

January 7, 2013

Mr. Tom Dieterle
Westlake Reed Leskosky
925 Euclid Avenue
Suite 1900
Cleveland, Ohio 44115

**Geotechnical Engineering Services Report
Proposed Community Living Center
VA Medical Center
135 East 38th Street
Erie, Pennsylvania
PSI Project No. 0139986**

Dear Mr. Dieterle:

Professional Service Industries, Inc. (PSI) is pleased to submit this Geotechnical Engineering Services Report for the above referenced project. Included in this presentation are the results of the exploration and recommendations concerning the design and construction of the foundations, as well as general site development.

PSI appreciates the opportunity to have provided you with our geotechnical engineering services and looks forward to participation in the construction phase of this project. If you have any questions concerning this report or if we may be of further service in any manner, please contact our office.

Respectfully submitted,
Professional Service Industries, Inc.



Randy Daub, P.E.
Project Engineer



A. Veeramani
District Manager

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PROJECT INFORMATION

Project Authorization

Professional Service Industries, Inc. (PSI) has completed a geotechnical exploration for the proposed community living center to be located within the existing VA Medical Center facility at 135 East 38th Street, in Erie, Pennsylvania. PSI's services were authorized by Mr. Tom Dieterle, RA of Westlake Reed Leskosky on December 4, 2012. This exploration was accomplished in general accordance with PSI Proposal No. 139-83897, dated December 3, 2012.

Project Description

The project is to consist of the construction of a new community living center complex within the existing Erie VA Medical Center facility. Specifically, only Phase 1 of the project is being considered at the time of this report. Phase 1 includes Building A and B, which would be utilized for residential housing, as well as some office space, dining, and laundry facilities. The proposed single-story structures will measure approximately 11,000 square feet in plan area each. No structural load and/or site grading information was provided at the time of this report. Therefore, for the purposes of this report, it is assumed that maximum column, wall and floor loads will be no more than about 100 kips, 5 kips per lineal foot, and 100 pounds per square foot, respectively, for this submittal. It is also anticipated that maximum cut and/or fill operations of less than 3 feet will be required for the proposed development.

The geotechnical recommendations presented in this report are based on the available project information, structure location, and the subsurface conditions described in this report. If PSI's estimations or understandings of the project are considered incorrect or if conditions during construction are significantly different from those described in this report, please inform PSI immediately in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site in order to develop recommendations for the development of the site for a proposed community living center project in Erie, Pennsylvania. PSI's scope of services included drilling a total of five (5) soil borings at the site to depths of about 20 feet below the existing surface grades, select laboratory testing, and preparation of this geotechnical report. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents geotechnical recommendations regarding the following:

- Review of regional geology;
- Geotechnical recommendations for the type of foundations that would be feasible for the proposed project;
- Allowable soil/rock bearing pressure;
- Recommendations for earthwork including subgrade preparation, excavations, fill and backfill;
- Geotechnical seismic design criteria and soil classification based on IBC;
- Construction considerations, including temporary excavation and construction control of water; and
- Floor slab-on-grade geotechnical recommendations including a modulus of subgrade reaction (k).

The scope of services of this report did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

Under the terms of PSI's proposal 139-83897 dated December 3, 2012, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. As stated in the above referenced proposal, mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Site conditions are outside of PSI's control, and mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site for the proposed community living center complex is located within the existing VA Medical Center facility at 135 East 38th Street, in Erie, Pennsylvania. Specifically, the site areas for the proposed structure are located immediately west of the existing medical center building structure. Currently, the proposed building site is an open area covered with landscaped grass/shrubs/trees, as well as paved parking lot/driveway areas and an existing one-story building structure. No topographical information is available at the time of this report. However, our visual observation indicates that the site areas for the proposed building development areas are fairly flat, with less than 5 feet of elevation difference. The general site location is shown on Figure 1, Site Vicinity Map, in the Appendix of this report.

Site Geology

Based on the glacial and physiographic geologic maps for Pennsylvania, the unconsolidated deposits of loam sheets consist of ground moraine of the Lavery Till from the Wisconsinan Age over Mississippian-age shales, siltstones, sandstones, coal, and limestones of the Pottsville and Allegheny Formation.

TESTING PROCEDURES

Field Operations

Five (5) soil test borings were performed at the site at the approximate locations shown on the Boring Location Plan presented in the Appendix. The boring locations were selected by and field located by PSI by measuring distances from known site reference points.

The borings were advanced into the ground using hollow stem augers. Soil samples were obtained with a split spoon sampler at regular intervals throughout the boring depths. The split spoon sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot, where possible, with blows of a 140 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler each six-inch increment is recorded in the field. The penetration resistance "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to

cohesion for clays and relative density for sands. Elevated “N” values may be attributed to large rock or gravel encountered during drilling and sampling operations. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D-1586.

Laboratory Testing

The soil samples obtained during the field exploration were transported to the laboratory and visually examined. The soil samples obtained from the drilling operation were classified in general accordance with ASTM D-2488 (Visual-Manual Procedure for Description of Soils). Soil classifications include the use of the Unified Soil Classification System described in ASTM D-2487 (Classification of Soils for Engineering Purposes). Water content determinations (ASTM D-2211), grain size analysis tests (ASTM D-422), and Atterberg Limits’ Determination tests (ASTM D-2487) were also conducted. Descriptions of the soils encountered in the test borings are provided on the Boring Logs included in the Appendix. Groundwater conditions, standard penetration resistances, and other pertinent information are also included. The soil samples will be retained at our office for 60 days from the date of this report and then discarded.

Subsurface Conditions

Topsoil was encountered at test boring locations B-1 thru B-5 having a thickness of approximately 6 to 8 inches. Topsoil thickness should be expected to vary across the site. Underlying the topsoil at all test boring locations, natural soils consisting of sandy silty clay with traces of rock fragments and/or silty, clayey sand with gravel were encountered to the terminal depths of about 20 feet below the existing surface grades.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring log included in the appendix should be reviewed for specific information at the boring location. The record includes soil descriptions, stratifications, penetration resistances, location of samples, and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Groundwater information obtained during field operations is also shown on these boring logs. The samples which were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Information

The following table illustrates the groundwater levels encountered at the test boring locations during the field drilling operations:

BORING Number	Water Level During Drilling	Water Level After Completion
	Depth (Feet)	Depth (Feet)
B-1	19	18.5
B-2	16	None
B-3	10.8	None
B-4	14	14.8
B-5	18.5	15.8

However, it must be recognized that the groundwater levels fluctuate seasonally as a function of rainfall. Therefore, at a time of year different from the time of drilling, there may be a considerable change in the water table or the occurrence of water where not previously encountered. PSI recommends that the

contractor determine the actual groundwater levels at the time of construction to determine groundwater impact.

EVALUATION AND RECOMMENDATIONS

SITEWORK RECOMMENDATIONS

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI cannot accept responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundation system if not engaged to also provide construction observation and testing for this project.

Site Preparation

Prior to placing structural fill on the proposed areas of development, any existing topsoil, grass, asphalt concrete, and any existing soft/loose material should be completely removed and replaced with materials approved by PSI. Topsoil should not be used to construct embankment fills. Under no circumstances should topsoil or other organic-laden soil be placed as fill beneath the proposed structures. Tree roots and stumps should be properly grubbed and the resulting depressions backfilled in lifts in accordance with the Structural Fill section of this report.

Prior to the beginning of fill placement activities, PSI recommends that all areas receiving new fill, and all areas at grade to receive pavements and floor slabs be compacted in the upper 12 inches of exposed subgrade to a minimum 98 percent of the maximum density obtainable in accordance with ASTM D-698 (standard) within ± 2 percent of optimum moisture content, and proofrolled. Proofrolling should be performed using a loaded dump truck, or similar rubber-tired equipment weighing at least 20 tons. Proofrolling operations should be observed by a representative of PSI and should continue until a firm and unyielding condition exists. Unstable soils which are revealed by proofrolling and which cannot be adequately densified in place, should be removed and replaced under the recommendations of the PSI representative. Areas to be cut to achieve subgrade elevation should be excavated prior to performing the proofrolling and compaction operation.

Structural Fill

Materials selected for use as structural fill should not contain waste construction debris, or other deleterious materials, or more than 3 percent by weight of organic matter as determined by loss-on-ignition test. Fill materials should generally have a standard Proctor maximum dry density greater than 105 pounds per cubic foot (pcf), an Atterberg Liquid Limit less than 40, a Plasticity Index of less than 15, and a maximum particle size of 4 inches or less. Structural fill should consist of non-expansive materials. Pyritic and/or potentially expansive materials, such as mine tailings, shales and slag should not be used as structural fill.

Based on the results of soil classifications, the existing natural soils at the project site generally appear to be suitable for reuse as structural fill material.

Fill material in "mass" fill areas should be placed and compacted in individual lifts of 8 inches or less loose measurement using a sheepsfoot or vibratory sheepsfoot roller. Within small excavations such as in utility trenches, foundation backfill, around manholes, or behind retaining walls, PSI recommends the use of

smaller, hand or remote-guided equipment. Loose lift thicknesses of 4 inches or less are recommended when using such equipment. Backfill compacted with hand or remote-guided equipment, where placed below floor slab and pavement areas, should consist of PennDOT #2A to facilitate proper compaction and reduce the risk of localized post-construction settlement.

Drainage and Groundwater Considerations

Water should not be allowed to collect near the foundation or over the floor slab areas of the building structure either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface runoff. Positive site drainage should be provided at all times during construction to reduce infiltration of surface water around the perimeter of the structure and beneath the floor slab. Overall site area drainage is to be arranged in a manner such that the possibility of water impounding below slab-on-grade areas and over the structural fill is prevented.

Floor Slab-On-Grade Subgrade Preparation

Based on the relatively silty and clayey nature of the on-site soils encountered during this investigation, the near surface soils present at this site may be sensitive to softening due to rainfall and traffic. When damp or wet, it is our experience that these soils tend to rut severely under rubber-tired vehicle traffic. Additionally, the operation of heavy rubber tired equipment on these soils will often shear the surficial soils even at optimum moisture. Rigorous maintenance of entrance roads and other areas subjected to construction traffic, such as floor slab areas, is typically required until construction is completed and may need to be periodically replenished. In some instances it is advantageous to place a working course of compacted graded aggregate base over building areas between the time of initial grading and final floor slab construction. The graded aggregate base should be end dumped outside of building areas and spread out with lightweight equipment that will not adversely affect the subgrade soils. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

PSI recommends that the floor slab subgrade be evaluated by a representative of the Geotechnical Engineer immediately prior to placing stone and beginning construction. If low consistency soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted fill material placed in accordance with the *Structural Fill* section of this report or with well-compacted crushed stone materials.

Seismic Design Considerations

The project site is located within a municipality that employs the International Building Code, 2006 edition. As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soils that underlie the site. As part of the procedure to evaluate seismic forces, the code requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface. To define the Site Class for this project, we have interpreted the results of soil test borings drilled with the project site and estimated appropriate soil properties below the base of the borings to a depth of 100 feet, as permitted by Section 1615.1.1 of the code. The estimated soil properties were based upon data available in published geologic reports as well as our experience with subsurface conditions in the general site area. Based upon our evaluation, it is our opinion that the subsurface conditions within the site are consistent with the

characteristics of Site Class D as defined in Table 1615.1.1 of the building code.

Federal Excavation Safety Regulations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better provide for the safety of workers entering trenches or excavations. This federal regulation mandates that excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties compliance with local, state, and federal safety or other regulations.

FOUNDATION AND FLOOR SLAB RECOMMENDATIONS

Foundation Design

The results of the test borings and PSI's evaluation indicate that the proposed building structures may be supported on conventional spread or continuous wall footing foundations bearing on natural soils and/or compacted structural fill.

Spread footings for building columns and continuous footings for bearing walls should be designed for a maximum allowable soil bearing pressure of 2,500 psf, based on dead load plus design live load. Minimum foundation widths for column and strip footings should be 24 inches and 18 inches, respectively, even if the bearing pressure is less than the recommended values. Perimeter footings are to be placed at a minimum depth of 42 inches below the finished grade in order to protect against frost action. Interior foundations not subject to frost action or in heated areas may be placed at a minimum depth of 18 inches below the floor slab. The recommended soil bearing pressure includes a factor of safety of at least 3.0 against shear failure. PSI estimates maximum total and differential settlements of less than 1-inch and 1/2 -inch, respectively.

The bottom of the footing excavations should be critically observed and the surface compacted with either a vibratory or an impact compactor, i.e. jumping jack weighing at least 200 pounds and imparting a minimum of four (4) kips of force to the subgrade. Foundation bearing surface evaluations should be performed in the shallow foundation excavations to identify isolated poor quality soils and to enable the development of remedial measures, if needed. Foundation bearing surface evaluations should be performed in each excavation prior to placement of reinforcing steel by a representative of PSI. Soft or loose soil zones encountered at the foundation subgrades should be remediated as directed by the Geotechnical Engineer.

The foundation walls may not be free standing in the overburden soils; therefore the sides of the cut excavation for the footings may need to be sloped and the footings formed and backfilled in order to maintain a vertical concrete face. Footing soils need to be observed and documented and concrete placed as quickly as possible to avoid exposure of the bottom of footing soils to disturbance due to construction traffic, drying or water accumulation. If concrete will not be placed the same day a foundation excavation is cut to grade, the contractor should be required to place three (3) to five (5) inches of compacted crushed aggregate within the footing excavation. The foundation excavations should be observed by a representative of PSI prior to steel or concrete placement to document that the foundation materials are consistent with the report.

After opening, footings should be evaluated and concrete placed immediately to avoid exposure of the footing bottoms to wetting and drying. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of soil moisture.

Floor Slab Design

The proposed slab-on-grade structure may be supported on compacted engineered fill placed over a natural soil subgrade and/or structural fill, provided the upper soils have been proof-rolled with fully loaded tandem-axle dump truck making a minimum of 4 passes in order to confirm their suitability. Any observed soft/loose or otherwise unsuitable areas should be over-excavated down to firm subgrade and replaced with compacted engineered fill.

For the subgrade prepared as recommended and properly compacted fill, a modulus of subgrade reaction, k value, of 100 pounds per cubic inch (pci) may be used in the grade slab design based on a one (1) foot by one (1) foot plate load test. However, depending on how the slab load is applied, the value will have to be geometrically modified. The value should be adjusted for larger areas using the following expression for cohesive and cohesionless soil:

$$\text{Modulus of Subgrade Reaction, } k_s = \frac{k}{B} \quad \text{for cohesive soil and}$$

$$k_s = k \left(\frac{B+1}{2B} \right)^2 \quad \text{for cohesionless soil and}$$

where: k_s = coefficient of vertical subgrade reaction for loaded area,
 k = coefficient of vertical subgrade reaction for 1 x 1 square foot area,
 B = width of area loaded, in feet.

In order to provide uniform subgrade reaction beneath any proposed floor slab-on-grade and provide separation between moderate potentially expansive soil, we recommend that floor slabs be underlain by a minimum of 6 inches of free-draining (a maximum particle size of ¾-inch with less than 5 percent material passing the no. 200 sieve), well-graded gravel or crushed rock base course. Base course material should be moisture conditioned to within +/- 2 percent of optimum moisture content and compacted by mechanical means to a minimum of 98 percent of the material's maximum dry density as determined in accordance with ASTM D-698 (Standard Proctor).

The crushed stone should provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired, a vapor retarding membrane may also be incorporated

into the design. Factors such as cost, special considerations for construction, and the floor coverings suggest that the architect and owner make decisions on the use of vapor retarding membranes.

PSI recommends that a vapor retarder be used only when required by the intended use and that installation be in accordance with ACI 302.1R Figure 3.1.

The precautions listed below should be followed for construction of slabs-on-grade pads. These details will not reduce the amount of movement, but are intended to reduce potential damage should some settlement of the supporting subgrade take place. Some increase in moisture content is inevitable as a result of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

Cracking of slabs-on-grade is normal and should be expected. Cracking can occur not only as a result of heaving or compression of the supporting soil and/or bedrock material, but also as a result of concrete curing stresses. The occurrence of concrete shrinkage cracks, and problems associated with concrete curing may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly, where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a joint spacing be provided for unreinforced floor slabs in accordance with Figure 5 of ACI 360R-06. PSI also recommends that the slab be independent of the foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking.

Areas supporting slabs should be properly moisture conditioned and compacted. Backfill in all interior and exterior water and sewer line trenches should be carefully compacted.

Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

REPORT LIMITATIONS

The recommendations submitted, in this report, are based on the available subsurface information obtained by PSI and design details furnished by Westlake Reed Leskosky for the proposed project. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions presented in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of the Westlake Reed Leskosky for the specific application to the proposed community living center complex to be located within the existing VA Medical Center facility at 135 East 38th Street, in Erie, Pennsylvania.

APPENDIX

General Site Vicinity Plan

Boring Location Plan

General Notes

Boring Logs (B-1 through B-5)

Grain Size Analysis (3)

Atterberg Limits' Determination (3)

U.S.C.S. Soil Classification

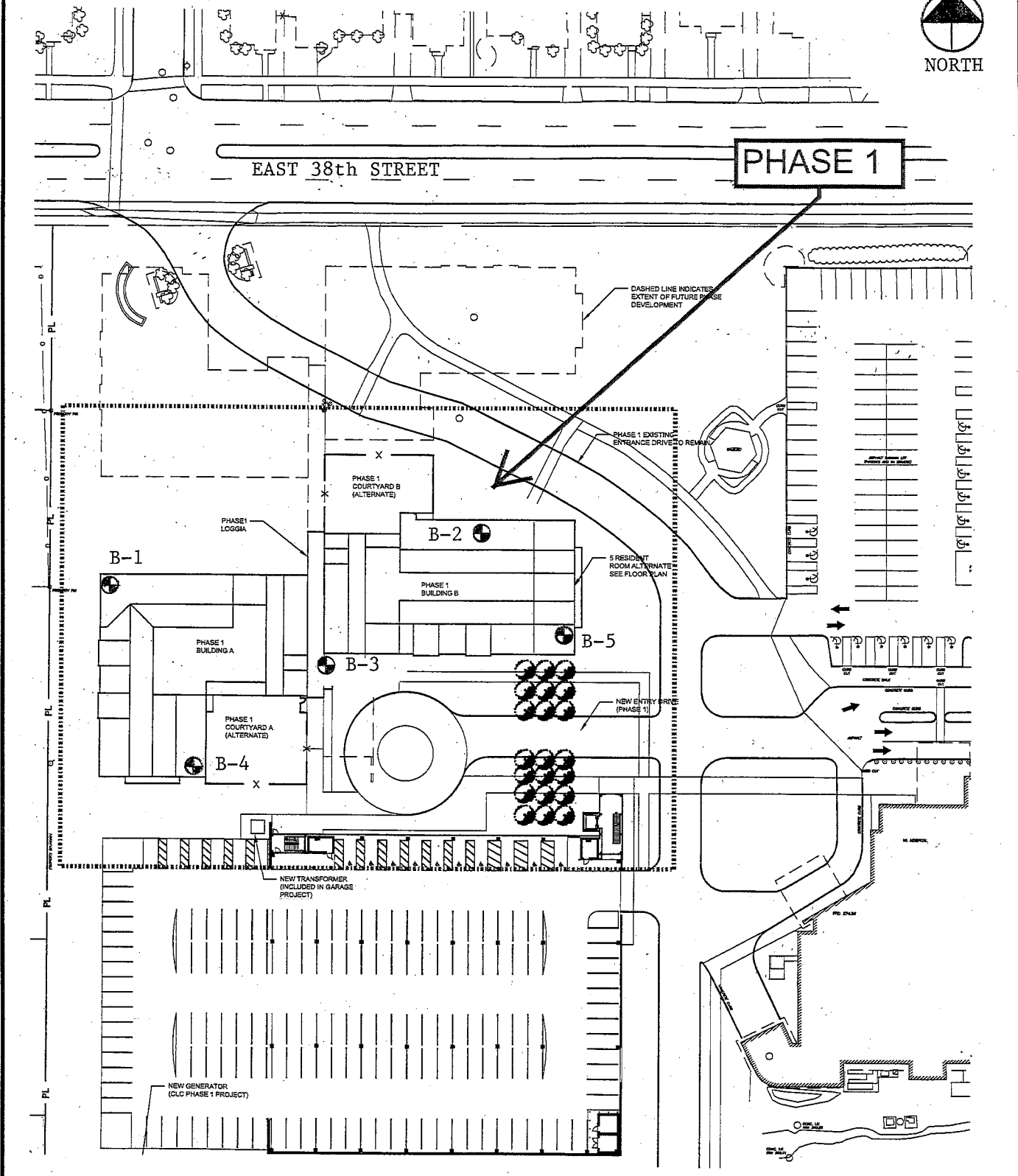


Project Name:
Proposed Community Living Center
VA Medical Center
135 East 38th Street
Erie, Pennsylvania

NOT TO SCALE
Base map obtained from MapQuest.com

Project No.:
0139986

Date:
January 7, 2013



PROJECT NAME

BORING LOCATION PLAN

Proposed Community Living Center
 Erie VA Medical Center
 135 East 38th Street
 Erie, Pennsylvania

PROJECT NO.

0139986

DATE


January 7, 2013

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon
Q_u :	Unconfined compressive strength, tons per square foot (TSF)
Q_p :	Penetrometer value, unconfined compressive strength (TSF)
M_c :	Water content, %
LL:	Liquid Limit, %
PI:	Plasticity Index, %
δ_d :	Natural dry density, pounds per cubic foot (PCF)
	Apparent groundwater level at time noted after completion

DRILLING AND SAMPLING SYMBOLS

SS:	Split-spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST:	Shelby Tube - 3" O.D., except where noted.
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit.
WS:	Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>TERM (NON-COHESIVE SOILS)</u>	<u>STANDARD PENETRATION RESISTANCE</u>
Very Loose	0 - 2
Loose	2 - 4
Slightly Compact	4 - 8
Medium Dense	8 - 16
Dense	16 - 26
Very Dense	Over 26
<u>TERM (COHESIVE)</u>	<u>Q_u - (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00 +

PARTICLE SIZE

Boulders:	8 in. +	Coarse Sand:	5 mm - 0.6 mm	Silt:	0.074 mm - 0.005 mm
Cobbles:	8 in. - 3 in.	Medium Sand:	0.6 mm - 0.2 mm	Clay:	< 0.005 mm
Gravel:	3 in - 5 mm	Fine Sand:	0.2 mm - 0.074 mm		



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LOG OF BORING B-1

Sheet 1 of 1

PSI Job No.: 0139986	Drilling Method: Hollow Stem Auger	WATER LEVELS
Project: Proposed Community Living Center	Sampling Method: 2-in SS	▽ While Drilling 19 feet
Location: VA Medical Center	Hammer Type: Automatic	▼ Upon Completion 18.5 feet
Erie, Pennsylvania	Boring Location: Proposed Building Structure	▼ Delay N/A

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
											<div>Moisture: X</div> <div>PL: □</div> <div>LL: +</div> <div>Qu: ▲</div> <div>Qp: *</div>	
0	0						6" Topsoil	TOPSOIL				
				1	18		Stiff to Hard, moist, brown/gray, Sandy Silty Clay, trace rock fragments (CL-ML)		6-6-7 N=13	13		
				2	18				6-6-10 N=16	7		
	5			3	14			CL-ML	7-23-13 N=36	8		>>*
				4	10		Large Cobbles (8'-9')		22-17-9 N=26	8		*
	10											
				5	2		Medium Dense, moist, gray, Silty, Clayey Sand with Gravel (SC-SM)		4-5-16 N=21	12		
	15							SC-SM				
				6	12				8-9-9 N=18	10		
	20						End of Boring @ 20'					
							Water Encountered @ 19'					
							Water at Completion @ 18.5'					

Completion Depth: 20.0 ft	Sample Types:	Shelby Tube	Latitude:
Date Boring Started: 12/17/12	Auger Cutting	Hand Auger	Longitude:
Date Boring Completed: 12/17/12	Split-Spoon	Calif. Sampler	Drill Rig: CME 55 Rig
Logged By: Randy Daub, PE	Rock Core	Texas Cone	Remarks:
Drilling Contractor: PSI, Inc.			

The stratification lines represent approximate boundaries. The transition may be gradual.



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LOG OF BORING B-2

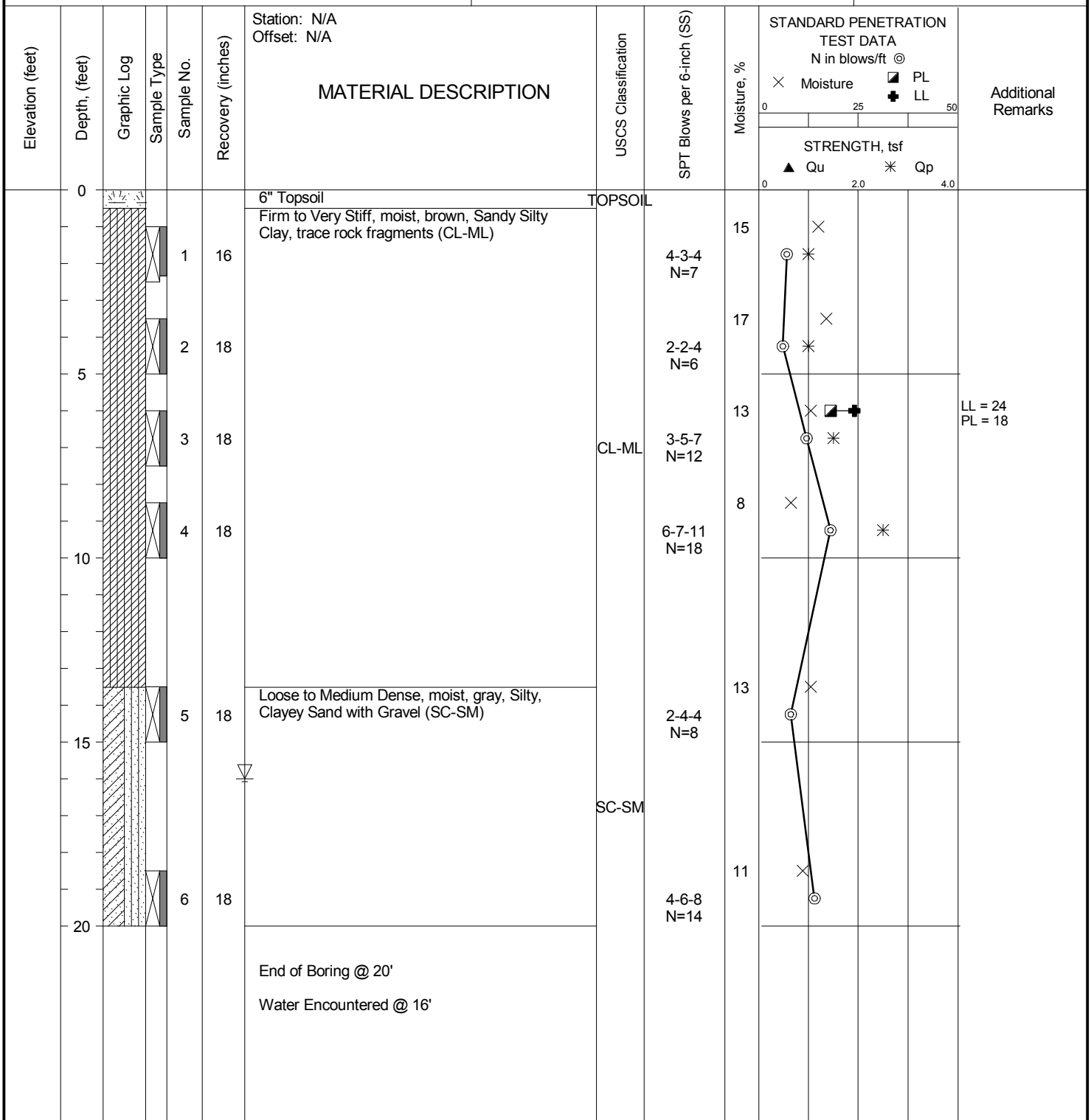
Sheet 1 of 1

PSI Job No.: 0139986
Project: Proposed Community Living Center
Location: VA Medical Center
Erie, Pennsylvania

Drilling Method: Hollow Stem Auger
Sampling Method: 2-in SS
Hammer Type: Automatic
Boring Location: Proposed Building Structure

WATER LEVELS

▽ While Drilling 16 feet
▼ Upon Completion feet
▼ Delay N/A



Completion Depth: 20.0 ft
Date Boring Started: 12/17/12
Date Boring Completed: 12/17/12
Logged By: Randy Daub, PE
Drilling Contractor: PSI, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Shelby Tube
Hand Auger
Calif. Sampler
Texas Cone

Latitude:
Longitude:
Drill Rig: CME 55 Rig
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.



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LOG OF BORING B-3

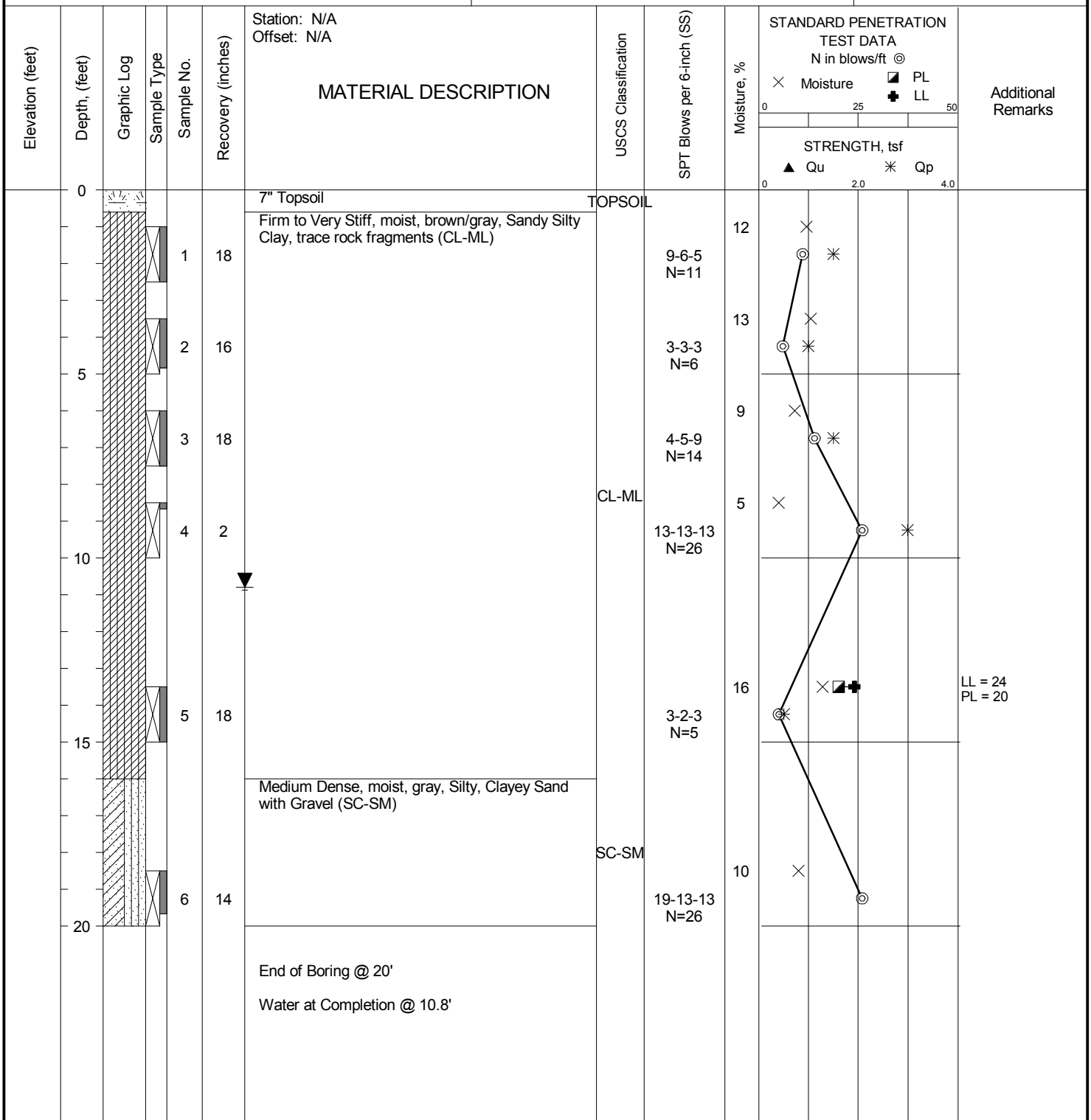
Sheet 1 of 1

PSI Job No.: 0139986
Project: Proposed Community Living Center
Location: VA Medical Center
Erie, Pennsylvania

Drilling Method: Hollow Stem Auger
Sampling Method: 2-in SS
Hammer Type: Automatic
Boring Location: Proposed Building Structure

WATER LEVELS

▽ While Drilling feet
▼ Upon Completion 10.8 feet
▽ Delay N/A



Completion Depth: 20.0 ft
Date Boring Started: 12/17/12
Date Boring Completed: 12/17/12
Logged By: Randy Daub, PE
Drilling Contractor: PSI, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Shelby Tube
Hand Auger
Calif. Sampler
Texas Cone

Latitude:
Longitude:
Drill Rig: CME 55 Rig
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.



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LOG OF BORING B-4

Sheet 1 of 1

PSI Job No.: 0139986	Drilling Method: Hollow Stem Auger	WATER LEVELS
Project: Proposed Community Living Center	Sampling Method: 2-in SS	▽ While Drilling 14 feet
Location: VA Medical Center	Hammer Type: Automatic	▼ Upon Completion 14.8 feet
Erie, Pennsylvania	Boring Location: Proposed Building Structure	▽ Delay N/A

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ▣ PL + LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0	0						6" Topsoil	TOPSOIL					
				1	18		Firm to Stiff, moist, brown/gray, Sandy Silty Clay, trace rock fragments (CL-ML)		6-4-4 N=8	11	◎	*	
				2	18				2-3-3 N=6	13	◎	*	
	5			3	18			CL-ML	2-4-5 N=9	11	◎	*	
				4	18				11-8-5 N=13	11	◎	*	
	10												
				5	10		Loose, moist, gray, Silty, Clayey Sand with Gravel (SC-SM)		2-2-3 N=5	11	◎	*	
	15							SC-SM					
				6	16				2-2-4 N=6	14	◎	▣	LL = 16 PL = 15
	20						End of Boring @ 20'						
							Water Encountered @ 14'						
							Water at Completion @ 14.8'						

Completion Depth: 20.0 ft	Sample Types:	Shelby Tube	Latitude:
Date Boring Started: 12/17/12	Auger Cutting	Hand Auger	Longitude:
Date Boring Completed: 12/17/12	Split-Spoon	Calif. Sampler	Drill Rig: CME 55 Rig
Logged By: Randy Daub, PE	Rock Core	Texas Cone	Remarks:
Drilling Contractor: PSI, Inc.			

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LOG OF BORING B-5

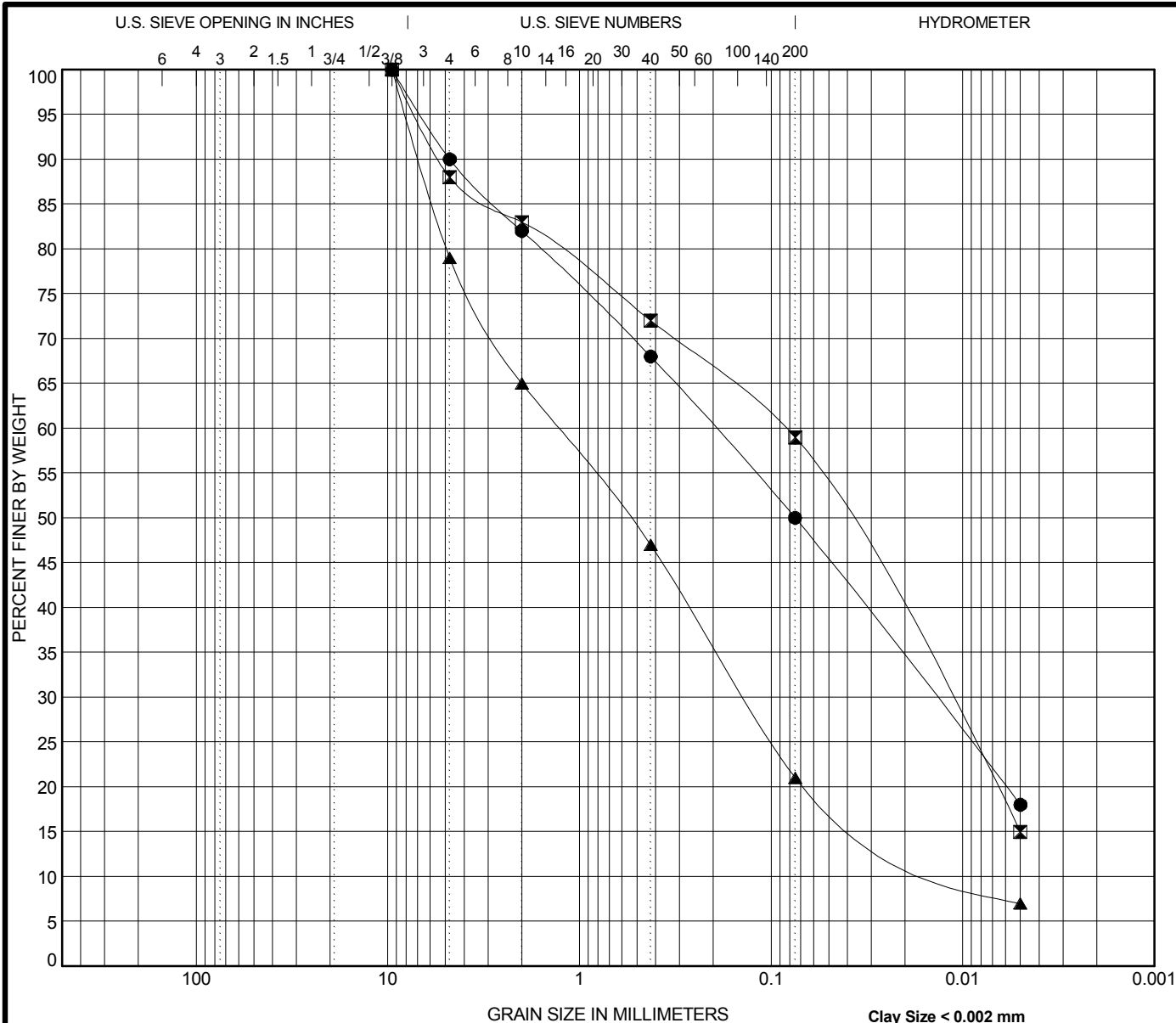
Sheet 1 of 1

PSI Job No.: 0139986	Drilling Method: Hollow Stem Auger	WATER LEVELS
Project: Proposed Community Living Center	Sampling Method: 2-in SS	▽ While Drilling 18.5 feet
Location: VA Medical Center	Hammer Type: Automatic	▼ Upon Completion 15.8 feet
Erie, Pennsylvania	Boring Location: Proposed Building Structure	▼ Delay N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ▣ PL + LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0	0						8" Topsoil	TOPSOIL					
				1	18		Very Stiff, moist, brown/gray, Sandy Silty Clay, trace rock fragments (CL-ML)		3-3-3 N=6	16	⊙	*	
				2	8		Large Cobble		7-50/2"	12	×	*	>>⊙
	5			3	18				4-11-7 N=18	10	×	⊙	*
				4	18		Shale Fragments		9-10-10 N=20	8	×	⊙	*
	10							CL-ML					
				5	8				4-7-10 N=17	9	×	⊙	*
	15												
				6	18				5-10-15 N=25	9	×	⊙	*
	20						End of Boring @ 20'						
							Water Encountered @ 18.5'						
							Water at Completion @ 15.8'						

Completion Depth: 20.0 ft	Sample Types:	Shelby Tube	Latitude:
Date Boring Started: 12/17/12	Auger Cutting	Hand Auger	Longitude:
Date Boring Completed: 12/17/12	Split-Spoon	Calif. Sampler	Drill Rig: CME 55 Rig
Logged By: Randy Daub, PE	Rock Core	Texas Cone	Remarks:
Drilling Contractor: PSI, Inc.			

The stratification lines represent approximate boundaries. The transition may be gradual.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	B-2	6.0	Sandy Silty Clay (CL-ML)			24	18	6		
⊠	B-3	13.5	Sandy Silty Clay (CL-ML)			24	20	4		
▲	B-4	18.5	Silty, Clayey Sand with Gravel (SC-SM)			16	15	1	1.61	145.61

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	6.0	9.5	0.197	0.014		10.0	40.0	50.0	
⊠	B-3	13.5	9.5	0.086	0.013		12.0	29.0	59.0	
▲	B-4	18.5	9.5	1.301	0.137	0.009	21.0	58.0	21.0	



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GRAIN SIZE DISTRIBUTION

Project: Proposed Community Living Center
 PSI Job No.: 0139986
 Location: VA Medical Center
 Erie, Pennsylvania



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ATTERBERG LIMIT RESULTS

PSI Job No.: 0139986
Project: Proposed Community Living Center
Location: VA Medical Center
Erie, Pennsylvania

United Soil Classification System
ASTM Designation D - 2487

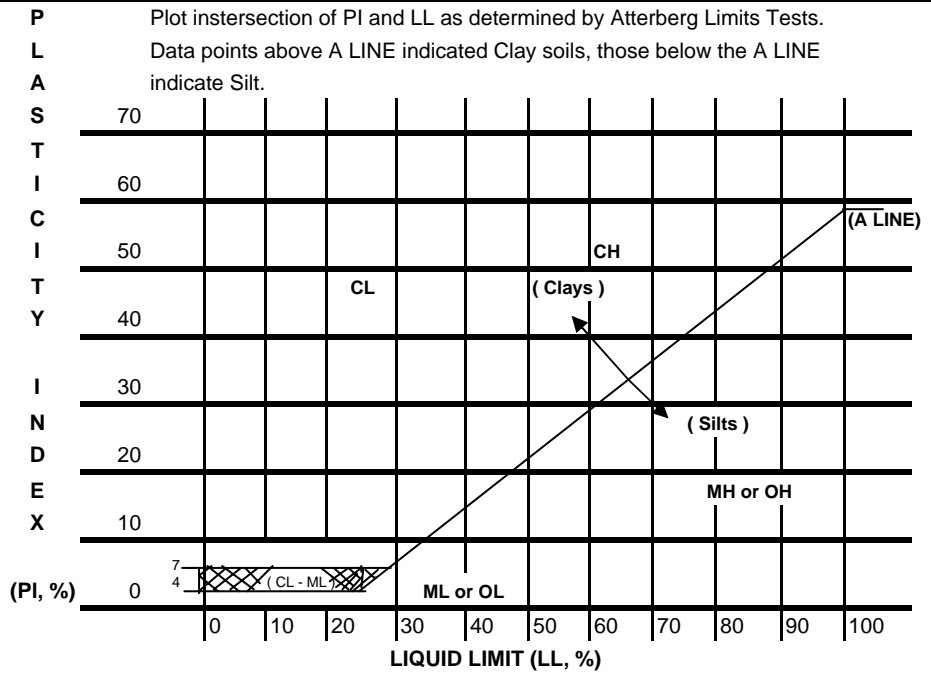


Based upon percentage of material passing No. 200 sieve classify as:

Less than 5% GW, GP, SW, SP

More than 12% GM, GC, SM, SC

5% to 12% Borderline, use dual symbols



Coarse Grained Soils (More than half of is larger than No. 200 sieve)	Gravels (More than 50% retained on No.4 sieve)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 4$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		GM	Silty gravels, gravel-sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7
		GC	Clayey gravels, gravel-sand-clay mixtures	above A Line, PI > 7	Dual Symbols
	Sands (More than 50% passing a No. 4 sieve)	SW	Well graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 6$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		SP	Poorly graded sands, gravelly sands, little or no fines		
		SM	Silty sands, sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7
		SC	Clayey sands, sand-clay mixtures	above A Line, PI > 7	Dual Symbols
Fine Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL	Organic silts and organic silty clays of low plasticity		
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts		
		CH	Inorganic clays of high plasticity fat clays		
		OH	Organic clays of medium to high plasticity		
	Highly Organic Soil	Pt	Peat and other highly organic soils		