

# ***GEOTECHNICAL REPORT***

**BRADLEY FULLER FIELD  
NEWBURYPORT, MASSACHUSETTS**

January 5, 2016

**GSI Project No. 215300**

***Prepared for:***

Mr. Chris Huntress  
Huntress Associates, Inc.  
17 Tewksbury Street  
Andover, MA 01810

***Prepared by:***

Geotechnical Services, Inc.  
55 North Stark Highway  
Weare, NH 03281

**Geotechnical Services Inc.**

Geotechnical Engineering ▴ Environmental Studies ▴ Materials Testing ▴ Construction Monitoring





# GEOTECHNICAL SERVICES INC.

▲ Geotechnical Engineering ▲ Environmental Studies ▲ Materials Testing ▲ Construction Monitoring ▲

January 5, 2016

Mr. Chris Huntress  
Huntress Associates, Inc.  
17 Tewksbury Street  
Andover, MA 01810

Advanced via Email: [chris@huntressassociates.com](mailto:chris@huntressassociates.com)

**RE: Geotechnical Investigation Report  
Bradley Fuller Field  
Newburyport, Massachusetts  
GSI Project No. 215300**

Dear Mr. Huntress:

Geotechnical Services, Inc. (GSI) is pleased to submit this report on the proposed design-redevelopment of the track and grass turf athletic field at the Bradley Fuller Field off of Low Street in Newburyport, MA. The report consists of the subsurface data obtained through implementation of an exploration program, evaluation of the subsurface data, a summary of our understanding of the proposed development, and the results of an assessment for earthwork design options. The content of this report is subject to the **Limitations** stated in Appendix A.

## PROJECT UNDERSTANDING

The project site is located at 89 to 107 Low Street in Newburyport, MA (See Figure 1, Project Locus). We understand that the planned redevelopment will include the renovation of both the existing grass turf field located within the limits of the track and replace and reconfigure the existing track.

## SUBSURFACE INVESTIGATION

Thirteen (13) soil probes, designated as GP-1 to GP-13, were performed at the site on December 14, 2015 by New England Boring Contractors, Inc. located in Derry, NH. The probes were conducted using a Geoprobe soil probing machine which collects continuous 5-ft long soil samples. Soil samples were collected to depths ranging from 5 to 10-ft below the existing grade. The Geoprobos were observed by the GSI engineer and the soils encountered were classified in accordance with the Burmister Classification system. The approximate locations of the Geoprobos are shown on Figures 2, Exploration Location Plan. The finalized logs for the Geoprobos are included in Appendix B. Representative portions of each sample retrieved were saved in plastic bags with identification, and delivered to the GSI Soils Laboratory. The samples were re-examined and field classifications were reviewed.

## SUBSURFACE CONDITIONS

The subsurface conditions encountered in the investigation indicate that the site is underlain by the following soil units/deposits, described in order of increasing depth:

**Topsoil:** All of the probes encountered the Topsoil layer at the ground surface. The Topsoil layer generally consists of organic silty soils. The thickness of this soil unit varies from less than 6-in in proximity to the existing track to 8 to 18-in. within the limits of the grass turf field.

**Sand Fill:** The Sand Fill was encountered with all the geoprobos immediately beneath the topsoil layer. The Sand Fill generally consists of brown fine to medium SAND with varying amounts of gravel and coarse sand. The thickness of the Filter Sand layer varies from about 12-in. (GP-6) to 38-in. (GP-13) and was about 24-in. (on average) in thickness across the project site.

**Fill:** Fill soils, consisting of gray, CLAY and fine to coarse SAND with little gravel, was encountered in GP-6 between 1.8 to 5.5-ft below the existing grade.

**Silt Deposits:** An isolated pocket of Silt was encountered in GP-9 from 2.5 to 5.5-ft below the existing grade which generally consists of brown Silt.

**Marine Deposits:** Marine Deposits were encountered in all of the geoprobes beneath the Sand Fill, Fill and Silt Deposits. The Marine Deposits generally consist of gray, CLAY with varying amounts of silt or fine to medium sand. All the geoprobes were terminated within this soil unit at depth of 5 to 10-ft below the existing grade.

**Groundwater:** Groundwater was not encountered upon completion of the probes. Groundwater levels should be expected to vary with season, precipitation, snowmelt, and other factors. As a result, groundwater levels encountered during construction may differ from those encountered in the explorations. It should be anticipated that perched groundwater above the Marine Deposits should be anticipated during construction due to seasonal groundwater conditions and weather.

## **GEOTECHNICAL DESIGN RECOMMENDATIONS**

### **General**

As a general guideline, foundation design and construction must conform to the applicable provisions of the Massachusetts Building Code, 8<sup>th</sup> Edition (Building Code).

### **Track and Grass Field Subgrades**

We anticipate that the construction of the new track and renovation of the existing grass field will involve the following; stripping off the track pavement, stripping off or amending the existing Topsoil, removing/relocating any existing utilities (irrigation, drainage pipes, electric utilities and any other utilities), grading the field to the planned rough grade, proof-rolling the subgrade and reconstructing the turf system, and construction of the re track to the planned configuration. The existing Sand Fill, Fill, Silt and Marine Deposit soils are suitable for support of the grass turf field and track provided the subgrade is prepared using the recommendation provided herein. It should be anticipated that the new track configuration will require some additional engineered fill beneath the track where the footprint of the track extends beyond the area where the geoprobe investigation was conducted where Sand Fill may not be present.

## **CONSTRUCTION CONSIDERATIONS**

### **General**

In general, all excavation work, any construction dewatering, and other construction activities should conform to the requirements of OSHA and all other applicable regulations. The site soils would typically be classified as Type C based on OSHA 29 CFR 1926.

### **Excavation**

Construction will involve clearing and grubbing of vegetation, stripping off the Topsoil and Track Asphalt, adding or cutting fill to achieve design grades (if needed), and constructing the planned turf field and track improvements. We anticipate that most of the site grading can be accomplished with conventional earth-moving equipment.

### **Construction Dewatering**

Based on the available subsurface data it is anticipated that during the general site work, no significant dewatering measures will be necessary to conduct the construction "in-the-dry." The Contractor should take measures to prevent stormwater from entering into excavated areas, and be prepared to remove ponded surface water by means of localized sumps and pumps. The Contractor should select whichever dewatering procedures may be effective to maintain dry, stable excavation bottoms.

### **Existing Utilities and Foundations of Former Structures**

Unknown and/or undocumented subsurface features, structures, and utilities may be present within the project site. The unknown structures and piping, should be anticipated during excavation work, and will need to be carefully removed to limit disturbance to underlying soil deposits and backfilled with compacted Granular Fill prior to construction of the planned field and track.

### **Preparation and Protection of Bearing Surfaces**

Final excavation should be conducted in a manner that minimizes disturbance to the subgrade soils when excavating for bearing surfaces. All final excavation and footing construction should be conducted in-the-dry. We recommend that the exposed subgrade soils be observed in the field by a geotechnical engineer to confirm the projected soil



bearing conditions. It may be necessary to over-excavate and replace weak, disturbed or otherwise unacceptable foundation bearing materials.

Following excavation to bearing grades, exposed soil surfaces should be re-compacted (proof-rolled) prior to placing engineered fill, or constructing foundations, with a minimum of four passes with a heavy vibratory roller or other heavy vibratory compaction equipment.

If subgrade protection difficulties are encountered due to surface or groundwater, various methods can be utilized:

- Leave subgrades high until immediately before forming and concreting to minimize the time the subgrade is exposed.
- Over excavate footings by 8 in. using a smooth edged bucket and backfill to the design bearing elevation using compacted Granular Fill.

Each such encounter is probably best resolved individually in the field upon observation of the subgrade conditions.

### **Compaction**

Minimum compaction requirements refer to percentages of the maximum dry density determined in accordance with ASTM D1557. Recommended compaction requirements are as follows:

<u>Location</u>	<u>Minimum Compaction Requirements</u>
Beneath the track & field	95 %
Landscaped areas	90 % nominal compaction

### **Filling and Backfilling**

Placement of compacted soil fills should not be conducted when air temperatures are low enough (approximately 30 degrees F, or below) to cause freezing of the moisture in the fill during or before placement. Fill materials should not be placed on snow, ice or uncompacted frozen soil. Compacted fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of uncompacted soil.

### **CONSTRUCTION MONITORING**

It is recommended that a geotechnical engineer or technician qualified by training and experience be present during construction to:

- Confirm that soils used as fill and backfill are in accordance with the contract requirements.
- Observe and test placement and compaction of Granular Fill and other compacted fills.
- Observe preparation of field and pavement bearing surfaces.

Monitoring by experienced personnel will be important to the efficiency and integrity of the geotechnical aspects of the project construction. It is recommended that GSI be retained to provide the recommended monitoring services during construction. This will enable us to observe compliance with the design concepts, help resolve construction problems and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### **PLAN REVIEW**

It is recommended that GSI be provided the opportunity to review the final plans in order to confirm that the recommendations made in this report were interpreted and implemented as intended.



**CLOSURE**

GSI appreciates the opportunity for participating in this early phase of the project, and looks forward to our continuing association during its subsequent phases towards its successful completion. In the mean time, please do not hesitate to contact us, if you have any questions on the content of this report.

Very truly yours,

**GEOTECHNICAL SERVICES, INC.**

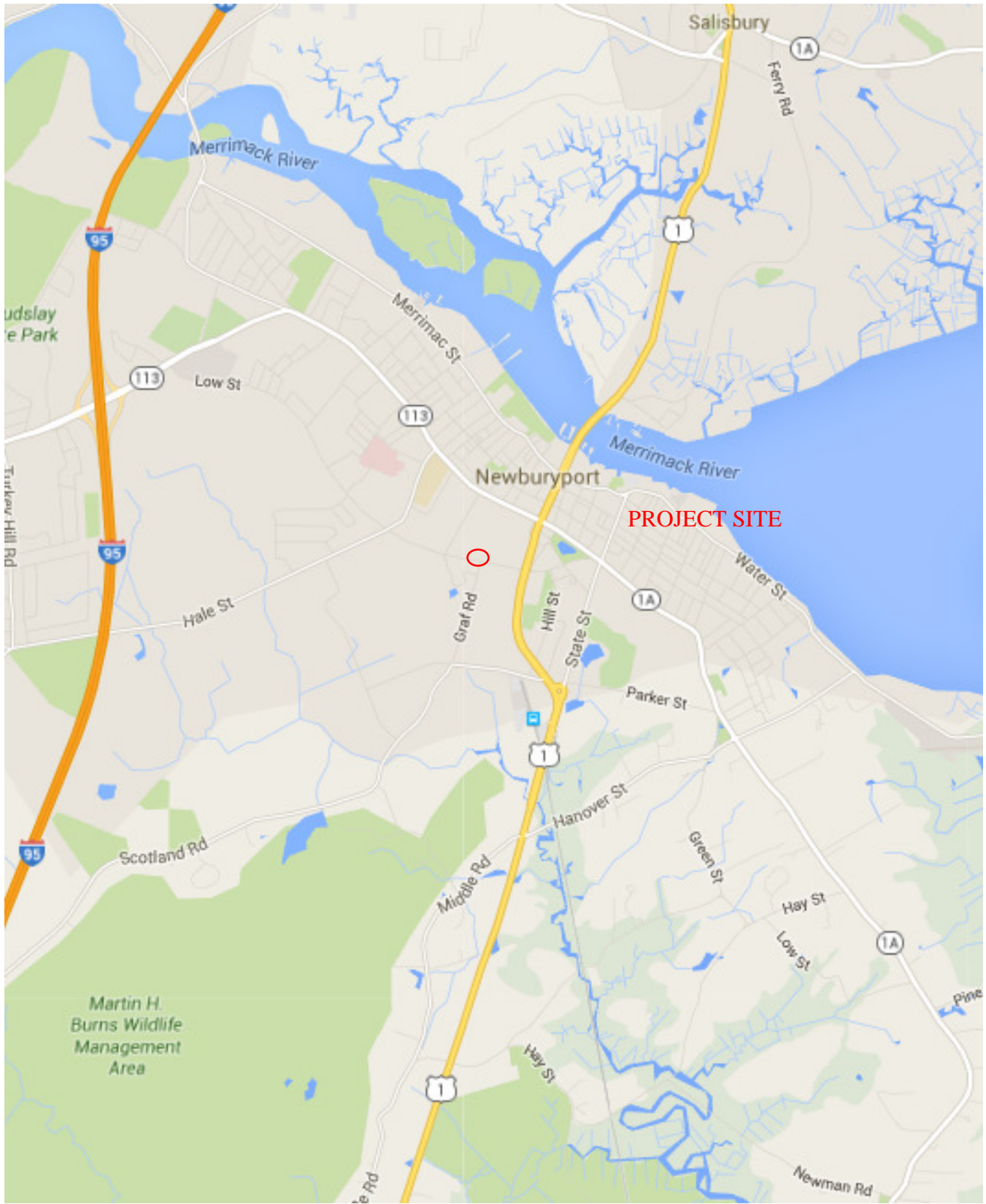


Glen V. Zola, P.E.  
*Project Manager*

Harry K. Wetherbee, P.E.  
*Principal Engineer*

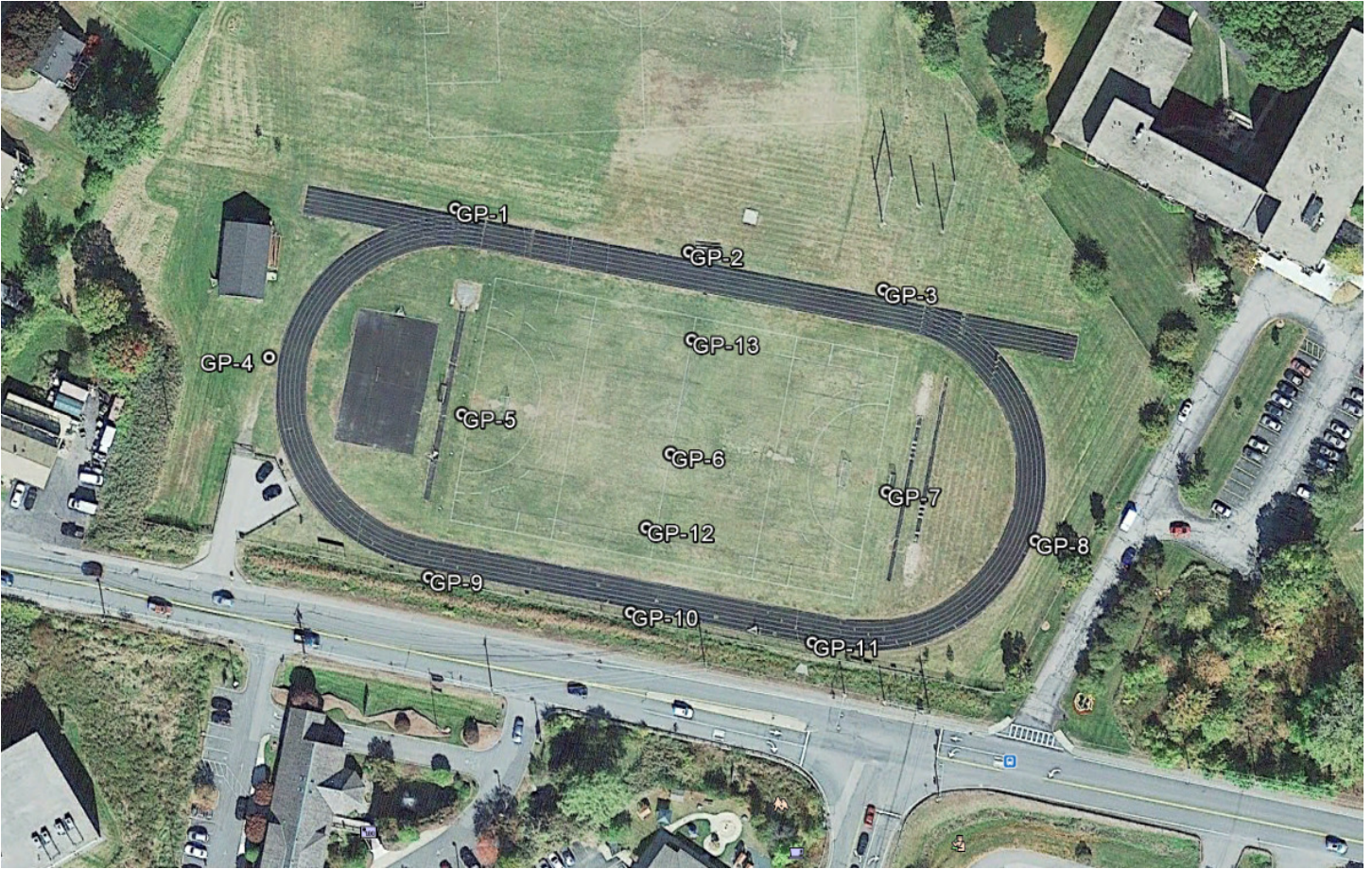
- Figure 1.        Project Locus
- Figure 2.        Exploration Location Plan
  
- Appendix A.    Limitations
- Appendix B.    Geoprobe Logs





**FIGURE 1—PROJECT LOCUS**  
**BRADLEY FULLER FIELD**  
**NEWBURYPORT, MA**  
**GSI PROJECT NO. 215300**

N



NOT TO SCALE

LEGEND:

○ GP-1    GEOPROBE I.D. AND APPROXIMATE LOCATION



FIGURE 2—EXPLORATION LOCATION PLAN

BRADLEY FULLER FIELD  
NEWBURYPORT, MA  
GSI PROJECT NO. 215300

**APPENDIX A**  
**LIMITATIONS**





## LIMITATIONS

### Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by Geotechnical Services, Inc.

### Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report


7. This report has been prepared for the exclusive use of Huntress Associates, Inc. in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by Geotechnical Services, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to evaluation considerations only.



**APPENDIX B**  
**GEOPROBE LOGS**



Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-1</b>
		<b>Page 1 of 1</b>

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic	
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV		
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone		
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other		
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head		<input type="checkbox"/> Roller Bit


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	43					0.4 Topsoil Brown, f/c SAND (wet)	
									1.7 <b>-SAND FILL-</b>	
									Gray CLAY	
									<b>-MARINE DEPOSITS-</b>	
5		G2	5-10	51					Gray, CLAY with occasional seams of silt	
10									Bottom of Exploration at 10-ft. No groundwater encountered.	
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value		
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense				
		Bott. of Casing	Bott. of Hole	Water							

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-1

Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-2</b>
		<b>Page 1 of 1</b>

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic	
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV		
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone		
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other		
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head		<input type="checkbox"/> Roller Bit


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	37					0.2	Topsoil Brown, f/m SAND, tr. c-sand
									3	-SAND FILL-
										-MARINE DEPOSITS-
5										Bottom of Exploration at 5-ft. No groundwater encountered.
10										
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value	
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense			
		Bott. of Casing	Bott. of Hole	Water						

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-2

Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-3</b>
		<b>Page 1 of 1</b>

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/13/2015
Contractor	NEBC	Checked By		Finish	12/13/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic	
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV		
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone		
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other		
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head		<input type="checkbox"/> Roller Bit


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	41					0.3 Topsoil Brown, f/m SAND, some c-sand, tr. gravel -SAND FILL-	
									2 Gray CLAY	
5		G2	5-10	60					-MARINE DEPOSITS-  Gray, CLAY (6-in seam of br., f/c SAND from 5 to 5.5-ft.)	
10									Bottom of Exploration at 10-ft.  No groundwater encountered.	
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value		
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense				
		Bott. of Casing	Bott. of Hole	Water							

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

GP-3

Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-4</b>
		<b>Page 1 of 1</b>

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod <input type="checkbox"/> Winch	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other <input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-				
Inside Diameter (in.)	-	-	-	-				
Hammer Weight (lb)	-	-	-	-				
Hammer Fall (in.)	-	-	-	-				


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	42					0.2 Topsoil	
									Brown, f/m SAND, trace gravel, c-sand, silt <b>-SAND FILL-</b>	
									2.8 Gray, CLAY <b>-MARINE DEPOSITS-</b>	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value		
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense				
		Bott. of Casing	Bott. of Hole	Water							

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-4

Geotechnical Services, Inc. 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-5</b>
		<b>Page 1 of 1</b>

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic	
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV		
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone		
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other		
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head		<input type="checkbox"/> Roller Bit


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	48					Topsoil	
								1.5	Brown, f/m SAND, little c-sand <b>-SAND FILL-</b>	
								3.5	Gray, CLAY <b>-MARINE DEPOSITS-</b>	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value											
Date	Time	Depth (ft) to:			O = Open Ended	U = Undisturbed	S = Split Spoon	C = Rock Core	GP = Geoprobe	0 to 2: Very Soft	2 to 4: Soft	4 to 8: Medium Stiff	8 to 15: Stiff	15 to 30 Very Stiff	Over 30: Hard	0 to 4: Very Loose	4 to 10: Loose	11 to 30: Medium Dense	31 to 50: Dense	Over 50: Very Dense
		Bott. of Casing	Bott. of Hole	Water																

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-5

Geotechnical Services, Inc. 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

	TEST BORING LOG	<b>Boring No.</b> <b>GP-6</b>
		Page 1 of 1

Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input type="checkbox"/> Skid <input checked="" type="checkbox"/> Track <input type="checkbox"/> ATV <input type="checkbox"/> Bomb. <input type="checkbox"/> Geophone <input type="checkbox"/> Tripod <input type="checkbox"/> Other			<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-				
Inside Diameter (in.)	-	-	-	-				
Hammer Weight (lb)	-	-	-	-				
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch <input type="checkbox"/> Cat Head <input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head			


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	47					Topsoil	
								0.8	Brown, fine SAND	
								1.8	-SAND FILL-	
									Gray, CLAY and f/c SAND, little gravel	
									-FILL-	
5		G2	5-10	51				5.5	Gray, CLAY	
									-MARINE DEPOSITS-	
10									Bottom of Exploration at 10-ft. No groundwater encountered.	
15										
20										
25										

Water Level Data					Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	Cohesive Soils N-Value 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	Granular Soils N-Value 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense
Date	Time	Depth (ft) to:					
		Bott. of Casing	Bott. of Hole	Water			

Notes: Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%) GP-6



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	TEST BORING LOG	<b>Boring No.</b> <b>GP-7</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic	
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV		
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone		
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other		
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head		<input type="checkbox"/> Roller Bit


Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	39					0.8 Topsoil Brown, f/m SAND, little gravel, c-sand, tr. silt	
									-SAND FILL-	
									-MARINE DEPOSITS-	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value											
Date	Time	Depth (ft) to:			O = Open Ended	U = Undisturbed	S = Split Spoon	C = Rock Core	GP = Geoprobe	0 to 2: Very Soft	2 to 4: Soft	4 to 8: Medium Stiff	8 to 15: Stiff	15 to 30 Very Stiff	Over 30: Hard	0 to 4: Very Loose	4 to 10: Loose	11 to 30: Medium Dense	31 to 50: Dense	Over 50: Very Dense
		Bott. of Casing	Bott. of Hole	Water																

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-7

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-8</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	


Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod <input type="checkbox"/> Winch	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other <input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-				
Inside Diameter (in.)	-	-	-	-				
Hammer Weight (lb)	-	-	-	-				
Hammer Fall (in.)	-	-	-	-				

Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	36					0.4 Topsoil Brown, f/m SAND, some c-sand, tr. gravel <b>-SAND FILL-</b>	
5		G2	5-10	58					2.2 Gray, CLAY little to trace f/m sand <b>-MARINE DEPOSITS-</b> Gray, CLAY little to trace f/m sand	
10									Bottom of Exploration at 10-ft. No groundwater encountered.	
15										
20										
25										

Water Level Data					<b>Sample Identification</b> O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	<b>Cohesive Soils N-Value</b> 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	<b>Granular Soils N-Value</b> 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense
Date	Time	Depth (ft) to:					
		Bott. of Casing	Bott. of Hole	Water			

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-9</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck	<input type="checkbox"/> Skid	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-	<input checked="" type="checkbox"/> Track	<input type="checkbox"/> ATV	
Inside Diameter (in.)	-	-	-	-	<input type="checkbox"/> Bomb.	<input type="checkbox"/> Geophone	
Hammer Weight (lb)	-	-	-	-	<input type="checkbox"/> Tripod	<input type="checkbox"/> Other	
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch	<input type="checkbox"/> Cat Head	
					<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Cutting Head	


Depth (ft)	Casing (Blows/ft)	Sample Data							Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	
0		G1	0-5	39					0.3 Topsoil Brown, f/m SAND, tr. gravel, coarse sand <b>-SAND FILL-</b>
									2.5 Brown, SILT <b>-SILT DEPOSITS-</b>
5		G2	5-10	58					5.5 Gray, CLAY <b>-MARINE DEPOSITS-</b>
10									Bottom of Exploration at 10-ft. No groundwater encountered.
15									
20									
25									

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value	
Date	Time	Depth (ft) to:			O = Open Ended	U = Undisturbed	0 to 2: Very Soft	0 to 4: Very Loose		
		Bott. of Casing	Bott. of Hole	Water					2 to 4: Soft	4 to 10: Loose
					S = Split Spoon	4 to 8: Medium Stiff	11 to 30: Medium Dense			
					C = Rock Core	8 to 15: Stiff	31 to 50: Dense			
					GP = Geoprobe	15 to 30 Very Stiff	Over 50: Very Dense			
						Over 30: Hard				

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: GP-9

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-10</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	


Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod <input type="checkbox"/> Winch	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other <input type="checkbox"/> Cat Head <input type="checkbox"/> Roller Bit	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic <input type="checkbox"/> Cutting Head
Type	-	-	-	-			
Inside Diameter (in.)	-	-	-	-			
Hammer Weight (lb)	-	-	-	-			
Hammer Fall (in.)	-	-	-	-			

Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	40					0.3 Topsoil	
									Brown, f/m SAND, little c-sand <b>-SAND FILL-</b>	
									3.1 Gray CLAY <b>-MARINE DEPOSITS-</b>	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	Cohesive Soils N-Value 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	Granular Soils N-Value 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense
Date	Time	Depth (ft) to:					
		Bott. of Casing	Bott. of Hole	Water			

Notes: Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%) **GP-10**

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-11</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	


Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-			
Inside Diameter (in.)	-	-	-	-			
Hammer Weight (lb)	-	-	-	-			
Hammer Fall (in.)	-	-	-	-	<input type="checkbox"/> Winch <input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head	

Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	34					0.3 Topsoil Brown, f/m SAND, little coarse sand, tr. gravel <b>-SAND FILL-</b> 2.8 Gray CLAY  <b>-MARINE DEPOSITS-</b> Gray, CLAY with seams of silt (wet from 5 to 6-ft below grade)	
5		G2	5-10	53					Bottom of Exploration at 10-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					<b>Sample Identification</b> O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	<b>Cohesive Soils N-Value</b> 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	<b>Granular Soils N-Value</b> 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense
Date	Time	Depth (ft) to:					
		Bott. of Casing	Bott. of Hole	Water			

Notes: Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%) **GP-11**

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-12</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	


Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod <input type="checkbox"/> Winch	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other <input type="checkbox"/> Cat Head	<input type="checkbox"/> Roller Bit <input type="checkbox"/> Cutting Head	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Type	-	-	-	-				
Inside Diameter (in.)	-	-	-	-				
Hammer Weight (lb)	-	-	-	-				
Hammer Fall (in.)	-	-	-	-				

Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	46					0.7 Topsoil Brown, f/m SAND	
									-SAND FILL-	
									3.8 Gray CLAY	
									-MARINE DEPOSITS-	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	Cohesive Soils N-Value 0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	Granular Soils N-Value 0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense
Date	Time	Depth (ft) to:					
		Bott. of Casing	Bott. of Hole	Water			

Notes: Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%) **GP-12**

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	TEST BORING LOG	<b>Boring No.</b> <b>GP-13</b>
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Project	Bradley Fuller Field	Project No.	215300	Elevation	N/A
Location	Newburyport, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/14/2015
Contractor	NEBC	Checked By		Finish	12/14/2015
Driller	C. Downing	Drill Rig	Geoprobe	Model	

Item:	Auger	Casing	Sampler	Core Barrel	<input type="checkbox"/> Truck <input checked="" type="checkbox"/> Track <input type="checkbox"/> Bomb. <input type="checkbox"/> Tripod <input type="checkbox"/> Winch	<input type="checkbox"/> Skid <input type="checkbox"/> ATV <input type="checkbox"/> Geophone <input type="checkbox"/> Other <input type="checkbox"/> Cat Head <input type="checkbox"/> Roller Bit	<b>Hammer Type:</b> <input type="checkbox"/> Safety Hammer <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic <input type="checkbox"/> Cutting Head
Type	-	-	-	-			
Inside Diameter (in.)	-	-	-	-			
Hammer Weight (lb)	-	-	-	-			
Hammer Fall (in.)	-	-	-	-			

Depth (ft)	Casing (Blows/ft)	Sample Data							Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
		No.	Depth (ft)	Rec. (in.)	SPT (Blows/6-in.)	Rock RQD (%)	PID Rdg. (ppm)			
0		G1	0-5	47					0.7 Topsoil Brown, f/m SAND	
									-SAND FILL-	
									3.9 Gray CLAY	
									-MARINE DEPOSITS-	
5									Bottom of Exploration at 5-ft. No groundwater encountered.	
10										
15										
20										
25										

Water Level Data					Sample Identification		Cohesive Soils N-Value		Granular Soils N-Value		
Date	Time	Depth (ft) to:			O = Open Ended U = Undisturbed S = Split Spoon C = Rock Core GP = Geoprobe	0 to 2: Very Soft 2 to 4: Soft 4 to 8: Medium Stiff 8 to 15: Stiff 15 to 30 Very Stiff Over 30: Hard	0 to 4: Very Loose 4 to 10: Loose 11 to 30: Medium Dense 31 to 50: Dense Over 50: Very Dense				
		Bott. of Casing	Bott. of Hole	Water							

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes: **GP-13**