SPECS
CONSULTING ENGINEERS
& SURVEYORS

ADDENDUM NO. 1

GARRETT COLLEGE MULTIPURPOSE FIELD SITE PREP

Date of Issue: December 8, 2022
SPECS JOB NO. 5593

CONTRACTOR IS TO ACKNOWLEDGE RECEIPT OF THIS ADDENDUM (1) ON BID FORMS.

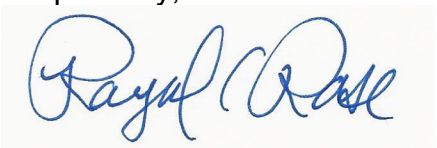
GENERAL:

DRAWINGS:

SPECIFICATIONS:

1. **ADD** Section 02 30 00 – Subsurface Drilling and Sampling Information.

Respectfully,



Raymond C. Rase, PE, PS
President

Attachments: Section 02 30 00
Report of Geotechnical Exploration, Garrett College Multi-purpose Field; TRIAD Project No 03-22-0707 Dated November 3, 2022.
Report of Geotechnical Investigation Garrett County CARC - Aquatic and Fitness Center; TRIAD Project No. 03-09-0276 Dated January 7, 2010.

105 S. CENTRE ST., SUITE 100 • CUMBERLAND, MD 21502
PHONE: 301.777.2510 • FAX: 301.777.8419

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The following information is included in the Project Manual for bidders' use in preparing bids, but is not part of the Contract Documents, and does not relieve the bidders from doing their own investigation to determine the accuracy of the information.
   1. Report of Geotechnical Exploration, Garrett College Multi-purpose Field; TRIAD Project No 03-22-0707 Dated November 3, 2022
   2. Report of Geotechnical Investigation Garrett County CARC - Aquatic and Fitness Center; TRIAD Project No. 03-09-0276 Dated January 7, 2010

1.2 STATEMENT CONCERNING THE BORING DATA

A. The test borings and samples of the soils encountered were obtained by the Engineer to assist the Engineer and his consultants in determining the type and design of the foundation systems.

B. The test borings were made by Triad Engineering, Inc., in accordance with their system of soils classification and they, Triad Engineering, Inc., neither the Owner, the Engineer, or his consultants guarantee the accuracy or consistency of the information contained within the Geotechnical Report with the actual site conditions.

C. Any radical deviation from the anticipated material, as indicated by the borings, during the excavation for the building should be reported to the Engineer immediately and confirmed in writing.

1.3 CONFIRMATION OF BORING DATA

A. Bidders, Contractors, and any others who are concerned with, or are affected by the test borings should make their own borings and tests at the site.

B. No additional compensations will be allowed the Contractor for failure to fully investigate the site or for the neglect of the information contained in the Boring Logs.

1.4 ATTACHMENT

A. Report of Geotechnical Exploration, Garrett College Multi-purpose Field; TRIAD Project No 03-22-0707 Dated November 3, 2022

B. Report of Geotechnical Investigation Garrett County CARC - Aquatic and Fitness Center; TRIAD Project No. 03-09-0276 Dated January 7, 2010

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

November 3, 2022

Mr. Raymond C. Rase, PE, PLS
SPECS, Inc.
105 S. Centre Street
Cumberland, Maryland 21502

RE: Report of Geotechnical Exploration
Garrett College Multi-purpose Field
Garrett County, Maryland
Triad Project No. 03-22-0707

Dear Mr. Rase:

In accordance with your request, we have completed a geotechnical exploration for the proposed Garrett College Multi-purpose Field project in Garrett County, Maryland. Work on the project was authorized by signature of our Professional Services Agreement on August 19, 2022. The subsurface exploration was performed to evaluate the subsurface conditions encountered at the site for the limited purposes of preparing design and construction recommendations for geotechnical aspects of the project. It is emphasized that subsurface conditions may vary dramatically between test locations, and Triad makes no representations as to subsurface conditions other than those encountered at the specific test locations.

This report has been prepared for the exclusive use of SPECS, Inc. for specific application to the design of the proposed Garrett College Multi-purpose Field in Garrett County, Maryland. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above. To observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction, it is recommended that Triad be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work.

We appreciate the opportunity to assist you on this project and trust this report satisfies your needs at this time. Please feel free to contact us if you have questions concerning this report, or if we can provide further assistance.

Sincerely,

TRIAD ENGINEERING, INC.

Anthony R. King, E.I.T.
Staff Engineer

Stephen J. Gyurisin, P.E.
Project Engineer

"Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 40821, Expiration Date: 6/16/2023."

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Report of Geotechnical Exploration
Garrett College Multi-purpose Field
Garrett County, Maryland
Triad Project No. 03-22-0707

FOREWORD

This report has been prepared for the exclusive use of SPECS, Inc. for specific application to the design of the proposed Garrett College Multi-purpose Field project in Garrett County, Maryland. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report should not be used for estimation of construction quantities and/or costs, and contractors should conduct their own exploration of site conditions for these purposes. Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or re-use of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the field exploration at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

It is recommended that we be provided the opportunity to review the final grading plan, overall foundation design, and specifications so that earthwork and foundation recommendations may be properly interpreted and implemented. If we are not afforded the privilege of making this review, we will not assume responsibility for misinterpretation of our recommendations, as our recommendations are strictly limited to conditions represented to Triad at the time this report was issued.

SITE AND PROJECT DESCRIPTION

The site is situated north of the Community Aquatic and Recreation Complex located at 695 Mosser Rd in Garrett County, Maryland. A Site Location Plan is included as Figure A-1 in Appendix A. The site was generally flat to sloping grass covered terrain with various site features including a scoreboard, fencing, isolated trees, structures, and site lighting.

As part of the construction a new baseball, soccer field, scoreboard and new lighting are planned. We assume that the light poles and scoreboard will be relatively light, but overturning loads often govern the design of such foundations. Design loads are not available currently. Once the design loads are available, we recommend they be provided to us for review to evaluate and determine if any revisions to our recommendations provided in this report are necessary. We received detailed grading plans. We understand that maximum cuts will be on the order of 14 feet or less to achieve final grades.

GEOLOGIC SETTING

According to the Geologic Map of the McHenry quadrangle, Garrett County, Maryland (2016), the project site is underlain by the Purslane Formation. The geology is described as “Light gray, tan, and locally reddish brown, coarse-grained to conglomeratic, thick-bedded to cross-bedded sandstone, thin beds of gray shale, and coaly shale. The Puslane Formation is 250 to 300 feet thick in western Garrett County.”

FIELD EXPLORATION

The scope of the field exploration included drilling three (3) test borings and excavating seven (7) test pits. The approximate test locations are shown on Figure A-2 contained in Appendix A. The test locations were selected and staked by SPECS, Inc. The ground surface elevation at each test location was provided by SPECS, Inc. All test borings included Standard Penetration Testing (SPT) and split barrel sampling (ASTM D 1586) at select intervals to boring refusal depths. The sandstone bedrock was cored with a handheld core machine at the bottom of test pit B-32 to obtain a sample for compressive strength testing.

Geotechnical personnel from our office were present full time during the field exploration to log all recovered soil samples and observe groundwater and rock conditions. The recovered soil samples were transported to our laboratory for further testing. Detailed descriptions of materials encountered in the borings and test pits are contained on the logs in Appendix B. Figure No. B-1 contains a description of the classification system and terminology utilized.

SUBSURFACE CONDITIONS

Subsurface Strata

Auger refusal was encountered in all borings at depths ranging from 4 to 8.5 feet below existing grades. Bucket refusal was encountered in all of the test pits at depths ranging from 5.3 to 12 feet below existing grades. The materials encountered in the borings and test pits are generally described below. Stratification lines indicated on the logs represent the approximate boundaries between material types.

Topsoil: Topsoil was encountered at the ground surface in all test locations. The thickness of the topsoil ranged from approximately 3 to 9 inches.

Residual Soil: Residual soils were encountered below the topsoil in all test locations. The residual soils generally consisted of tan and brown sand, clay, and sandstone cobbles and boulders. In general, with increasing depth, the residual soils increased in density and gradually graded to weathered rock. Based on SPT N-values varying from 7 blows per foot to 50 blows per zero inches of penetration, the residual materials exhibited a loose to very dense relative density, with the majority exhibiting a medium dense relative density.

Weathered Rock: Weathered rock, consisting of weathered sandstone, was encountered below the residual soils in boring B-32 and test pits B-32, B-33, B-34, B-36 and Perc 5. The weathered sandstone was generally tan brown. Based on SPT blow counts of 50 blows per 3 inches of penetration, the weathered rock materials exhibited a very dense relative density.

Groundwater Observations

Groundwater was not encountered in any of the test locations. It should be noted that our borings and test pits did not extend into bedrock. It is important to note that fluctuations in groundwater levels may occur due to variations in environmental conditions, recent precipitation events, surface drainage and other factors which may not have been evident at the time measurements were made and reported herein.

LABORATORY TESTING

Laboratory tests were performed to supplement the field classifications and establish design criteria. All laboratory tests were performed in accordance with appropriate ASTM standard test methods. Detailed results of the laboratory tests are contained in Appendix C. A summary of the test results is presented below.

TEST TYPE	TEST RESULTS
Natural Moisture Contents	5.5 % to 14.8 %
Atterberg Limits: Liquid Limit Plasticity Index	 NP NP
Percent Passing No. 200 Sieve	29.0%
USCS Soil Classifications	SM
Rock Core Unit Weight	149.6 and 150.5 pcf
Unconfined Compressive Strength of Rock	15,370 and 19,442 psi

CONCLUSIONS AND RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

The subsurface information obtained from the field exploration, our experience with similar projects, and the noted design criteria were the basis for our assessment of the geotechnical issues currently existing at the site. Our geotechnical recommendations associated with the design and construction of foundations are presented in the following sections of this report.

Drilled Pier Foundation Design

We anticipate the light poles foundations will consist of drilled piers. Based on the subsurface conditions encountered, it is our opinion that the drilled piers are a suitable foundation type. The design of the drilled piers should consider the compression, lateral and overturning moment loads. Based on our experience, we anticipate that overturning will be the controlling factor in the foundation design. The geotechnical design parameters listed in the following table should be utilized for foundation design. The listed values are allowable values. Due to the anticipated disturbance during construction, we recommend that the upper 2 feet of soil/rock be neglected for providing lateral resistance.

Material Type	Allowable Tip Bearing Pressure (psf)	Lateral Bearing Pressure Value (psf/ft)	Lateral Sliding Resistance (Coefficient of Friction)
Medium Dense to Dense Granular Residual Soils and Weathered Rock	3,000	200	0.35
Hard Sandstone Bedrock	4,000	400	0.35

Provided that the recommendations in this report are adhered to, we estimate that total settlements for each drilled pier bearing in approved soils, weathered rock and/or new controlled fill will be one (1) inch or less.

Drilled Pier Foundation Construction

We anticipate that a conventional caisson drill rig equipped with earth augers can be used to advance the drilled piers through the on-site soils and somewhat into the weathered rock. Rock augers, core barrels and drop hammers will likely be required to drill through the denser weathered rock and hard bedrock. Temporary casing should be installed to shore the hole as necessary. Temporary de-watering equipment such as a pump should be available for use in areas where groundwater is encountered during construction. If groundwater is present and pumping cannot maintain dry conditions, all concrete should be placed using approved tremie pipe methods.

To facilitate placement of concrete in drilled piers, we suggest that a minimum slump of 5 inches be permitted for the concrete, provided that a suitable mix design is developed to assure the necessary strength at the appropriate water-to-cement ratio. Placement of concrete by the free-fall method should be adequate for the depths anticipated with the stipulation that the concrete be guided (in an acceptable manner) down the center of the shaft without contacting the steel reinforcement cage.

Shallow Spread Foundation Design

We anticipate that the scoreboard foundations will consist of shallow spread foundations. We recommend that a maximum allowable bearing pressure of 3,000 psf be utilized to proportion conventional shallow spread foundations bearing within the Medium Dense to Dense Granular Residual Soils and Weathered Rock. We recommend that a maximum allowable bearing pressure of 4,000 psf be utilized to proportion conventional shallow spread foundations bearing within the Hard Sandstone Bedrock. Test pit Perc 5 encountered clay soils; we recommend that a maximum allowable bearing pressure of 2,000 psf be utilized to proportion conventional shallow spread foundations bearing within the clay soils.

All foundations should be constructed to bear on approved residual soils, weathered rock, hard rock or controlled fill. Minimum dimensions of 2 feet and 3 feet should be observed for continuous and isolated footings, respectively. Exterior foundations should bear at least 36 inches below the final outside grade for frost protection. Footings within permanently heated areas can bear at minimum depths below the finished floor.

We estimate that total settlements for foundations bearing on approved residual soils, weathered rock, hard rock and/or new controlled fill will be one (1) inch or less. Differential settlements are anticipated to be one-half of the total settlements.

Shallow Spread Foundation Construction

We anticipate that conventional earth excavation equipment such as a tracked excavator can be utilized to excavate the residual soils or controlled fill for foundation construction. Any foundation excavations which encounter dense weathered rock and/or hard rock will require heavy ripping and possible hoe ram chipping to attain required bearing elevations. We recommend that any loose materials present at the bottom of footing excavations as a result of excavation operations be re-compacted in order to minimize differential settlements.

Foundation concrete should be placed the same day that excavations are completed to reduce the potential for softening due to precipitation and/or runoff. All footing excavations for the proposed structure should be examined by a geotechnical engineer or a qualified representative from our office prior to placing concrete to confirm that the required bearing support is available.

Seismic Site Classification

We recommend that Site Class B be utilized for seismic evaluation. This classification is based on the International Building Code (IBC) criteria.

Controlled Fill

Fill materials should not contain any debris, waste, pyrites or frozen materials and they should contain less than two (2) percent vegetation-organic materials by weight. Also, materials classified as OL, OH, or Pt are not suitable for use as structural fill.

Within the foundation footprints, we recommend materials placed to a depth of 1 foot below foundation bearing levels be free of rock or gravel larger than four (4) inches in any dimension. Satisfactory materials placed below these levels should be free of rock larger than six (6) inches in any dimension.

All proposed fill materials should be approved by a geotechnical engineer prior to placement as controlled fill, and representative samples should be submitted by the contractor one week prior to placement of that material to allow time for completion of the necessary laboratory tests.

All fill material compacted by heavy compaction equipment should be placed in maximum 9-inch loose lifts. All fill material compacted by hand-operated tampers or light compaction equipment should be placed in maximum 4-inch loose lifts.

Controlled fill material should be compacted to at least 98 percent of the laboratory maximum dry density as determined by the Standard Proctor method (ASTM D 698). The moisture content of the soils should be at or within two (2) percentage points of the optimum moisture content.

Construction Monitoring

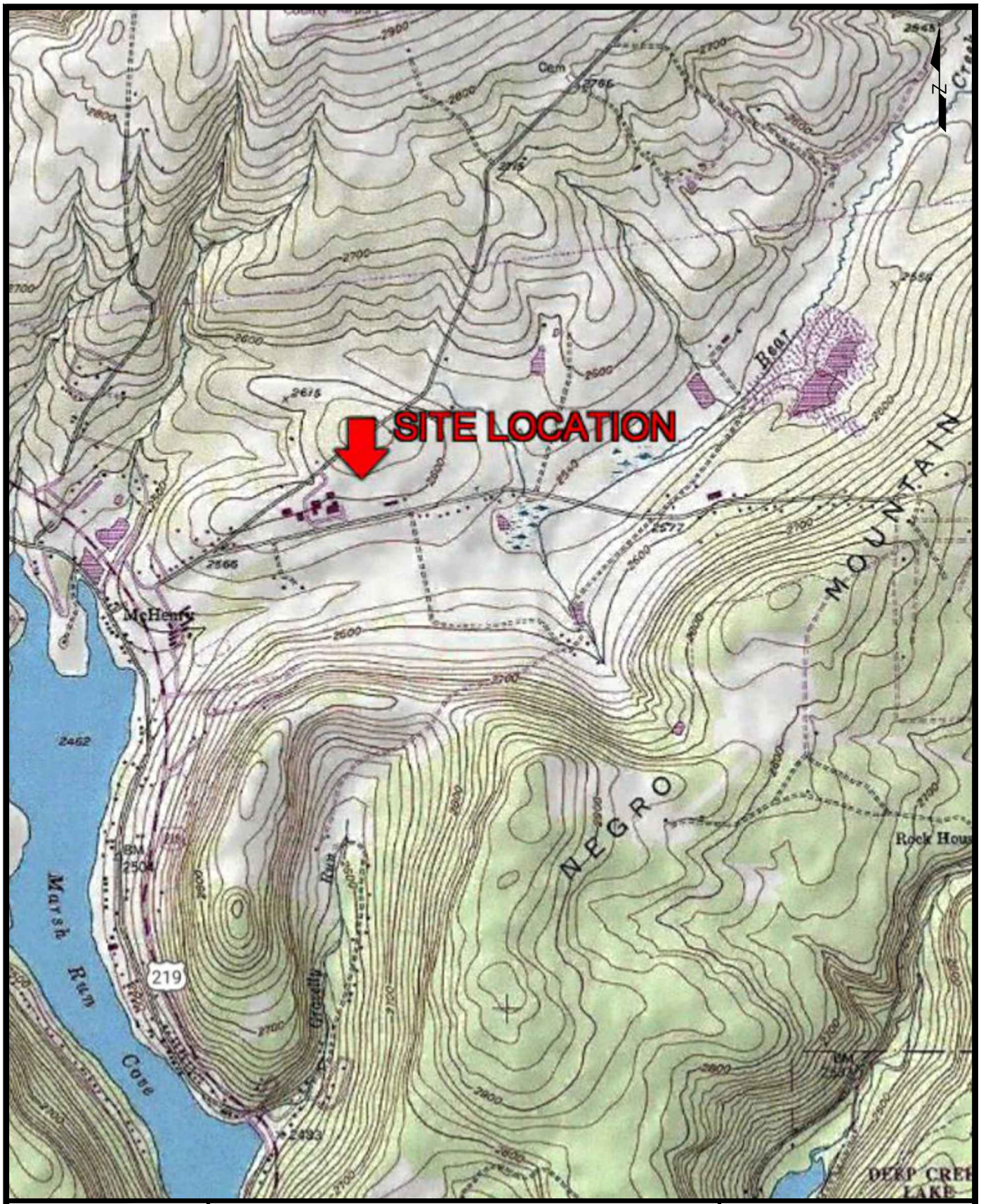
We recommend that an on-site geotechnical engineer be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our exploration. If significant variations are encountered, or if the design is altered, we should be notified.

Triad should also examine all foundation bearing levels, foundation depths, and reinforcing steel size, amount and placement for the proposed structures. The inspection should be performed by a professional engineer or qualified representative working under the direct supervision of the professional engineer from our office. All foundation bearing levels should be tested immediately prior to placing reinforcing steel and concrete to confirm that the required bearing support is available.

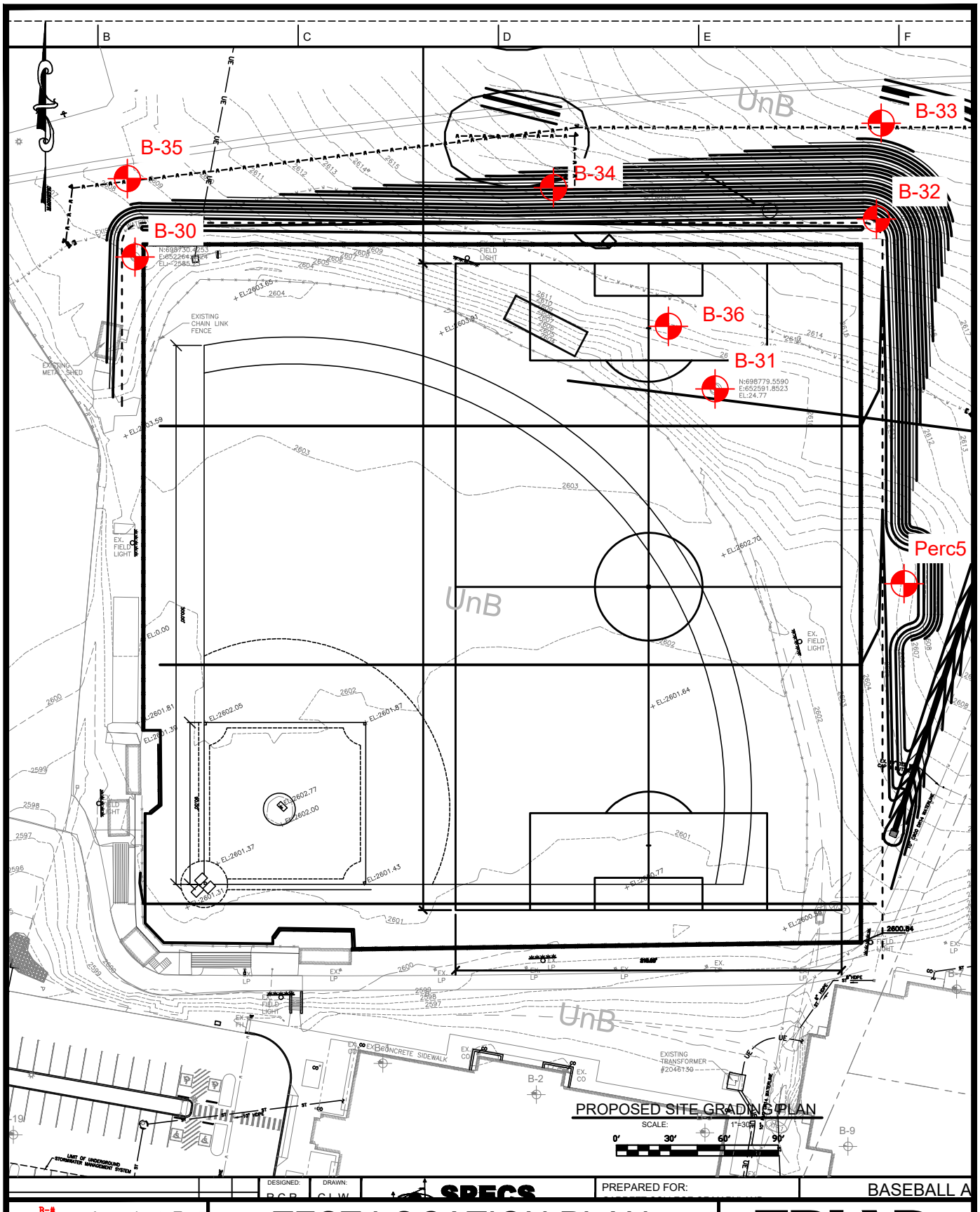
TRIAD ENGINEERING, INC.

APPENDIX A

Illustrations



GARRETT COUNTY MARYLAND		SITE LOCATION PLAN	TRIAD ENGINEERING, INC.
PREPARED BY: ARK	REVIEWED BY: SJG	GARRETT COLLEGE MULTI-PURPOSE FIELD	www.triadeng.com
DATE: 9/22/2022	SCALE: N/A	PROJECT NO:03-22-0707 Figure: A-1	1075-D SHERMAN AVENUE HAGERSTOWN, MD 21740



	DESIGNED: RGB	DRAWN: CLW	SPECS	PREPARED FOR: BASEBALL A

B-# Approximate Test Location

TEST LOCATION PLAN

GARRETT COLLEGE MULTI-PURPOSE FIELD

PREPARED BY:	REVIEWED BY:
ARK	SJG
DATE: 9/22/2022	SCALE: 1"=75'

PROJECT NO:03-22-0707 Figure:A-2

TRIAD ENGINEERING, INC.
www.triadeng.com
1075-D SHERMAN AVENUE
HAGERSTOWN, MD 21740

TRIAD ENGINEERING, INC.

APPENDIX B

Field Exploration

FIELD EXPLORATION

The subsurface conditions at the site were explored by drilling 3 test borings with Standard Penetration Testing (SPT) and excavating 7 test pits. The borings were drilled utilizing a drill rig equipped with hollow stem augers. The test pits were excavated utilizing a Komatsu PC 138 Excavator. The field exploration was supervised by a geotechnical engineer from our office.

SPT and sampling was performed in accordance with ASTM D 1586. The SPT's were performed to depths indicated on the attached boring logs using a split barrel sampler with an outside diameter of two (2) inches and an inside diameter of one and three-eighths (1-3/8) inches. The split barrel sampler was driven eighteen (18) inches with a hammer weighing approximately 140 pounds and falling thirty (30) inches. The number of blows required to drive the split barrel sampler at six (6) inch increments was recorded on the boring logs. The method utilized to classify the soils is defined in Figure B-1.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED BEDROCK SAMPLES

Descriptor Sequence	
1	Color
2	Primary Component
3	Fractions
4	Moisture
5	Descriptors
6	Plasticity
7	Consistency/ Relative Density
8	Deposition Type

1. Color	
Gray	Tan
Brown	Black
Orange	Red
Green	Yellow
Purple	Blue
Modifiers	
Light	Lighter side of color range
Dark	Darker side of color range
Mottled	Irregularly marked with spots of different colors
Banded	Alternating shades or colors

2. Primary Component	
Component	Grain Size
Boulders	≥ 12 inches
Cobbles	3 to 12 inches
Coarse Gravel	1 to 3 inches
Medium Gravel	$^{3}/_{8}$ to 1 inch
Fine Gravel	$^{5}/_{64}$ to $^{3}/_{8}$ inch
Coarse Sand	#40 to #10
Fine Sand	#200 to #40
Silt/Clay	≤ #200

3. Fractions	
And	≥ 35%
Some	20 to 35%
Little	10 to 20%
Trace	< 10%

4. Moisture	
Dry	Dry to touch
Damp	Slightly moist
Moist	No visible free water
Wet	Visible free water

5. Descriptors	
Fissile	Splits easily along closely spaced parallel planes (breaks into plates)
Hackly	Jagged or irregular fracture planes
Slickenside	Polished and striated surface that results from friction along a fault plane
Laminated	Alternating thin layers of varying material or colors less than ¼" thick
Lensed	Inclusion of small pockets of different soils
Saprolitic	Completely weathered rock that retains the appearance of the original rock structure but has only a trace of the original bond strength
Micaceous	Containing mica minerals
Varved	Laminated sediment consisting of alternating layers of fine sand and silt or clay deposited in still water

6. Plasticity of Fine-Grained Soils

Fine-Grained Component	Plasticity	Estimated Plasticity Index (PI)	Smallest Thread Diameter	Thread Characteristics	Dilatancy
Predominately Silt (Silt ↑ More Silt ↑)	Non-Plastic	0 - 2%	Ball cracks	Dries rapidly; a 1/8-inch thread cannot be rolled at any water content	Moist ball sheds water when shaken giving a glossy appearance
	Low Plasticity	3 - 10%	$^{1}/_{8}$ to $^{1}/_{4}$ inch	Feels powdery when drying out during rolling; thread can barely be rolled	Moist ball retains water or sheds water slowly when shaken
Predominately Clay (More Clay ↓ Clay ↓)	Medium Plasticity	> 10 - 20%	$^{1}/_{16}$ inch	Thread cannot be rerolled after reaching plastic limit	
	Highly Plastic	> 20%	$^{1}/_{32}$ inch	Thread can be rerolled after reaching plastic limit	Moist ball retains water when shaken

7a. Relative Density of Granular Coarse-Grained Soils

Descriptor	N-Value
Very Loose	≤ 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

7b. Consistency of Fine-Grained Soils

Descriptor	Pocket Penetrometer (tons/ft^2)	N-Value
Very Soft	≤ 0.25	≤ 2
Soft	≥ 0.25 - 0.5	3 - 4
Medium Stiff	> 0.5 - 1.0	5 - 8
Stiff	> 1.0 - 2.0	9 - 15
Very Stiff	> 2.0 - 4.0	16 - 30
Hard	> 4	≥ 31

8. Type of Deposit	
Alluvium	Sediment deposited by moving water
Colluvium	Sediment deposited by gravity
Fill	Manmade deposit
Fluviomarine	Stratified materials formed by the combined action of river and sea processes
Glacial Outwash	Sediment deposited by glacial meltwater; commonly sand and gravel
Glacial Till	Unsorted sediment deposited by glacier
Glacial Lake Deposit	Sediment deposited in glacial lake; commonly silt and clay
Residuum	Insoluble material remaining from weathered rock
Weathered Bedrock	Bedrock that has been weathered

TRIAD ENGINEERING, INC.

FIGURE B-1

BORING LOG

Sheet 1 of 1

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field**

Inspector: TK Boring Location: See Figure A-2 Boring No.: **B- 30**

Date Started: 9/14/22 Drilling Method: 3.25 HSA

Date Completed: 9/14/22 Driller: CONNELLY Ground Elev.: 2607

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Pocket Penetrometer (tsf)	Sample Type	Penetration Blows/6 inches	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.5	6.0" TOPSOIL				2606.5
	3.25		2-3-4	83%			Tan brown **SAND**, loose, little silt, trace gravel, moist				
							- medium dense, little gravel				
	4.5		7-10-13	94%							
5.0											
	3		11-13-18	94%			- dense				
						8.5	- - very dense				2598.5
			50/0"				- RESIDUUM - REFUSAL AT 8.5 FEET				
10.0											

Remarks: Boring dry during and upon completion of drilling.

TRIAD ENGINEERING, INC.

BORING LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field**

Inspector: TK Boring Location: See Figure A-2 Boring No.: **B- 31**

Date Started: 9/14/22 Drilling Method: 3.25 HSA

Date Completed: 9/14/22 Driller: CONNELLY Ground Elev.: 2609.5

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Pocket Penetrometer (tsf)	Sample Type	Penetration Blows/6 inches	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.5	6.0" TOPSOIL				2609.0
			3-10-20	89%			Tan brown **SAND**, medium dense, little silt, little gravel, slightly moist				
			50/4"	100%			- very dense				
						4.0	- RESIDUUM -				2605.5
			50/0"				REFUSAL AT 4.0 FEET				
5.0											
10.0											

Remarks: Boring dry during and upon completion of drilling. Grinding at 2'-4'. Offset 5' West. Auger refusal at 3.5'.

TRIAD ENGINEERING, INC.

BORING LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field**

Inspector: TK Boring Location: See Figure A-2 Boring No.: **B- 32**

Date Started: 9/14/22 Drilling Method: 3.25 HSA

Date Completed: 9/14/22 Driller: CONNELLY Ground Elev.: 2622

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Pocket Penetrometer (tsf)	Sample Type	Penetration Blows/6 inches	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.6	7.0" TOPSOIL				2621.4
	1.5		2-2-11	78%			Tan brown **SAND**, medium dense, little silt, little gravel, moist				
						2.5	- RESIDUUM -				2619.5
			50/3"	100%			Tan brown **SANDSTONE**, very dense, slightly moist				
						4.5	- WEATHERED ROCK -				2617.5
5.0							REFUSAL AT 4.5 FEET				
10.0											

Remarks: Boring dry during and upon completion of drilling. Grinding at 2'-4'. Offset 5' West. Auger refusal at 2'.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 31**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2609.5

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.3	3.0" TOPSOIL				2609.3
							Brown **SANDSTONE COBBLES**, and sand, moist				
5.0											
						9.0	- RESIDUUM -				2600.5
							BUCKET REFUSAL AT 9.0 FEET				
10.0											
15.0											

Shelby Tube; Standard Split Spoon; Core Sample; Auger Probe

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 32**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2622

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.4	5.0" TOPSOIL				2621.6
							Brown **SANDSTONE GRAVEL AND COBBLES**, and sand, moist				
						2.0	- RESIDUUM -				2620.0
							Brown **WEATHERED SANDSTONE**, dry, rippable, layered				
						4.0	- WEATHERED ROCK -				2618.0
							BUCKET REFUSAL AT 4.0 FEET				
5.0											
10.0											
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 33**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2627

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.5	6.0" TOPSOIL				2626.5
						2.3	Brown **SANDSTONE COBBLES AND BOULDERS**, little sand, moist - RESIDUUM -				2624.8
						4.0	Brown **WEATHERED SANDSTONE**, dry, rippable - WEATHERED ROCK -				2623.0
							BUCKET REFUSAL AT 4.0 FEET				
5.0											
10.0											
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 34**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2618

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.5	6.0" TOPSOIL				2617.5
							Brown **SANDSTONE COBBLES AND BOULDERS**, little sand, little cobbles, trace boulders, moist				
5.0											
10.0						11.0	- RESIDUUM -				2607.0
							Brown **WEATHERED SANDSTONE**, dry, rippable				
						12.0	- WEATHERED ROCK -				2606.0
							BUCKET REFUSAL AT 12.0 FEET				
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 35**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2608.5

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.8	9.0" TOPSOIL				2607.8
							Brown **SANDSTONE COBBLES**, little sand, trace clay				
5.0						5.3	- RESIDUUM -				2603.3
							BUCKET REFUSAL AT 5.3 FEET				
10.0											
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **B- 36**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2612

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.4	5.0" TOPSOIL				2611.6
							Brown **SANDSTONE COBBLES AND BOULDERS**, little sand, moist				
5.0											
						8.0	- RESIDUUM -				2604.0
							Brown **WEATHERED SANDSTONE**, dry, rippable				
						9.0	- WEATHERED ROCK -				2603.0
							BUCKET REFUSAL AT 9.0 FEET				
10.0											
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TEST PIT LOG

Project Number: **03-22-0707** Project Name: **Garrett College Multi-Purpose Field** Test Pit No.: **Perc 5**

Inspector: JRW Test Pit Location: See Figure A-2

Date Started: 10/17/22 Method: Komatsu PC 138 Excavator

Date Completed: 10/17/22 Operator: Byco Ground Elev.: 2606

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Penetration Blows/ 3/4 inch	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.4	5.0" TOPSOIL				2605.6
							Tan **CLAY**, some gravel, trace sand, moist				
5.0						5.0	- RESIDUUM -				2601.0
							Brown **WEATHERED SANDSTONE**, dry, rippable				
						9.0	- WEATHERED ROCK -				2597.0
10.0							BUCKET REFUSAL AT 9.0 FEET				
15.0											

Remarks: Test dry during and upon completion of excavation.

TRIAD ENGINEERING, INC.

TRIAD ENGINEERING, INC.

03220707

10/21/2022

Triad Representative
James Wheeler

Tp-perc5

TRIAD ENGINEERING, INC.

03220707

10/21/2022

Triad Representative
James Wheeler

TP-perc5

TRIAD ENGINEERING, INC.

APPENDIX C

Laboratory Testing

LABORATORY TESTING

The soil samples obtained from the test borings were visually classified in the field by a geotechnical engineer from Triad. The recovered soils were further evaluated by laboratory testing. Laboratory soil tests were conducted in accordance with applicable ASTM Standards as listed below:

1) Moisture content tests were performed in accordance with ASTM D 2216.

2) An Atterberg Limits test, consisting of the liquid limit, plastic limit, and plasticity index, was performed in accordance with ASTM D 4318.

3) A sieve analyses with washed No. 200 sieve test was performed in accordance with ASTM D 422.

4) Rock core compressive strength tests were performed in general accordance with ASTM D 7012.

A summary and details of the laboratory tests are included on the following pages of this appendix.

TRIAD ENGINEERING, INC.

SOIL DATA SUMMARY

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	UNIT WEIGHT (PCF)	UNCONFINED COMPRESSIVE STRENGTH (PSI)
				LL	PL	PI	% GRAVEL	% SAND	% FINES			
B-30	0-1.5	SS	14.8									
B-30	2.5-6.5	SS	9.1	NP	NP	NP	24.0	47.0	29.0	SM		
B-31	0-1.5	SS	5.5									
B-31	2.5-2.8	SS	9.3									
B-32	0-1.5	SS	13.5									
B-32	4	ROCK CORE									150.5	15,370
B-32	4	ROCK CORE									149.6	19,442

Notes: 1) Soil tests performed in accordance with ASTM testing standards.

2) SS = Split Spoon; UD = Undisturbed

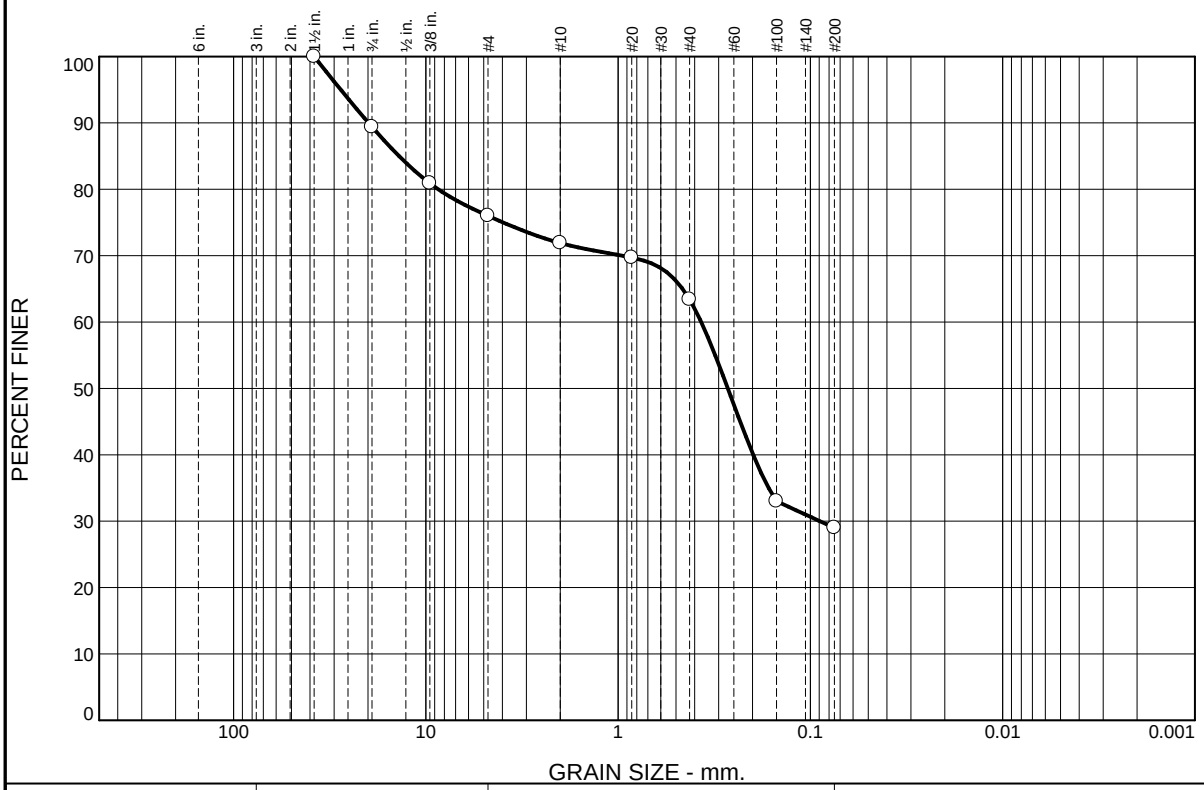
TRIAD ENGINEERING, INC.

Client: SPECS, Inc.
Project : Garrett College Multi-purpose Field
Location Garrett County, MD
Project No.: 03-22-0707

FIGURE

C-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.6	13.4	4.1	8.5	34.4	29.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.50	100.0		
3/4	89.4		
3/8	80.9		
#4	76.0		
#10	71.9		
#20	69.7		
#40	63.4		
#100	33.0		
#200	29.0		

* (no specification provided)

Soil Description

Brown silty SAND with gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 19.8584 D_{85}= 13.7665 D_{60}= 0.3697
D_{50}= 0.2688 D_{30}= 0.0892 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample Number: B-30 **Depth:** 2.5'-6.5'

Date: 9/26/22

Triad Engineering, Inc.

Client: SPECS, Inc.
Project: Garrett College Multi-purpose Field
Garrett County, MD
Project No: 03-22-0707 **Figure** C-2

Tested By: DLS

January 7, 2010

Mr. Ray Rase
SPECS, INC
105 South Centre Street, Suite 100
Cumberland, Maryland 21502

RE: Report of Geotechnical Investigation
Garrett County CARC - Aquatic and Fitness Center
Garrett County, Maryland
TRIAD Project No. 03-09-0276

Dear Mr. Rase:

Triad Engineering, Inc. (TRIAD) has completed a geotechnical investigation at the site planned for the Garrett County CARC - Aquatic and Fitness Center in Garrett County, Maryland. The purpose of the investigation was to explore and evaluate the subsurface conditions at the above referenced site. This report outlines the results of our field exploration and presents our recommendations for design and construction of the geotechnical elements of the project.

SCOPE OF SERVICES

The scope of services was performed in general accordance with our proposal dated October 16, 2009. The field exploration included drilling a total of 19 test borings with Standard Penetration Testing and 3 auger probes, performing appropriate soils testing in our laboratory and preparing a detailed geotechnical report. Laboratory soil tests, performed in accordance with appropriate ASTM testing procedures, were conducted to supplement the field exploration. Preparation of this geotechnical report completes our scope of services and includes the following:

1) A detailed discussion of the site geology and subsurface conditions encountered.

2) Detailed boring logs with a Boring Location Plan.

3) Results of laboratory testing.

4) Foundation recommendations with specific references to bearing capacity and settlement potential.

5) Site preparation and structural fill requirements.

6) Lateral earth pressure recommendations for design of below grade walls.

7) Foundation installation procedures.

8) General design and construction recommendations for the proposed SWM facilities.

9) Pavement subgrade preparation recommendations.

10) Construction recommendations as they relate to the geotechnical aspects of the project.

Our scope of services did not include a hazardous waste study, an environmental site assessment, structural design, retaining wall design, a geophysical survey, preparation of plans and specifications, pavement design, quantity and cost estimates, or construction inspection and testing services.

SITE AND PROJECT DESCRIPTION

The proposed project site is located at 687 Mosser Road at the existing Garrett College in Garrett County, Maryland. The site proposed for the expansion is gently to moderately sloping grass covered terrain with some isolated wooded areas. Several existing structures and associated site infrastructure are also present within the general development area. The existing structures are present within the eastern and northeastern portions of the site. Other notable site features consist of asphalt/gravel parking and access drives, concrete sidewalks and curbing, existing sheds and site utilities consisting of water and sewer. Based on the proposed site plan, we anticipate that all existing structures and the majority of the existing infrastructure will be demolished and removed as part of the overall construction project.

The project will include the construction of a new aquatic and fitness/gymnasium center. New SWM facilities, paved parking and access drives are also planned as part of the project. We anticipate that the new structures will consist of masonry bearing walls with interior steel framing, brick veneer, isolated columns, upper level slab on decks and lowest level slab on grade construction. We assume that structural loading will be on the order of 5 to 6 kips per linear foot and 150 to 200 kips for continuous and isolated foundations, respectively. Based on existing grades and a tentative finished floor elevation of 2597, we anticipate that cuts may range from 6 to 8 feet with fills on the order of 12 to 15 feet.

SOILS AND GEOLOGIC SETTING

According to the United States Department of Agriculture Web Soil Survey, the soil unit present within the project site is UnB – Ungers-Gilpin-Calvin channery loams with 0 to 10 percent slopes. The average water table depth within this soil unit is generally more than 80 inches below the ground surface. The portion of the Soil Survey Map that illustrates the site location is included as Plate A-7 of Appendix A to this report.

Based on a review of available geologic maps for Maryland, the site for the proposed expansions is underlain by the Mauch Chunk and Greenbrier formations. Residual soils weathered from the parent bedrock generally consists of silts, sandy silts, and sands with varying amounts of weathered rock fragments generally increasing with depth. The bedrock is generally that of shale and sandstone for the Mauch Chunk formation and shale and sandstone with some limestone inter-bedded within for the Greenbrier formation.

It should be noted that coal mining operations are common within the general geographic area. At this time, TRIAD has not performed any research regarding the potential existence of past and/or present deep mining operations below and/or within close proximity of the site. We are unaware of any mine subsidence issues within the immediately surrounding area. If desired, research can be performed for the site and depending on the availability; mining maps can sometimes be obtained from local coal mining industry. Upon review of any available maps, TRIAD can provide a risk assessment associated with possible subsidence associated with past deep mining operations, if desired.

FIELD EXPLORATION

The scope of work included drilling eleven (11) structure test borings and eight (8) parking lot test borings within the subject site at the approximate locations shown on Plates A-2 through A-6 contained in Appendix A. The test borings included Standard Penetration Testing (SPT) and split barrel sampling (ASTM D 1586) at select intervals to boring termination depths or auger refusal on hard rock. Auger refusal on hard rock was encountered in twelve (12) of the test at depths ranging from 4.0 to 15.5 feet below existing grades. The remaining test borings were extended to their planned termination depths without encountering refusal on hard rock. The boring and auger probe locations were selected and staked in the field by others.

Additionally, three (3) storm water management auger probes were performed. All probes encountered refusal at depths ranging from 1.9 to 3.6 feet. The approximate locations of the auger probes are shown on Plate A-4 contained in Appendix A. In auger probe, SWM-4 infiltration testing was performed in accordance with appendix D.1 of the 2000 Maryland Storm Water Design manual. The infiltration rate was measured as 3.2 in/hr.

It should be noted that boring B-12 was not drilled due to the proximity an existing sewer line to the boring location. Also, SWM-3 was not drilled due to snow no allowing access to the location of this boring. Geotechnical personnel from our office were present full time during the drilling and probing operations to direct the drill crew, log all recovered soil samples, and observe groundwater and rock conditions. The recovered soil samples were transported to our laboratory for further testing. Detailed descriptions of materials encountered in the test borings are contained on the test boring logs in

SUBSURFACE CONDITIONS

Subsurface Strata

The materials encountered in the borings are generally described below. Stratification lines indicated on the boring logs represent the approximate boundaries between material types.

Surface Materials: Surface materials encountered in the borings consisted of topsoil, asphalt and base stone of varying thicknesses as summarized on the attached boring logs.

Old Fill: Isolated areas of existing fill materials were encountered in several of the borings to depths on the order of 2.0 to 8.0 feet below existing grades. The old fill consisted of silty sands and silty gravels with varying amounts of rock fragments.

Residual Soils: Residual soils were encountered below surface materials and fill and generally consisted of silty sands and silty gravels grading to dense weathered rock with increasing depth. Based on SPT N-values varying from 7 blows per foot to over 50 blows per foot, the residual materials exhibited a medium stiff consistency to very dense relative density. The higher N-values are associated with the appreciable amount of rock fragments encountered in the borings.

Groundwater Observations

Groundwater levels were checked during and upon completion of drilling operations. A static groundwater level was detected in boring B-7 during the investigation. The groundwater level was measured as 13.0 feet below existing grade during drilling operations and 8.0 feet below existing grade after 24 hours. However, it is important to note that fluctuations in groundwater levels may occur due to variations in environmental conditions, surface drainage, and other factors which may not have been evident at the time measurements were made and reported herein.

LABORATORY TESTING

Laboratory tests were performed to supplement the field classifications, assess potential volume changes, and establish design criteria. All laboratory tests were performed in accordance with appropriate ASTM standard test methods. Detailed results of the laboratory tests are contained in Appendix C. A summary of the test results is presented below.

TEST TYPE	TEST RESULTS
Natural Moisture Content	3.0 to 11.9%
Atterberg Limits: Liquid Limit	31.5 to 36.5
Plasticity Index	3.3 to 10.3
Percent Passing No. 200 sieve	27.2 to 38.4%

Based on the Unified Soil Classification System, all of the samples tested were classified as silty sands (SM) and silty gravels (GM).

CONCLUSIONS AND RECOMMENDATIONS FOR DESIGN

The subsurface information obtained from the field investigation, our past experience with similar projects, and the noted design criteria were the basis for our assessment of the geotechnical issues currently existing at the site. Our geotechnical recommendations associated with the design and construction of foundations, floor slabs, retaining walls and storm water management facilities are presented in the following sections of this report.

As previously indicted, isolated areas of old fill were encountered in several of the borings. We recommend that any old fill be over-excavated to depths of approved residual soils and be replaced with new controlled fill. In addition, any old structure foundations, slabs, utilities, foundation walls and miscellaneous debris associated with the existing structure should be completely removed and be replaced with new controlled fill.

Foundations

Based on the results of our field exploration, it is our opinion that the proposed structures can be supported on conventional shallow foundations bearing on approved residual materials and/or new controlled fill. Any existing fill and demolition debris should be completely removed from within the building footprint to depths of approved residual soils and be replaced with new controlled fill.

Provided that the recommendations above are strictly adhered to, we recommend that a maximum allowable bearing pressure of 2,500 psf be utilized to proportion foundations for the proposed structures. All foundations should be constructed to bear on approved residual soils or new controlled fill. Minimum dimensions of 3 feet and 2 feet for isolated and continuous footings, respectively, should be considered. In addition, exterior foundations should bear at least 36 inches below the final outside grade for frost protection.

If partial rock bearing is encountered at the bottom of proposed footing levels, we recommend that the rock be undercut approximately one (1) foot and be replaced with

new controlled soil fill. This treatment generally reduces the magnitude of differential settlements associated with footings bearing partially on hard rock and partially on soil.

We estimate that total settlements for foundations bearing on approved residual soils and/or new controlled fill will be one (1) inch or less. Differential settlements are anticipated to be one-half of the total settlements. Differential settlements along continuous wall footings are not expected to exceed an angular distortion of 0.0015 inch/inch.

Seismic Classification

Based on the field exploration and our experience in this region, we recommend that a Site Class C be utilized for seismic evaluation. This classification is based on the 2006 International Building Code (IBC) criteria.

Floor Slabs

We understand that the structure will include a concrete slab supported on grade bearing on new controlled, compacted fill and/or approved residual soils. We recommend that a modulus of subgrade reaction, "k", equal to 110 pci be adopted for design of the slabs-on-grade.

A minimum 4-inch layer of crushed stone such as ASTM designation No. 57 coarse aggregate can be placed under the slab-on-grade to serve as a capillary water barrier and a leveling surface. Use of a conventional six (6) mil thick polyethylene vapor barrier is considered optional for structure areas which will include an exposed concrete slab (i.e. maintenance, receiving, etc.). However, areas upon which VCT, carpeting, quarry tile, or other flooring products will be placed should be underlain by the vapor barrier.

Proper joint installation should be specified and maintained throughout construction of the floor slabs. Joints should be installed in the floor slabs in accordance with the recommendations specified by the Portland Cement Association (PCA) or American Concrete Institute (ACI). Where construction joints are required in heavy traffic areas such as storage areas, we strongly recommend the use of dowelled joints rather than keyed joints. The dowelled joints provide a positive transfer of shear forces and prevent movements.

Lateral Earth Pressure

Concrete Retaining Walls

Retaining walls will be subject to either active or at-rest lateral earth pressures. For walls which are permitted to rotate or translate slightly at the top, this represents an active condition with an active earth pressure. However, for rigid walls with movement restricted, this presents an at-rest condition.

For select backfill consisting of SW or more granular based on U.S.C.S. and a level backslope, we recommend that an active equivalent fluid pressure (γKa) of 40 psf per foot of height be used for evaluation and design. For at-rest conditions, an equivalent fluid pressure (γKo) of 55 psf per foot of height is recommended. For passive resistance analysis and design, we recommend an equivalent fluid pressure (γKp) of 220 psf per foot of height.

The coefficient of friction utilized for determination of sliding resistance on the base of foundation elements should be 0.42.

Mechanically Stabilized Earth Walls

Suitable materials for MSE walls should be specified and determined by the wall designer. It is our opinion that the on site material will be suitable for reuse as backfill. For the suitable on site materials a design soil unit weight of 125 pcf and an internal angle of friction of 30 degrees should be utilized. The design team should be given the opportunity to review the wall design and provide direction regarding the sequence of construction operations associated with the wall construction in relation to the proposed storm water utilities, propane tanks and foundations.

Any surcharge loads anticipated at the surface should be multiplied by 0.5 and superimposed as a uniform horizontal pressure on the recommended design lateral loading.

The lateral pressure values recommended above are based on adequate drainage behind the walls without build-up of hydrostatic pressures. Consequently, a permanent backwall drainage system should be constructed along exterior retaining walls or below grade walls. The permanent backwall drainage should include a 4-inch diameter Schedule 40 PVC or HDPE perforated pipe surrounded by an 18-inch wide zone of free draining gravel such as ASTM Size No. 57, and separated from the general site backfill by a non-woven geofabric, such as Mirafi 140-N or an approved equal. Backwall drains should be sloped such that water will flow by gravity to an appropriate drain and day-light or to a sump pit and pump.

SWM Facility

Three (3) storm water management auger probes were performed. Due to highly weathered rock conditions and small auger rig utilized for the probes, refusal at depths ranging from 1.9 to 3.6 feet was encountered. The approximate locations of the auger probes are shown on Plate A-4 contained in Appendix A. In auger probe, SWM-4 infiltration testing was performed in accordance with appendix D.1 of the 2000 Maryland Storm Water Design manual. The field measured infiltration rate was established as 3.2 in/hr. Therefore, it is our opinion that the design infiltration rate of 0.52 in/hr is considered appropriate for recharge within the proposed facilities.

Upon final excavations, any planned infiltration facility subgrade should not be compacted and should be avoided with any heavy construction traffic. The facility subgrades should be scarified to a depth of 6 inches prior to final grading and placement of any permeable media. Final grading should only be performed with very light equipment. The permeable materials utilized within the water quality areas should not be compacted and should be placed with only very light grading equipment. In addition, the area should be avoided with any heavy construction traffic. Select soil analysis on proposed materials should be conducted prior to construction in accordance with the current Maryland Storm Water Design Manual.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial site clearing and grubbing should consist of removal of the topsoil, old fill, old demolition/structure debris, asphalt, concrete, brush, trees, and any other deleterious materials within the structure, pavement and SWM areas and extending ten (10) feet beyond their perimeters. After removal of the unsuitable surface soils, the subgrade soils should be heavily proof-rolled with approved construction equipment to locate isolated soft spots or areas of excessive "pumping" which are too wet to accommodate compacted fill or building construction. These areas should be scarified, air-dried to sufficient moisture content and re-compacted prior to fill placement or excavated and removed to a level of stable soils. The exposed subgrade should be inspected and tested by TRIAD personnel prior to placement of compacted fill.

Excavation Areas

Auger refusal on hard rock was encountered within twelve (12) borings at depths ranging from 4.0 to 15.5 feet below existing grades and in all three auger probes at depths ranging from 1.9 to 3.6 feet below existing grades. We anticipate that conventional earth excavation equipment such as backhoes, trackhoes and front end loaders can effectively remove the existing fill and residual soils present within the project site. In areas where very dense materials are encountered, (greater than 50 blows per increment) larger ripping equipment would be required for more effective removal. Depending upon the size of the equipment, excavations performed below auger refusal depths will likely require hoe-ramming or blasting for effective removal. Any blasting operations should be performed in strict accordance with local and state regulation. Blasting operations should be performed in a manor not to adversely effect adjacent properties.

During excavation operations, dry conditions should be maintained within the cut areas at all times in order to minimize the need for additional undercutting or aeration of soils. The contractor should be prepared to implement, if necessary, temporary de-watering measures in these areas during construction. These measures can include sloping the cut areas to appropriate sump pit(s) and pumping accumulated surface runoff from

precipitation. All cut areas should be sealed at the end of each day, to the extent which construction practicality will permit, to help prevent infiltration of precipitation and subsequent unsuitable soil conditions.

Controlled Fill

Satisfactory Soils

On-site residual materials and select old fill removed from required excavations can generally be used for fill provided that compaction criteria are strictly maintained. This will be very dependent upon seasonal conditions at the time of earthwork construction. Also, the low to high elastic silts are sensitive to moisture fluctuations and typically can be effectively placed and compacted only during drier seasons. Use of these soils during wet or rainy seasons is often futile due to the time and effort required to dry the material to achieve adequate compaction.

Fill materials should not contain any debris, waste, or frozen materials and they should contain less than two (2) percent vegetation-organic materials by weight. Also, materials classified as CL, CH, ML, MH, OL, OH, or Pt are not suitable for use as structural fill. The on-site soils are generally suitable for re-use as structural fill provided that proper drainage, grading, and sloping away from the structure is maintained both during and after construction.

All proposed fill materials should be approved by a geotechnical engineer prior to placement as controlled fill, and representative samples should be submitted by the contractor one week prior to placement of that material to allow time for completion of the necessary laboratory tests.

Placement and Compaction

Before compaction, each layer should be moistened or aerated as necessary to obtain the required compaction moisture content. Each layer should be compacted to the required percentage of maximum dry density. Fill should not be placed on surfaces that are muddy or frozen, or have not been approved by testing and/or proof-rolling. Free water should be prevented from appearing on the surface during or subsequent to compaction operations.

Soil material which is removed because it is too wet to permit proper compaction can be stockpiled, or spread and allowed to dry. Drying can be facilitated by discing or harrowing until the moisture content is reduced to an acceptable level. When the soil is too dry, water should be applied uniformly to the subgrade surface or to the layer to be compacted.

Maximum rock particle sizes should not exceed 3 inches. All fill material compacted by heavy compaction equipment should be placed in maximum 10-inch loose lifts. All fill

material compacted by hand-operated tampers or light compaction equipment should be placed in maximum 4-inch loose lifts.

Fill material placed below and extending ten (10) feet beyond the foundations for the structure and behind retaining walls should be compacted to at least 95 percent of the laboratory maximum dry density as determined by the Modified Proctor method (ASTM D 1557). Fill placed within the top one (1) foot of pavement subgrade areas should also be compacted to 97 percent of the maximum dry density as determined by ASTM D 1557. Fill placed below the top one (1) foot of pavement subgrade areas should be compacted to not less than 95 percent of the maximum dry density as determined by ASTM D 1557. Fill placed for the storm water management pond should be compacted to at least 95 percent of the laboratory maximum dry density as determined by the Standard Proctor method (ASTM D 698). The moisture content of the soils should be at or within two (2) percentage points of the optimum moisture content.

Foundation Construction

We anticipate that conventional earth excavation equipment such as a backhoe can be utilized to excavate the residual soils or new controlled fill for foundation construction. Any foundation excavations which encounter dense weathered rock and/or hard rock will require heavy ripping and/or hoe ramming to attain required bearing elevations.

For foundations bearing on residual soils and/or new controlled fill, we recommend that any loose materials present at the bottom of footing excavations as a result of excavation operations be re-compacted in order to minimize differential settlements. Any unsuitable materials should be removed to underlying approved residual materials. Widening of over-excavations approximately 1 foot laterally for every 1 foot in vertical over-excavation will be required if new controlled fill is utilized to replace the over-excavations to original bearing sugrade elevations. Backfill in any over-excavations should consist of an approved controlled fill compacted in accordance with the recommendations presented in this report.

Foundation concrete should be placed the same day that excavations are completed to reduce the potential for softening due to precipitation and/or runoff. All footing excavations for the proposed structures should be examined by a geotechnical engineer or a qualified representative from our office prior to placing concrete to confirm that the required bearing support is available.

Floor Slab Construction

Prior to placement of crushed stone for the floor slabs, the subgrade should be proof-rolled in order to detect any soft/wet "pumping" areas. Any soft "pumping" areas should be either scarified, aerated to an approved moisture content, and re-compacted or undercut and replaced with controlled fill.

Utility Excavations

All utility trenches should be sloped and/or supported in accordance with current Occupational Safety and Health Administration (O.S.H.A.) requirements. Backfill of trenches below structure and pavement areas should be performed in accordance with the Controlled Fill section of this report.

Pavement Construction

Drainage ditches and/or inlets should be constructed for the access roads and pavement areas to maintain drainage and divert runoff away from the pavement subgrade. It is very important that the pavement subgrade be properly sloped to help maintain adequate drainage after construction. Any wet/unstable soils encountered at the subgrade level during grading operations should be either scarified, aerated and re-compacted or should be removed and replaced with suitable fill materials. Remediation of any final subgrade soils should be performed immediately prior to placement of base stone and asphaltic concrete.

It is very important that placement of both the base stone and asphaltic concrete be conducted immediately after final soil subgrade approval has been obtained due to the potential for subgrade softening from adverse weather conditions. In addition, heavy construction traffic should be limited from traveling across approved final subgrade areas that have been subjected to adverse weather conditions in order to help maintain a stable subgrade prior to pavement construction. If hard rock is encountered above final grades in pavement area excavations, it should be over-excavated to at least the level of the bottom of the pavement section (i.e. the bottom of the aggregate base material).

Construction Monitoring

We recommend that TRIAD be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our investigation. If significant variations are encountered, or if the design is altered, we should be notified.

The geotechnical engineer should provide personnel as required to observe and document proof-rolling prior to fill placement. In addition, all fill material should be monitored, tested and approved during fill construction. Field density tests should be performed in accordance with ASTM D 2922. A minimum of three field density tests should be performed for each lift of fill placed or a minimum of every 2,500 square feet of fill placed to confirm the required soil compaction.

All foundation bearing surfaces for the proposed structures should be examined by a geotechnical engineer or qualified representative from our office to verify that adequate bearing capacity is available immediately prior to placement of concrete.

LIMITATIONS

This geotechnical engineering report has been prepared by TRIAD for the exclusive use of SPECS, Inc. and their design team for specific application to the proposed Garrett County CARC - Aquatic and Fitness Center in Garrett County, Maryland. The work on the project has been carried out in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is applicable to this project.

Subsurface conditions will likely vary from those encountered at the test boring locations. The test boring logs are intended to only represent the conditions at each location when the sampling occurred. Classifications of the recovered soil samples are based on recognized standards.

The interpretations and recommendations in this report are based solely on the information available at the time this report was prepared. In the event that the location or design of the structures is altered, the conclusions and recommendations presented herein should not be considered valid unless we have been given the opportunity to review the changes.

It is **strongly** recommended that we be provided the opportunity for a general review of the final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented. If we are not accorded the privilege of making this review, we can assume no responsibility for misinterpretation of our recommendations.

The nature and extent of variations between exploration locations and observed conditions may not become evident until construction. It is suggested that we be retained to provide continuous soil engineering services during the earthwork and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and/or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to construction.

We appreciate the opportunity to provide our services on this project. If you have any questions regarding this report, or you require any additional information, please do not hesitate to contact us.

Sincerely,

TRIAD ENGINEERING, INC.

James R. Wheeler
Project Geotechnical Scientist

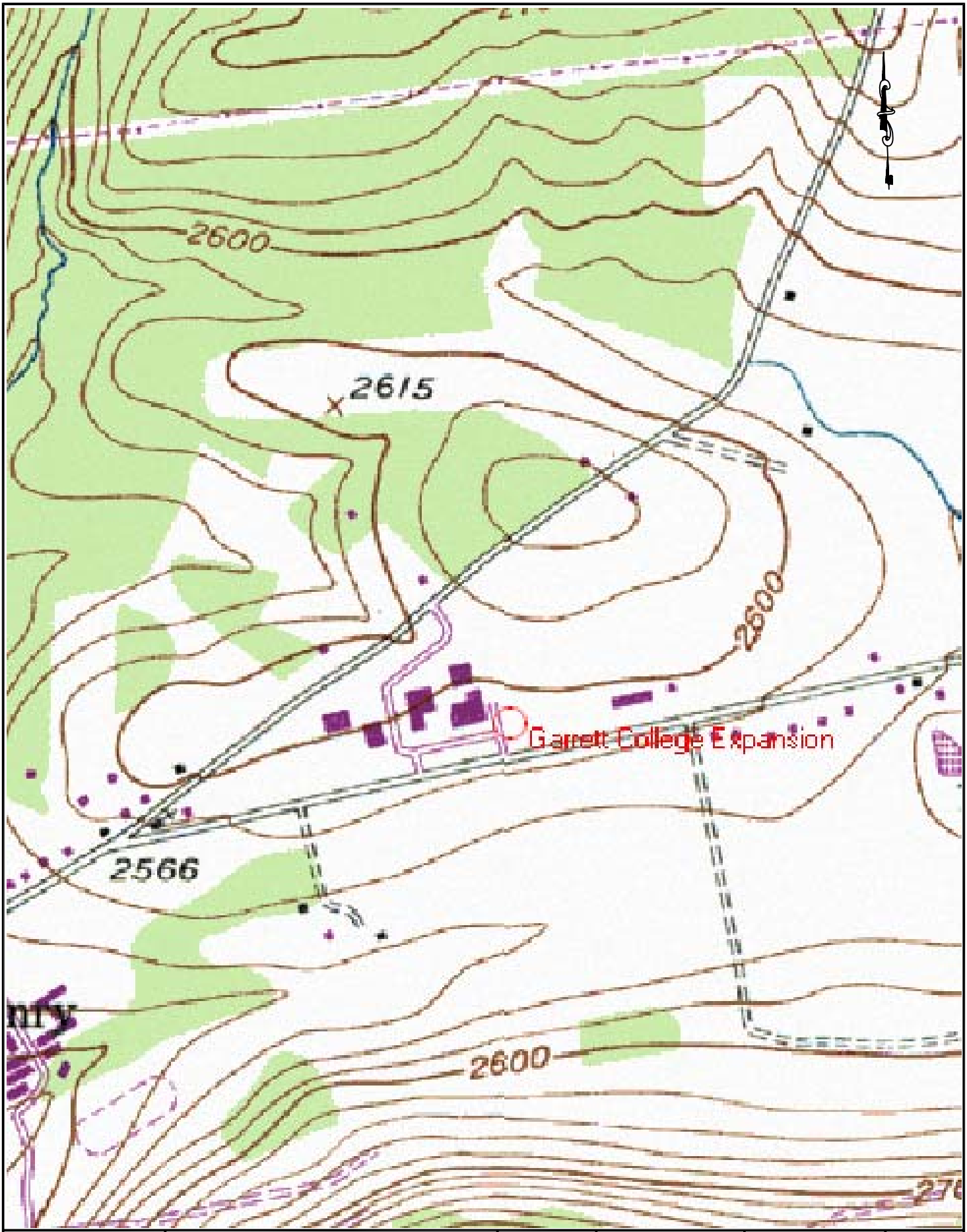
Bradley A. Reynolds, P.E.
Senior Geotechnical Engineer

Attachments:

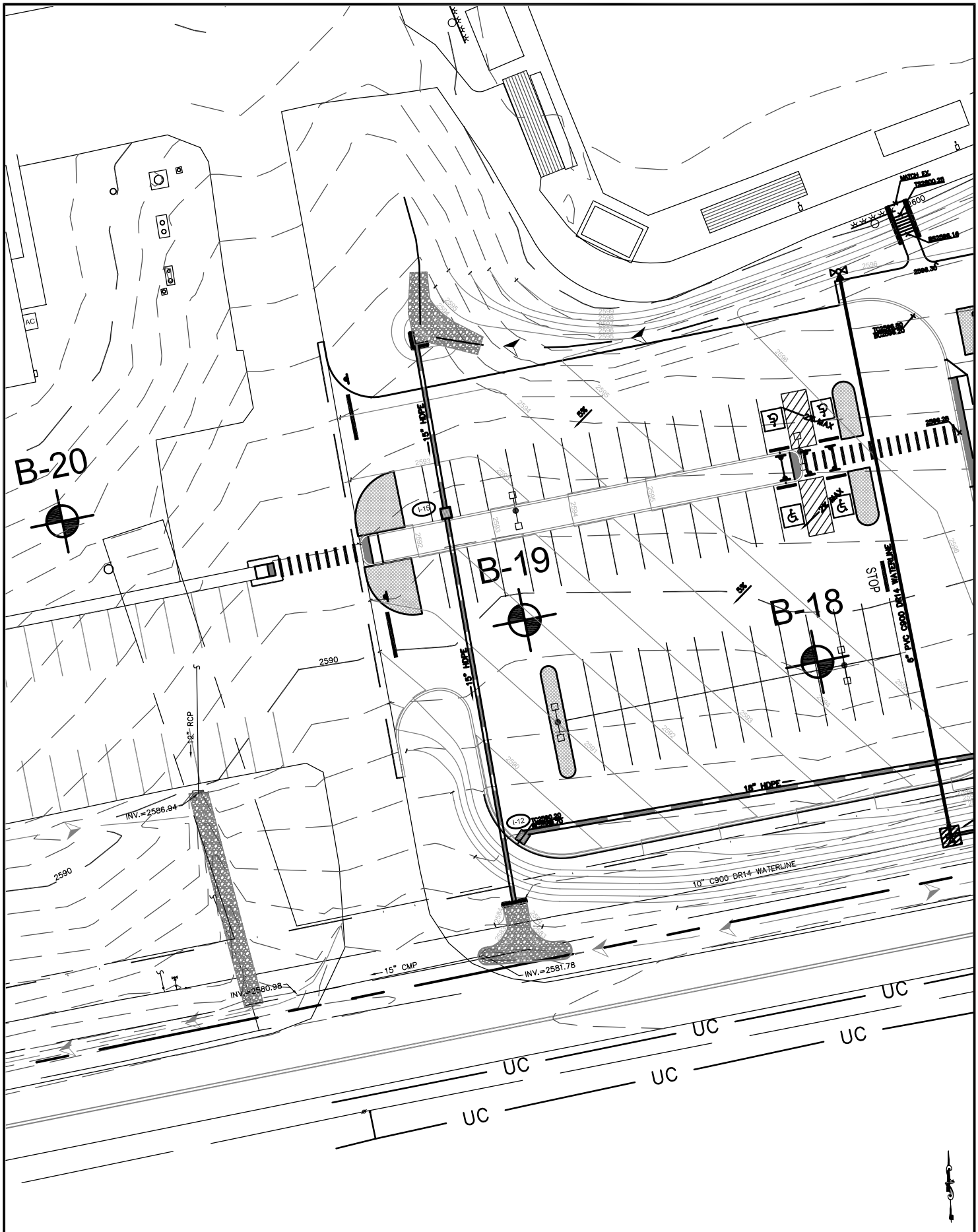
Appendix A - ILLUSTRATIONS
Appendix B - FIELD EXPLORATION
Appendix C - LABORATORY TESTING

Appendix A

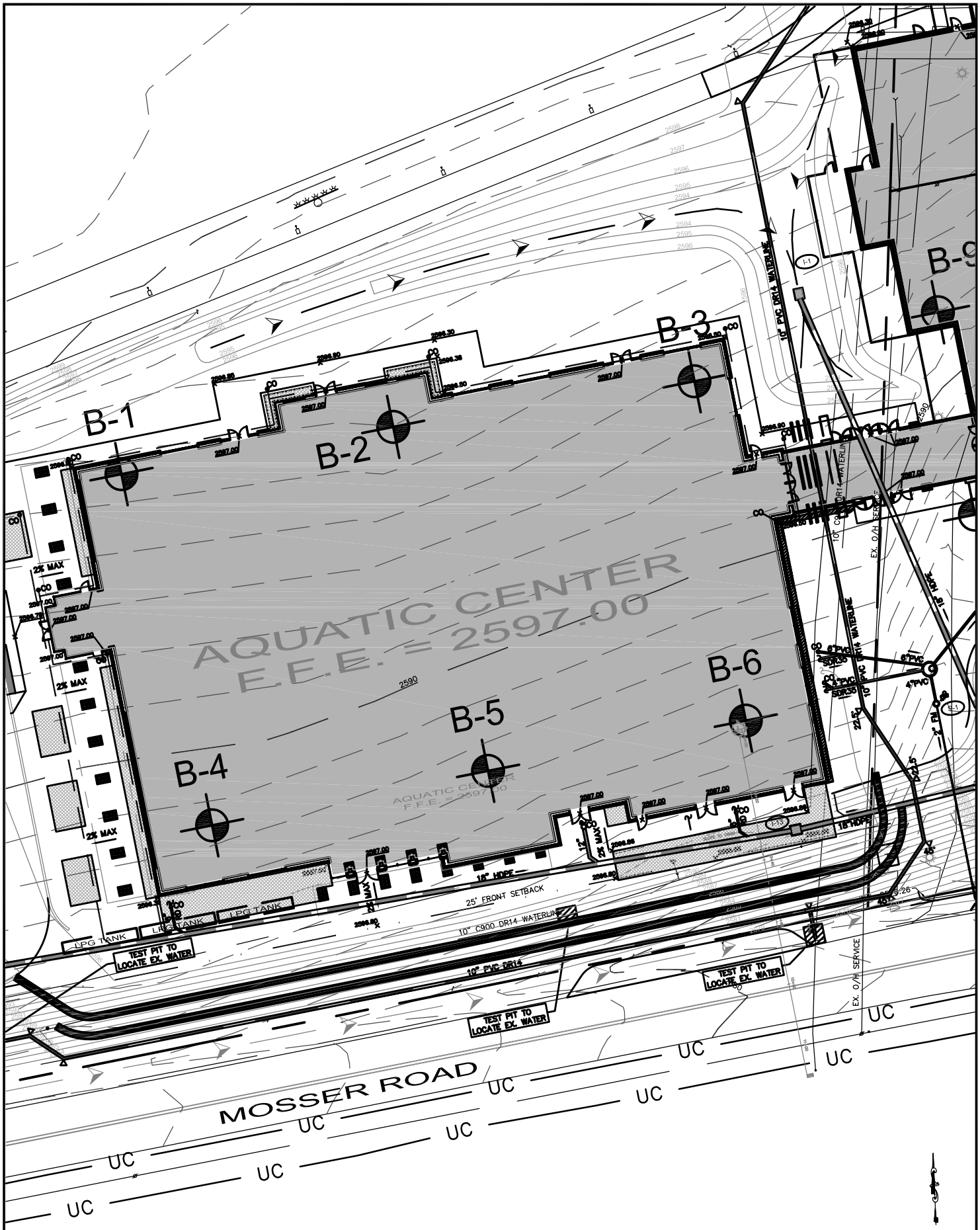
ILLUSTRATIONS



TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COLLEGE EXPANSION	DATE 11-11-09	◯ = Approximate Site Locations	Job No.: 03-09-0276	Plate No.: A-1
	SITE LOCATION PLAN	GARRETT COUNTY, MARYLAND		MCHENRY QUADRANGLE Maptech 2001	



TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COUNTY – CARC AQUATIC AND FITNESS CENTER GARRETT COUNTY, MARYLAND	Date 1/7/10	B-# = Approximate Boring Location	Job No.: 03-09-0276	Scale N/A	Plate No.: A-2
	BORING LOCATION PLAN	Base Plan Provided By SPECS, Inc.		Plan For Reference Only Not Intended For Construction		



TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COUNTY – CARC AQUATIC AND FITNESS CENTER GARRETT COUNTY, MARYLAND	Date 1/7/10	B-# = Approximate Boring Location	Job No.: 03-09-0276	Scale N/A	Plate No.: A-4
	BORING LOCATION PLAN	Base Plan Provided By SPECS, Inc.		Plan For Reference Only Not Intended For Construction		

TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COUNTY – CARC AQUATIC AND FITNESS CENTER GARRETT COUNTY, MARYLAND	Date 1/7/10	B-# = Approximate Boring Location	Job No.: 03-09-0276	Scale N/A	Plate No.: A-4
	BORING LOCATION PLAN	Base Plan Provided By SPECS, Inc.		Plan For Reference Only Not Intended For Construction		

TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COUNTY – CARC AQUATIC AND FITNESS CENTER GARRETT COUNTY, MARYLAND	Date 1/7/10	B-# = Approximate Boring Location	Job No.: 03-09-0276	Scale N/A	Plate No.: A-5
	BORING LOCATION PLAN	Base Plan Provided By SPECS, Inc.		Plan For Reference Only Not Intended For Construction		

TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COUNTY – CARC AQUATIC AND FITNESS CENTER GARRETT COUNTY, MARYLAND	Date 1/7/10	B-# = Approximate Boring Location	Job No.: 03-09-0276	Scale N/A	Plate No.: A-6
	BORING LOCATION PLAN	Base Plan Provided By SPECS, Inc.		Plan For Reference Only Not Intended For Construction		

TRIAD ENGINEERING, INC. www.triadeng.com	GARRETT COLLEGE EXPANSION	DATE 11/11/09	= Approximate Site Locations	Job No.: 03-09-0276	Plate No.: A-7
	SOILS MAP	GARRETT COUNTY, MARYLAND		Soils Map Provided BY: Web Soil Survey	

Appendix B

FIELD EXPLORATION

FIELD EXPLORATION

The subsurface conditions at the site were investigated by drilling 19 test borings with Standard Penetration Testing (SPT) and sampling and the drilling of 3 auger probes. The borings and auger probes were drilled utilizing an ATV drill rig equipped with hollow stem augers. The field exploration was supervised by a geotechnical engineer from our office.

SPT and sampling was performed in accordance with ASTM D 1586. The SPT's were performed to depths indicated on the attached boring logs using a split barrel sampler with an outside diameter of two (2) inches and an inside diameter of one and three-eighths (1-3/8) inches. The split barrel sampler was driven eighteen (18) inches with a hammer weighing approximately 140 pounds and falling thirty (30) inches. The number of blows required to drive the split barrel sampler at six (6) inch increments was recorded on the boring logs. The method utilized to classify the soils is defined in Plate B-1, Soils Classification System.

TRIAD ENGINEERING, INC.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		**Consistency – Fine-grained Soils**	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	≤4	Very Soft	≤2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	**Plasticity Index (PI)**	**Rock Hardness**	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Very Weathered	≤50/.5
Medium	5 to 20	Weathered	50/.4
High	20 to 40	Soft	50/.3
Very High	over 40	Medium hard	50/.2 to 50/.1
Moisture Description		Hard	Auger Refusal

Dry - Dusty, dry to touch

Slightly Moist - damp

Moist - no visible free water

Wet - visible free water, saturated

PLATE NO. 1

TRIAD ENGINEERING, INC.

LOG OF BORING NUMBER: B-1

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2595.6** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			6.0 Inches of Topsoil.	0.5			1-1-2						
			Reddish brown clayey **SILT**, soft, medium plasticity, some sand, trace rock fragments, moist. - Possible Fill to Residual -	2.0									
			Tan reddish brown silty **SAND**, medium dense, some rock fragments, moist.				8-13-20	33.6	39.2	27.2	8.6	32	27
5							50/4"						
			- Residual -	7.0									
			Auger Refusal at 7.0 Feet										
10													
15													
20													
25													

Completion Depth: **7.0 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-2

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2596.0** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			1-2-3						
			Tan brown clayey **SILT**, medium stiff, medium plasticity, little sand, trace rock fragments, moist. - Residual -	2.0									
			Reddish brown silty **SAND**, dense, trace rock fragments, moist.				5-13-19				9.5		
5			- some rock fragments, very dense.				15-50/5"						
							50/5"						
			- Residual -	9.0									
10			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				32-21-50/5"				5.1		
15			- Residual -	15.5			50/2"						
			Auger Refusal at 15.5 Feet.										
20													
25													

Completion Depth: **15.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation. Auger Refusal at 2.0 Feet, offset 8.0 Feet.**

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

LOG OF BORING NUMBER: B-3

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2593.8** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3.0 Inches of Topsoil.	0.3			1-2-2						
			Brown clayey **SILT**, soft, low to medium plasticity, some sand, trace rock fragments, moist.										
			- very stiff.				7-16-25						
			- Residual -	4.5									
5			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				50/4"				5.3		
							50/4"				3.8		
10							50/4"						
			- Residual -	12.5									
			Auger Refusal at 12.5 Feet.										
15													
20													
25													

Completion Depth: **12.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-4

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2588.5** Offset: **10'**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			6.0 Inches of Topsoil	0.5			1-1-2						
			Tan brown silty **SAND**, very loose, trace sand and rock fragments, moist.										
			- Residual -	2.0									
			Reddish brown sandy **SILT**, dense, trace rock fragments, moist.				10-17-21				8.2		
5			- Residual -	5.5			50/3"						
			Auger Refusal at 5.5 Feet										
10													
15													
20													
25													

Completion Depth: **5.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation. Offset 10 Feet towards B-5.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-5

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2587.3** Offset: **10'**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			Tan brown silty **SAND**, loose, trace rock fragments, moist.				2-2-4						
			- Possible Fill to Residual -	2.5									
			Reddish tan brown sandy **SILT**, very dense, little rock fragments, moist.				8-30-29				8.8		
			- Residual -	5.0									
5			- limestone fragments	5.5			50/2"				3.2		
			- Residual -										
			Auger Refusal at 5.5 Feet										
10													
15													
20													
25													

Completion Depth: **5.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation. Offset 10 Feet towards B-2**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-6

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-3**
Surface El.: **2586.1** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3.0 inches of Topsoil	0.3			2-2-5						
			Reddish tan brown sandy **SILT**, loose, trace rock fragments, moist.										
			- some rock fragments.				4-4-50/4"						
			- Residual -	4.5									
5			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				50/4"						
			- Residual -	8.5			50/2"				3.0		
			Auger Refusal at 8.5 Feet										
10													
15													
20													
25													

Completion Depth: **5.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-7

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2597.8** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			1-2-3						
			Tan brown clayey **SILT**, medium stiff, medium plasticity, trace sand and rock fragments, moist. - Fill -	2.0									
			Tan brown sandy **SILT**, medium dense, trace rock fragments, moist.				10-18-18				10.7		
5							50/3"						
			- Residual -	7.0									
			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				50/3.5"						
10			- moist to very moist.				20-32-50/2"				10.3		
			- Residual -	13.0									
			Auger Refusal at 13.0 Feet										
15													
20													
25													

Completion Depth: **13.0 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Water was encountered in boring at a depth of 13.0 Feet and at a depth of 8.0 Feet after 24 hours.**

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

LOG OF BORING NUMBER: B-8

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2596.2** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			12.0 Inches of Topsoil.	1.0			1-3-4						
			Brown clayey **SILT**, medium stiff, medium plasticity, trace sand and rock fragments, moist. - Residual -	2.0									
			Reddish brown silty **SAND**, very dense, some rock fragments, moist. - Residual -	4.0			11-50/4"				4.8		
			Auger Refusal at 4.0 Feet										
5													
10													
15													
20													
25													

Completion Depth: **4.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-9

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2591.9** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			2-3-3						
			Brown clayey **SILT**, medium stiff, low to medium plasticity, little rock fragments, moist. - Residual -	2.0									
			Reddish brown silty **SAND**, very dense, trace rock fragments, moist.				34-50/1"						
5			- little rock fragments.				50/3"						
			- some rock fragments.				50/2"						
				9.5									
10			Reddish brown sandy **SILT**, very dense, little rock fragments, moist. - Residual -	11.5			4-50/4"				11.9		
			Auger Refusal at 11.5 Feet										
15													
20													
25													

Completion Depth: **11.5 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-10

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2589.6** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			8.0 Inches of Topsoil.	0.7			1-2-4						
			Tan brown clayey **SILT**, medium stiff, medium plasticity, trace sand and rock fragments, moist. - Residual -	2.0									
			Reddish brown silty **SAND**, very dense, trace rock fragments, moist.				50/4"				4.5		
5			- Residual -	6.0			50/2"						
			Auger Refusal at 6.0 Feet										
10													
15													
20													
25													

Completion Depth: **6.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-11

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2586.9** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3									
			2.0 Inches of Stone Base.	0.5			12-6-23						
			Reddish brown silty **GRAVEL**, medium dense, some sand, moist.										
			- Tan brown, very dense.				50/3"	50.3	20.4	29.3	6.5	37	26
5							50/3"						
			- Residual -	7.5									
			Auger Refusal at 7.5 Feet										
10													
15													
20													
25													

Completion Depth: **7.5 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-13

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-6**
Surface El.: **2617.2** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			1-3-4						
			Tan brown clayey **SAND**, medium stiff, medium plasticity, little sand, trace rock fragments, moist. - Residual -	2.0									
			Reddish brown silty **SAND**, very dense, little rock fragments, moist.				15-50/4"				9.3		
			- Residual -	8.0			31-21-33						
			Boring Terminated at 8.0 Feet										

Completion Depth: **8.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-14

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-6**
Surface El.: **2612.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3.0 Inches of Stone Base.	0.3			4-4-4						
			Tan brown clayey **SILT**, medium stiff, medium plasticity, little sand, trace rock fragments, moist. - Possible Fill to Residual -	2.0									
			Tan brown silty **SAND**, loose, some rock fragments, moist.				3-4-7	21.1	40.5	38.4	10.0	32	28
5			- Residual -	6.0									
			Reddish brown silty **SAND**, very dense, trace rock fragments, moist.				50/4"						
			- Residual -	8.0									
			Boring Terminated at 8.0 Feet										
10													
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-15

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2601.1** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			1-2-2						
			Tan brown silty **CLAY**, soft, medium plasticity, trace sand and rock fragments, moist. - Fill -	2.0									
5			Tan reddish brown silty **SAND**, medium dense, trace rock fragments, moist.				5-5-13						
			- Tan brown, some sand.				50/5"				6.1		
			- Residual -	8.0									
10			Boring Terminated at 8.0 Feet										
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-16

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2600.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			6.0 Inches of Stone Base.	0.5			4-4-2						
			Brown clayey **SILT**, medium stiff, medium plasticity, little sand, trace rock fragments, moist. - Residual -	2.0									
5			Tan brown silty **SAND**, medium dense, trace rock fragments, moist.				5-7-7						
			- Reddish brown, very dense, some weathered rock fragments. - Residual -	8.0			35-50/5"				6.3		
			Boring Terminated at 8.0 Feet										
10													
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-17

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-5**
Surface El.: **2588.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			8.0 Inches of Asphalt.	0.7			28-20-8						
			2.0 Inches of Stone Base.	0.8									
			Tan brown silty **SAND**, medium dense, trace rock fragments, moist.										
			- Reddish brown, loose.				6-4-5						
5													
							8-12-12						
			- Possible Fill to Residual -	8.0									
			Boring Terminated at 8.0 Feet										
10													
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/30/09**
Date Boring Completed: **10/30/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-18

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-2**
Surface El.: **2589.3** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			4.0 Inches of Topsoil.	0.3			1-1-1						
			Tan brown clayey **SILT**, very soft, medium plasticity, trace sand and rock fragments, moist. - Fill -	2.0									
5			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				9-32-40						
			- Residual -	7.0			50/4"						
			Auger Refusal at 7.0 Feet										
10													
15													
20													
25													

Completion Depth: **7.0 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: B-19

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-2**
Surface El.: **2589.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			6.0 Inches of Topsoil.	0.5			1-1-2						
			Tan brown clayey **SILT**, soft, medium plasticity, trace sand and rock fragments, moist. - Fill -	2.0									
			Reddish brown sandy **GRAVEL**, very dense, trace clay, moist.				2-22-35						
5			- little clay. - Residual -	8.0			20-20-20						
			Boring Terminated at 8.0 Feet										
10													
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

LOG OF BORING NUMBER: B-20

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-2**
Surface El.: **2597.4** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			1.0 Inches of Topsoil.	0.1			1-2-4						
			Brown clayey **SILT**, medium stiff, medium plasticity, little sand, trace rock fragments, moist. - Fill -	2.0									
5			Tan brown silty **GRAVEL**, medium dense, some sand, moist.				8-8-14	34.2	32.0	33.8	10.8	35	30
			- Reddish brown. - Residual -	8.0			15-15-12						
10			Boring Terminated at 8.0 Feet										
15													
20													
25													

Completion Depth: **8.0 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **RHM**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

LOG OF BORING NUMBER: SWM-1

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2579.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3 Inches of Topsoil.	0.3									
			Tan brown silty **SAND**, very dense, moist. - Residual -	1.9									
			Probe Refusal at 1.9 Feet										

Completion Depth: **1.9 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **JRW**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: SWM-2

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2579.5** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3 Inches of Topsoil.	0.3									
			Tan brown silty **SAND**, very dense, moist.										
			- Residual -	2.3									
			Probe Refusal at 2.25 Feet										
5													
10													
15													
20													
25													

Completion Depth: **2.3 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **JRW**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

LOG OF BORING NUMBER: SWM-4

Project Description: **Garrett County - CARC Aquatic and Fitness Center**
Project Location: **Garrett County, Maryland**

triadeng.com

Borehole Location: **See Plate A-4**
Surface El.: **2600.0** Offset: **0**

Split Spoon
No Recovery
Rock Core

Depth, feet	Sample Type	Symbol / USCS	LITHOLOGIC DESCRIPTION	Contact Depth	Rock Coring: Recovery	Rock Coring: RQD	Penetration Blows / 6 inches	Laboratory Testing: Gravel %	Sand %	Silt and Clay %	Water Content %	Liquid Limit	Plastic Limit
			3 Inches of Topsoil.	0.3									
			Tan reddish brown sandy **SILT**, dense, moist.										
			- Residual -	3.6									
			Probe Refusal at 3.6 Feet										

5
10
15
20
25

Completion Depth: **3.7 feet**
Date Boring Started: **10/29/09**
Date Boring Completed: **10/29/09**
Engineer/Geologist: **JRW**
Project Number: **03-09-0276**

Remarks: **Boring dry during and at completion of the drilling operation.**

TRIAD Engineering, Inc.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

BORING 0276 GARRETT COLLEGE EXPASION.GPJ 1/7/10

Appendix C

LABORATORY TESTING

LABORATORY TESTING

The soil samples obtained from the test boring operations were visually classified in the field by a geotechnical engineer from TRIAD. The recovered soils were further evaluated by laboratory testing. Laboratory soil tests were conducted in accordance with applicable ASTM Standards as listed below:

1) Moisture content tests were performed in accordance with ASTM D 2216.

2) Atterberg Limits tests, consisting of the liquid limit, plastic limit, and plasticity index, were performed in accordance with ASTM D 4318.

3) Sieve analyses with washed No. 200 sieve tests were performed in accordance with ASTM D 422.

A summary and details of the laboratory tests are included on the following pages of this appendix.

SOIL DATA SUMMARY SHEET

Sample No.	Elev./Depth (ft)	Source of Sample	Natural Water Content (%)	Atterberg Limits			Particle Size Distribution			USCS	Additional Testing Performed
				PL (%)	LL (%)	PI (%)	% GRAVEL	% SAND	% FINES		
B-1	2.5'-6.5'	SS	8.6	26.6	31.5	4.9	33.6	39.2	27.2	SM	
B-2	2.5'-4.0'	SS	9.5								
B-2	10.0'-11.5'	SS	5.1								
B-3	5.0'-6.5'	SS	5.3								
B-3	7.5'-9.0'	SS	3.8								
B-4	2.5'-4.0'	SS	8.2								
B-5	2.5'-4.0'	SS	8.8								
B-5	5.0'-6.5'	SS	3.2								
B-6	7.5'-9.0'	SS	3.0								
B-7	2.5'-4.0'	SS	10.7								
B-7	10.0'-11.5'	SS	10.3								
B-8	2.5'-4.0'	SS	4.8								
B-9	10.0'-11.5'	SS	11.9								
B-10	2.5'-4.0'	SS	4.5								
B-11	2.5'-6.5'	SS	6.5	26.2	36.5	10.3	50.3	20.4	29.3	GM	
B-13	3.0'-4.5'	SS	9.3								
B-14	3.0'-8.0'	SS	10.0	28.2	31.5	3.3	21.1	40.5	38.4	SM	
B-15	6.5'-8.0'	SS	6.1								
B-16	6.5'-8.0'	SS	6.3								
B-20	3.0'-8.0'	SS	10.8	30.0	34.6	4.6	34.2	32.0	33.8	GM	

TRIAD ENGINEERING, INC.

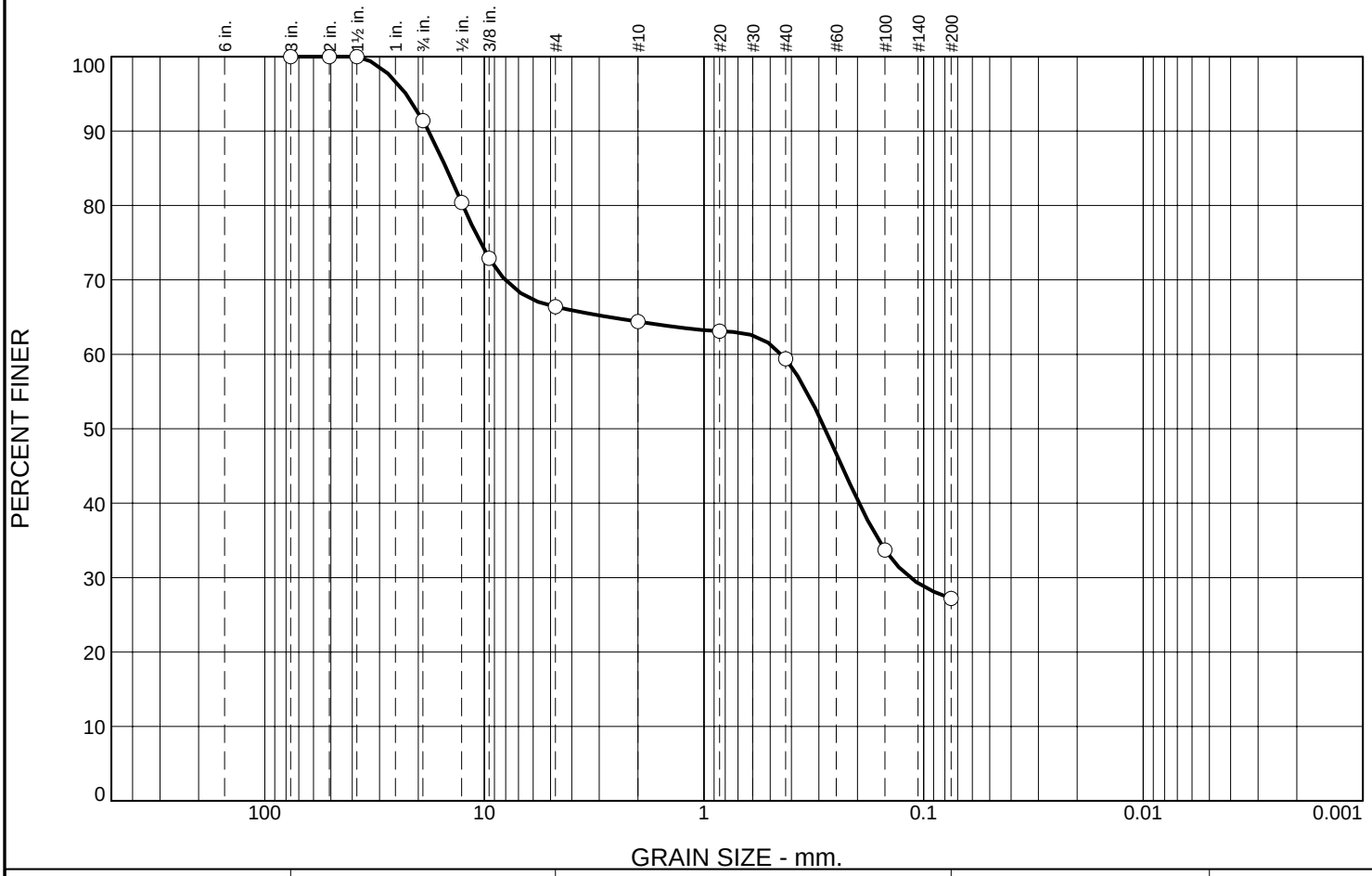
Client:	Specs, Inc.
Project	Garrett College Expansion
Location:	Mchenry, Maryland
Project No:	03-09-0276

Notes:
1) Soil test performed in accordance with ASTM testing standards.
2) SS = Split Spoon Sample
3) ST = Shelby Tube Sample

Date: 11/19/2009

Plate No. C-1

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	33.6	39.2	27.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
3/4	91.4		
.5	80.4		
3/8	72.9		
#4	66.4		
#10	64.4		
#20	63.1		
#40	59.4		
#100	33.7		
#200	27.2		

* (no specification provided)

Soil Description

Tan brown silty SAND, some gravel.

Atterberg Limits

PL= 27 LL= 31 PI= 4

Coefficients

D_{85}= 14.9057 D_{60}= 0.4427 D_{50}= 0.2815
D_{30}= 0.1153 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

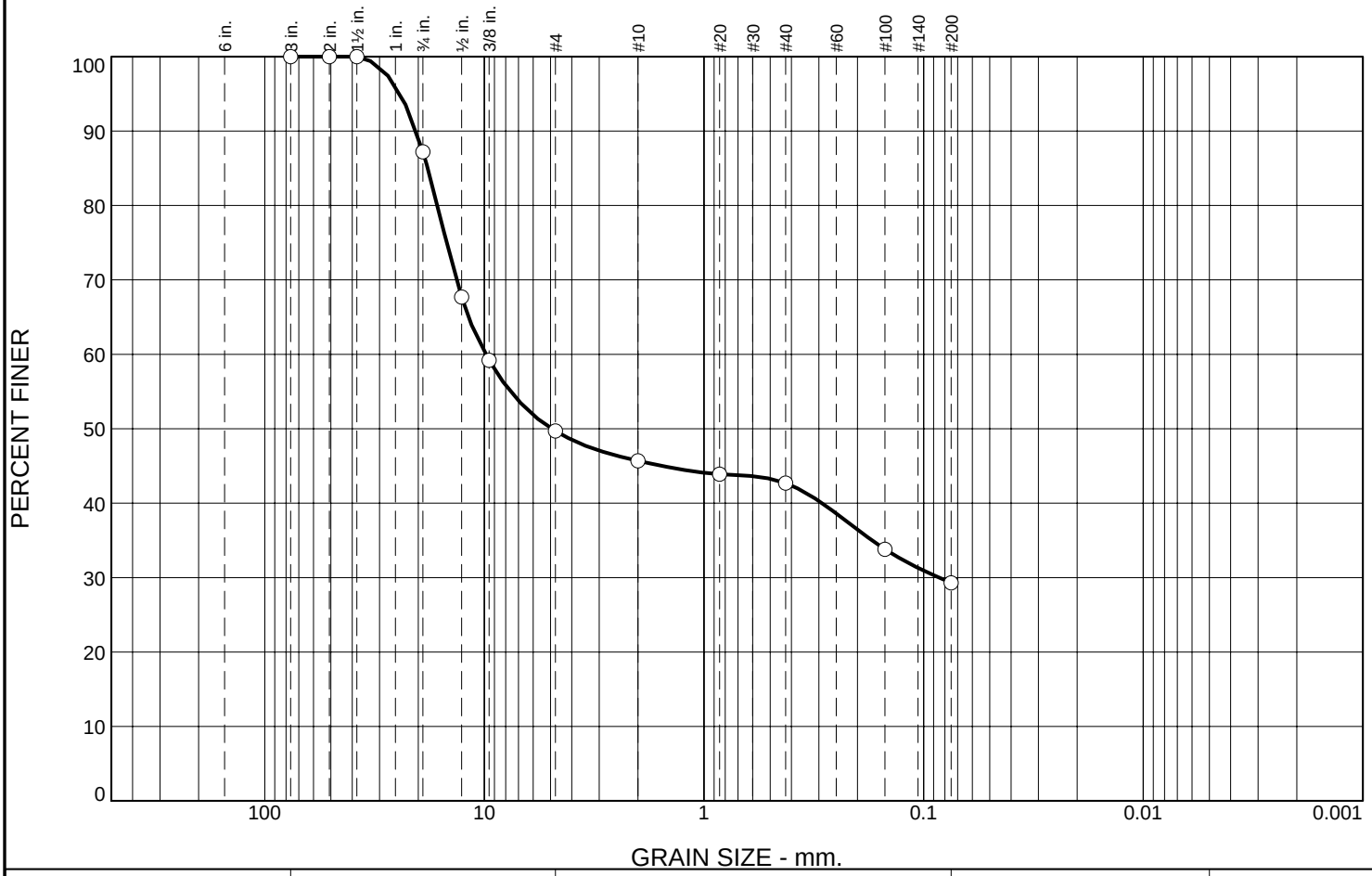
Sample No.: B-1 **Source of Sample:** Jar **Date:** 11/16/09
Location: See Plate No. A-3 **Elev./Depth:** 2.5'-6.5'

Triad Engineering, Inc.

Hagerstown, MD

Client: Specs, Inc.
Project: Garrett County-CARC Aquatic and Fitness Center
Mchenry, Maryland
Project No: 03-09-0276 **Figure** C-2

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	50.3	20.4	29.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
3/4	87.2		
.5	67.7		
3/8	59.2		
#4	49.7		
#10	45.7		
#20	43.9		
#40	42.7		
#100	33.8		
#200	29.3		

* (no specification provided)

Soil Description

Tan brown silty GRAVEL, some sand.

Atterberg Limits

PL= 26.2 LL= 36.5 PI= 10.3

Coefficients

D_{85}= 18.1329 D_{60}= 9.8710 D_{50}= 4.9326
D_{30}= 0.0850 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO= A-2-4(0)

Remarks

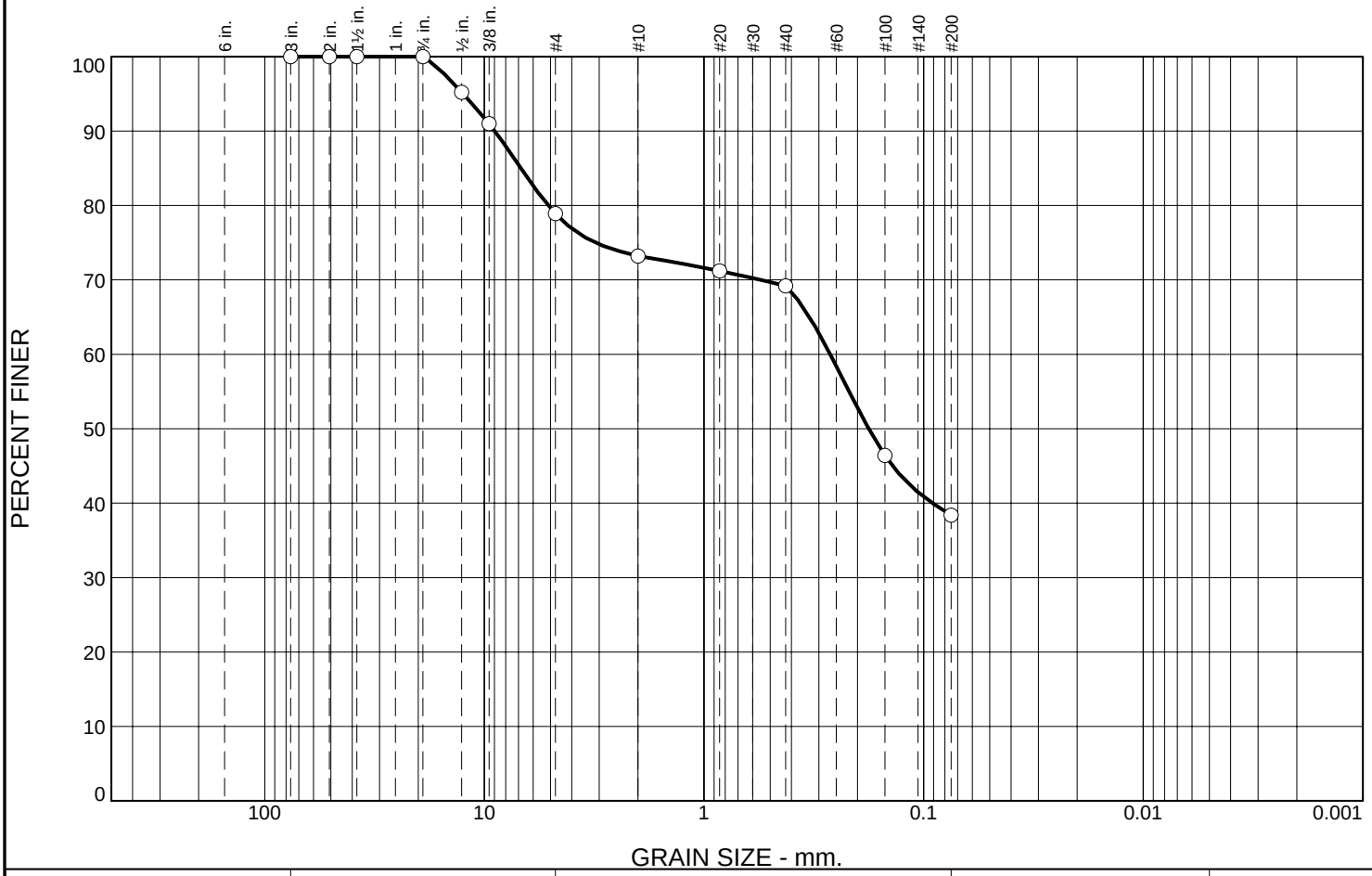
Sample No.: B-11 **Source of Sample:** Jar **Date:** 11/16/09
Location: See Plate No. A-4 **Elev./Depth:** 2.5'-6.5'

Triad Engineering, Inc.

Hagerstown, MD

Client: Specs, Inc.
Project: Garrett County-CARC Aquatic and Fitness Center
Mchenry, Maryland
Project No: 03-09-0276 **Figure** C-3

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	21.1	40.5	38.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
3/4	100.0		
.5	95.2		
3/8	91.0		
#4	78.9		
#10	73.2		
#20	71.2		
#40	69.2		
#100	46.4		
#200	38.4		

* (no specification provided)

Soil Description

Tan brown silty SAND, some gravel.

Atterberg Limits

PL= 28.2 LL= 31.5 PI= 3.3

Coefficients

D_{85}= 6.8246 D_{60}= 0.2663 D_{50}= 0.1780
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

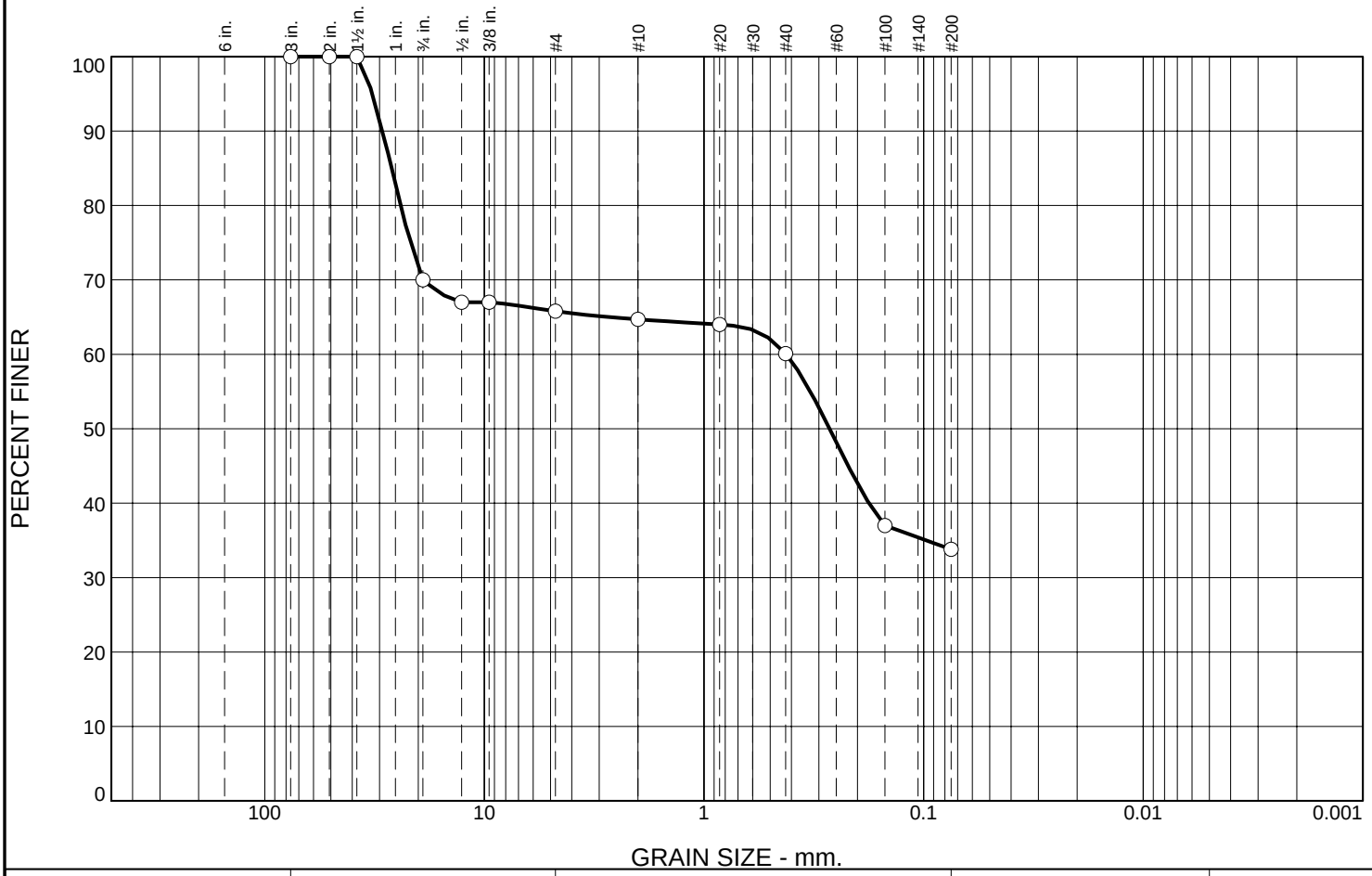
Sample No.: B-14 **Source of Sample:** Jar **Date:** 11/16/09
Location: See Plate No. A-6 **Elev./Depth:** 3.0'-8.0'

Triad Engineering, Inc.

Hagerstown, MD

Client: Specs, Inc.
Project: Garrett County-CARC Aquatic and Fitness Center
Mchenry, Maryland
Project No: 03-09-0276 **Figure** C-4

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	34.2	32.0	33.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
3/4	70.0		
.5	67.0		
3/8	67.0		
#4	65.8		
#10	64.7		
#20	64.0		
#40	60.1		
#100	37.0		
#200	33.8		

* (no specification provided)

Soil Description

Tan brown silty GRAVEL, some sand.

Atterberg Limits

PL= 30 LL= 35 PI= 5

Coefficients

D_{85}= 26.4444 D_{60}= 0.4222 D_{50}= 0.2680
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO= A-2-4(0)

Remarks

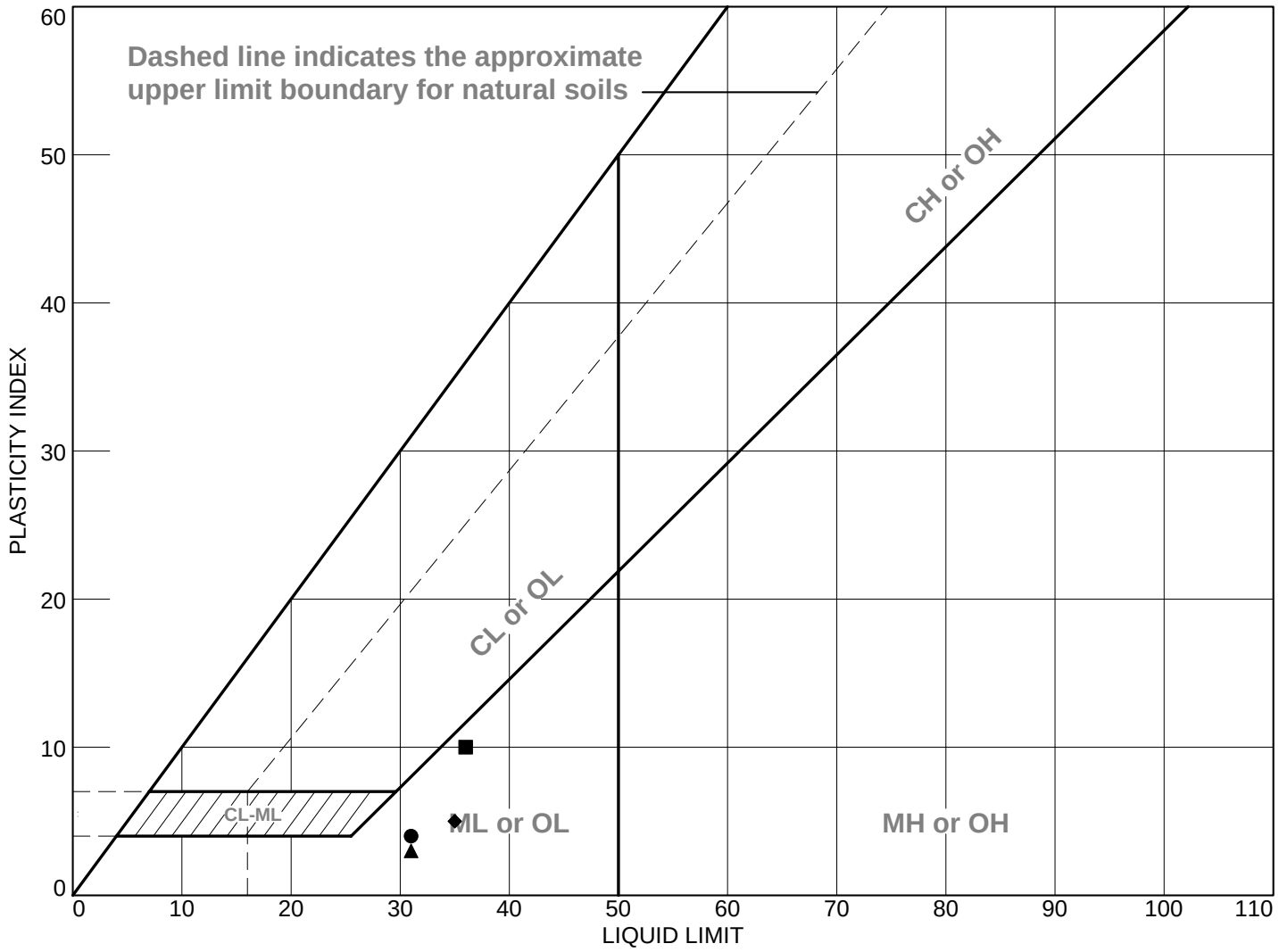
Sample No.: B-20 **Source of Sample:** Jar **Date:** 11/16/09
Location: See Plate No. A-2 **Elev./Depth:** 3.0'-8.0'

Triad Engineering, Inc.

Hagerstown, MD

Client: Specs, Inc.
Project: Garrett County-CARC Aquatic and Fitness Center
Mchenry, Maryland
Project No: 03-09-0276 **Figure** C-5

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Jar	B-1	2.5'-6.5'	8.6	27	31	4	SM
■	Jar	B-11	2.5'-6.5'	6.5	26	36	10	GM
▲	Jar	B-14	3.0'-8.0'	10.0	28	31	3	SM
◆	Jar	B-20	3.0'-8.0'	10.8	30	35	5	GM

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Project No.: 03-09-0276 **Figure** C-6

Tested By: DLS