXPLORATION 10.0 IN. Note: Refusal on BEDROCK (granite).										5	5		5	50	35				-
-																				
, 13																				
IP.GPJ May 21																				
GINT/39579-003_																				
SASEBALL FIELU																				
G:/395/9/9/000-1																				
A-TP07-1.GD ו																				
CLB -	Obstru	uctions:		Re	ema	arks:				Fi	eld T	ests	3					-		
4-LIB07-1-BOS.									Dilatancy Toughness Plasticity N -	R L - Nonpl	- Rap Low lastic	oid M L -	S - - M Lov	- Slo ediu w N	w m 1 - M	N - I H - lediu	None High m H	H - H	igh High	-
STPIT-07-1 H	ato	Standing V	Vater in C	Comple tered	ft	Diameter (in.)	Bo Num	ulders ber <u>/</u> =	Approx. Vol. (cu.ft)	Pit	Len	gth	Pit x V	Dir Vidi	nen th (f	nsio ft) 7	ns ((ft) x 4.	0	
HA TE	me	asureu atter NC	DTE: Soil	identific	ntio	ours elapsed Over 24	 ds of the	= e USCS	svstem as practiced by	Pit Hale		an (Aldri	π) ich.	Inc		1.0				

HA TESTPIT-07-1 HA-LIB07-1-BOS.GLB HA-TP07-1.GDT G:339579003 - BASEBALL FIELD/GINT/39579-003_TP.GPJ



G:\39579\003 - Baseball Field\Geotech Memo\Appendix A - Test Pit Photos and Logs\[2013 0515-TP Photographs.xls]Photos ENGINEERING & ENVIRONMENTAL SOLUTIONS FILE NO. 39579-003

May 2013

	H/ AI	HALEY& TEST PIT LOG							est	: Pi	it N	No.		TP	-25	5	
	Proje	ect y	KAVERL	AN BRO	THERS HIGH	SCHOOL- BASEBA	LL FIELD	File	e No).		395	79-0	03			
	Loca	tion V	WESTWO	DOD, MA	4			H&	AR	lep		C.	Sull	ivan			
	Clien	it 2	XAVERI/	AN BRO	THERS HIGH	SCHOOL		Dat	to	-		14 N	fav 2	2013			
	Cont	nment Use	d Bo	bcat E45	NDUSTRIES, I	INC.			-41-		т	iaht	roir	52	۰с		
╞	Crow				Leastion G		Groundwater depths/entry	vve vrates		er /mi	n).			, 55	Г		
	El. Da	atum: NGV	VD 1929			e Plan			5 (III)			IN.	с 				
	æ		Stratum		VIS	UAL-MANUAL IDENTIFICA	ATION AND DESCRIPTION		Gra	vel	S	and 도	_	Fie	eld T ໃ	ests	;
	Depth	Sample ID	Elev./ Depth (ft)	Symbol	(color, natural g particl	rain size and artificial comp e size, manual test properti other descriptions a GEOLOGIC INTE	ponent percentage estimates, maxi ies, structure, odors, moisture, and observations RPRETATION)	mum	% Coarse	% Fine	% Coarse	% Mediur	% Fines	Dilatancy	Toughnes	Plasticity	Strength
	0 SM Brown silty SAND (SM) with cobbles, mps 25 in., no structure, no odor, moist								5	5		5	0 35				
_	- 1 -	-BOULDER-COBBLE FILL															
			150.5														
	150.5 Instant 1.5 ML Orange-brown sandy SILT with trace gravel (ML), mps 2 in., no structure, no odor, moist								5	5		5 3	5 50				
y 21, 13	- 2 -	2 - -LOESS DEPOSIT-															
l Ma			149.3		011				45	10	_						
TP.GPJ	2		2.8 149.0	SM	Olive-gray sil	ty SAND with gravel (S -GLACIA)	M), mps 4 in., well bonded, n L TILL-	101st	15	10	5	10 4	0 30				
79\003 - BASEBALL FIELD\GINT\39579-003	5		3.0		Note: Refusal	BOTTOM OF EXPL on BEDROCK (granite -BEDR(ORATION 3.0 FT). DCK-										
HA-TP07-1.GDT G:\395																	
S.GLB	Obstru	ictions:		Ren	narks:			Field Tests									
HA-LIB07-1-BOS							Dilatancy Toughness Plasticity N - Dry Strength N - None	-R L-L Nonpla eL-Lo	- Rapi ₋ow astic ow_M	id M - L - I I - Me	S - S - Me Low ediu	Slow dium M - m H	- N H Mediu - High	None High um H	H - H Very	igh Higł	1
PIT-07-1	at d	Standing V lepth no	Vater in C	Complete	ed Pit	<u>Diameter (in.)</u> Nun	oulders nber Approx. Vol. (cu.ft)	Pit	<u>Te</u> Lenç	gth :	Pit I x W	Dime /idth	ensio (ft)	ons (8.0	ft) x 4.	0	
HA TEST	me	asured after	DTE: Soil	identificat	hours elapsed ion based on visu	over 24 4	 ne USCS system as practiced by	Pit / Halev	Dep	th (f	ft) ch. I	Inc.	3.0)			

APPENDIX B

Geotechnical Laboratory Results



Client:	Haley & Al	drich, Inc.				
Project:	Xaverian B	rothers High S	chool - Parking	Lot		
Location:	Westwood	, MA			Project No:	GTX-300410
Boring ID:			Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-13		Test Date:	05/16/13	Checked By:	jdt
Depth :			Test Id:	265521		
Test Comm	ent:					
Sample Des	scription:	Moist, olive br	own silty sand	with gravel		
Sample Cor	mment:					

Particle Size Analysis - ASTM D422





Client:	Haley & Ale	drich, Inc.				
Project:	Xaverian B	rothers High S	chool - Parking	Lot		
Location:	Westwood	MA			Project No:	GTX-300410
Boring ID:			Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-19		Test Date:	05/16/13	Checked By:	jdt
Depth :			Test Id:	265522		
Test Comm	ent:					
Sample Des	scription:	Moist, olive br	own silty sand	with gravel		
Sample Cor	nment:					

Particle Size Analysis - ASTM D422





Client:	Haley & Al	drich, Inc.				
Project:	Xaverian E	Brothers High S	chool - Parking	Lot		
Location:	Westwood	, MA			Project No:	GTX-300410
Boring ID:			Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-13, TP-	19, TP-22	Test Date:	05/16/13	Checked By:	jdt
Depth :			Test Id:	265523		
Test Comm	ent:					
Sample Des	scription:	Moist, olive br	own silty sand	with gravel		
Sample Cor	nment:	Composite sar	mple of TP-13,	TP-19, and	TP-22	

Particle Size Analysis - ASTM D422





Haley & Al	drich, Inc.							
Xaverian E	Brothers High S	chool - Parking	Lot					
Westwood	, MA			Project No:	GTX-300410			
		Sample Type:	bag	Tested By:	cwd			
TP-13, TP-	19, TP-22	Test Date:	05/16/13	Checked By:	jdt			
		Test Id:	265524					
ient:								
Sample Description: Moist, olive brown silty sand with gravel								
Sample Comment: Composite sample of TP-13, TP-19, and TP-22								
	Haley & Al Xaverian E Westwood TP-13, TP- ent: scription: mment:	Haley & Aldrich, Inc. Xaverian Brothers High S Westwood, MA TP-13, TP-19, TP-22 tent: scription: Moist, olive br mment: Composite sar	Haley & Aldrich, Inc. Xaverian Brothers High School - Parking Westwood, MA Sample Type: TP-13, TP-19, TP-22 Test Date: Test Id: ent: scription: Moist, olive brown silty sand mment: Composite sample of TP-13,	Haley & Aldrich, Inc. Xaverian Brothers High School - Parking Lot Westwood, MA Sample Type: bag TP-13, TP-19, TP-22 Test Date: 05/16/13 Test Id: 265524 ent: scription: Moist, olive brown silty sand with gravel mment: Composite sample of TP-13, TP-19, and	Haley & Aldrich, Inc. Xaverian Brothers High School - Parking Lot Westwood, MA Project No: Sample Type: bag Tested By: TP-13, TP-19, TP-22 Test Date: 05/16/13 Checked By: Test Id: 265524 ent: scription: Moist, olive brown silty sand with gravel mment: Composite sample of TP-13, TP-19, and TP-22			

Compaction Report - ASTM D1557



	Method : B	
	Preparation : WET	
	As received Moisture :15 %	
	Rammer : Manual	
	Zero voids line based on assumed specific gravity of 2.75	
	Maximum Dry Density=	130.0 pcf
	Optimum Moisture =	8.0 %
	<u>Oversize Correction (17.8% > 3/8</u>	<u>8 inch Sieve)</u>
	Corrected Maximum Dry Density=	134.5 pcf
	Corrected Optimum Moisture=	6.5 %
	Assumed Average Bulk Specific Gravity =	2.55
-		