STS CONSULTANTS, LTD.

Subsurface Exploration and Geotechnical Engineering Analysis
40-Acre Parcel
26 Mile at Frost Road
Lenox Township, Michigan

Trinity Management, Inc.
45000 River Rouge Drive
Suite 200
Clinton Township, MI 40038

STS Project No. 7-74511

STS CONSULTANTS

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July 9, 2004

Ms. Deborah Addy
Trinity Management, Inc.
45000 River Rouge Drive
Suite 200
Clinton Township, MI 40038

Re: Subsurface Exploration and Geotechnical Engineering Analysis for
Site Development in Lenox Township, Michigan
STS Project No. 7-74511

Dear Ms. Addy:

The subsurface exploration and geotechnical engineering analysis for the above referenced project has been completed. The attached report contains the logs of 10 soil borings, an evaluation of the conditions encountered by the borings, and our recommendations regarding suitable foundation types, support of floor slabs, pavements and other geotechnical-related design and construction considerations.

We appreciate the opportunity to have provided exploration, testing and geotechnical engineering services for you. If you have any questions regarding the attached report, or if we can be of further assistance, please call.

Respectfully,
STS Consultants, Ltd.

Jennifer E. Bowyer
Project Engineer

James J. Botz, P.E.
Principal Engineer

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B Soil Boring Logs

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1.0 PROJECT OVERVIEW

1.1 Project Description

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reports to the site

The project site is located at the northwest corner of 26 Mile Road and Frost Road in Lenox Township, Macomb County, Michigan. The exploration was performed for future development of this vacant 40-acre parcel. It is anticipated that the future development will consist of residential development, with paved roads, underground utilities, and some basement foundations. We assume that typical footings will be continuous, with some isolated spread footings for column loads.

1.2 Project Scope and Purpose

STS Consultants, Ltd. (STS) has completed the following tasks for this project:

- Located 10 borings using conventional taping and staking methods;
- Mobilized an ATV drill rig to the site to advance the soil borings. The borings were extended to a depth of 26.5 feet;
- Observed ground conditions during drilling and prepared field logs documenting drilling methods, Standard Penetration Test results and ground condition observations. Representative samples were placed in sealed jars and labeled;
- Observed and measured groundwater conditions during drilling and sampling and recorded the measurements on the field logs;
- Backfilled and abandoned borings with cuttings;
- Reviewed and classified the retained split-spoon samples in general accordance with the Unified Soil Classification System (USCS);
- Performed routine strength, classification and index tests on representative samples obtained from the borings and prepared boring logs;
- Analyzed the soil and groundwater conditions encountered with respect to the proposed construction;
- Prepared this engineering report under the direction of a Professional Engineer registered in the State of Michigan. The geotechnical report describes the subsurface exploration program and summarizes the subsurface conditions encountered in the borings. It provides recommendations regarding the suitability of existing soils for support of foundations, floor slabs, pavements and other construction considerations.

2.0 EXPLORATION PROCEDURES

2.1 Boring Layout Procedures

Proposed soil boring locations were selected by and located in the field by representatives of STS. The approximate as-drilled boring locations are shown on the Project Site Plan and Soil Boring Locations diagram (Figure 2) in Appendix A.

2.2 Drilling and Sampling Procedures

The borings were completed using an all-terrain vehicle (ATV) drill rig. The borings were advanced using hollow stem augers, and mud rotary drilling methods. Specific drilling methods, depths, and other drilling information are documented on the boring logs.

Soil sampling was performed at 2.5-foot intervals to a depth of 10 feet and then at 5-foot intervals to the boring termination depths. Representative samples were obtained using a split-barrel sampling procedures completed in general accordance with ASTM D-1586, Standard Method of Penetration Test and Split-Barrel Sampling of Soils. Additional explanations of typical STS drilling and sampling procedures are presented in Appendix D.

Recovered samples were described on field logs, containerized, sealed, labeled and then transported to our laboratory for further classification and testing. The field logs also documented sample intervals, test data and observations of drilling resistance, groundwater occurrence and other pertinent conditions.

2.3 Groundwater Measurements

The drill crew recorded the presence of standing groundwater in the open boreholes while drilling and sampling. These groundwater observations are noted on the lower left-hand corner of the boring logs.

2.4 Laboratory Testing Procedures

The retained samples were visually classified by a geotechnical engineer to estimate the distribution of grain sizes, plasticity, consistency, moisture condition and color. The soils were classified according to type using the STS Soil Classification System. A chart describing this classification system is contained in Appendix F. An explanation of STS laboratory procedures is presented in Appendix D.

2.5 Boring Log Procedures and Qualifications

The results of the field and laboratory observations and tests are printed on the boring logs. Similar soils were grouped into the strata, which are shown on the logs. The corresponding estimated USCS classification symbols were also added. Stratification lines between soil types were estimated by our geotechnical engineer based on the available data. In-situ, the transition between soil types may be less distinct. Subsurface conditions and water levels at locations between borings may differ from the conditions encountered at the boring locations. Furthermore, the subsurface conditions may change over time. These variables need proper assessment when utilizing the information presented on the boring logs. Additional comments on boring log preparation procedures and qualifications are contained in Appendix E.

3.0 EXPLORATION RESULTS

3.1 Site Conditions

The site is located in the northwest corner of the 26 Mile Road at Frost Road intersection in Lenox Township, Michigan. The site is relatively level with no major grade changes. The site was previously used as farmland but has been inactive for several years. Currently, a wooded area occupies the eastern portion of the site, with the remainder of the site covered by meadowland with scattered scrubby brush. The site is directly south of US-25/I-94, near Port Huron, Michigan.

3.2 Soil Conditions

The following is a brief summary of the subsurface conditions encountered at the site. Detailed information of the soils encountered in each boring are presented on the enclosed soil boring logs located in Appendix B of this report.

Topsoil was encountered in all borings except SB-8 and SB-10. The topsoil depth ranged from 0.4 to 1.5 feet, and consisted of silty sand or clay, and supporting roots and vegetation.

The site can be divided into two sections; east and west. Two distinct soil profiles were apparent, based on the soil samples. The transition between the two profiles is likely to be gradual and cannot be precisely determined.

Borings B-1 through B-5 and B-10 provide the east profile. These borings exhibit cohesive soils underlain by fine sand. The cohesive soil (typically a silty clay) extends to depths ranging from 7 to 23 feet below ground surface. In boring SB-1, the cohesive soil consists of clayey silt, to 7 feet. The clay in boring SB-3 extends to 16.5 feet, and is underlain by a layer of clayey silt to 26.3 feet. Each boring terminates in a layer of fine sand with varying amounts of silt constituent.

The west profile is comprised of SB-6 through SB-9, and displays non-cohesive soils to the termination depth. These non-cohesive soils consist of fine to medium sand with varying amounts of silt component, and ranging in consistency from loose (in the upper seven feet) to medium dense.

3.3 Groundwater Conditions

Groundwater was encountered in each soil boring, as summarized in Table 1. Based on these readings, we estimate the groundwater table to be located at between 4 and 10 feet below ground surface, within the underlying sand layers. However, it should be noted that groundwater table elevations fluctuate due to seasonal variations in rainfall and surface run-off conditions, and therefore, the readings indicated on the boring logs may not be representative of the long-term hydrostatic groundwater table. Long-term monitoring would be required to make a more accurate estimate of the groundwater table elevation.

TABLE 1

Boring Number	Depth to Groundwater (While Sampling) (Feet)	Depth to Groundwater (After Boring) (Feet)
SB-1	7.0	6.4
SB-2	9.5	8.5
SB-3	26.3	--
SB-4	17.0	8.6
SB-5	13	9.4
SB-6	4.0	4.0
SB-7	4.5	4.1
SB-8	5.0	4.8
SB-9	4.5	4.5
SB-10	15.4	9.3

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 Project Description

At this time, no development plan was available. As stated previously, it is assumed that the development will consist of residential sites with paved roads and underground utilities. It is assumed that some structures will include basement foundations. STS assumed that extensive re-grading will not be necessary, other than minor adjustments for landscaping and drainage.

4.2 Site Preparation

We do not anticipate the necessity for fill or cut to develop this site. Very little earthwork should be required other than excavating for footings and removing the excess material. The removed material should be replaced with structural fill as described below. Some general guidelines for the construction at this site are as follows:

- Remove all topsoil and other unsuitable materials as specified by a representative from STS;
- Footing excavations and pavement subgrades should be inspected and tested by a qualified field representative from STS Consultants. Unsuitable soils should be removed and replaced as directed by the Geotechnical Engineer;
- Clean well-graded granular soils or approved on-site soils can be used for structural fill, unless otherwise specified;
- The structural fill should be placed in lifts of nine (9) inches or less, each lift should be compacted and tested before placing subsequent lifts;
- All soils used for the structural fill or supporting the structural fill must be compacted to 95% of the maximum dry density determined by the modified Proctor method (ASTM D1557);
- Granular soils should be compacted with a vibratory roller. Cohesive soils should be compacted with a sheepsfoot roller with tines equal in length to the thickness of the lift of loose material;
- STS should monitor all operations during the excavation and filling phases, including subgrade examination.

4.3 Foundations

Based on the available information, we recommend the structure be supported by a footing foundation system. The bottom of the footings should be placed at a minimum depth of 4.0 feet below finished grade to provide adequate frost protection. At all of the boring locations, footings should be supported by the natural soils. Footings may be designed for placement on natural soils consisting of stiff to hard silty clay with a net allowable bearing capacity of 3,000 pounds per square foot (psf). In natural sand subgrade soils, a net allowable bearing capacity of 3,500 psf may be used for design. The net allowable soil bearing pressure refers to that pressure that may be transmitted to the foundation soil in excess of the final minimum surrounding overburden pressure.

The base of all footing excavations should be observed and tested by a Geotechnical Engineer or their designated representative to verify that they are suitable for support of the recommended design bearing pressure. Any soft, loose or disturbed soils should be removed and the foundation extended deeper to adequate bearing subgrade soils. A minimum footing size of 1.5 feet for continuous and 2.5 feet for spread footings should be utilized to prevent disproportionately small footing sizes.

Total settlement of footing foundations as described above is estimated to be less than 1 inch in cohesive soils, and less than ½ inch in sandy soils. Differential settlement is anticipated to be half or less of the total settlement.

4.4 Slabs-On-Grade

We anticipate that the floor slabs within the structure will bear on natural soils or structural fill. These soils should be suitable for floor slab support, provided the subgrade is approved by a qualified inspector or engineer immediately prior to construction and any additional fill is placed as outlined in Section 4.2 Site Preparation of this report. Floor slabs in this area overlying a suitable subgrade may be designed as conventional slabs-on-grade.

We recommend that the floor slab be underlain by at least six (6) inches of compacted, well-graded granular material containing less than five (5) percent (by weight) of material passing the No. 200 sieve. This granular layer will act both as a base for slab support and as a capillary break to vertical moisture migration between the base of the floor slab and the underlying subgrade. The American Concrete Institute also recommends that a vapor barrier be placed below slabs where moisture sensitive floor coverings will be used. If needed, the depth of the vapor barrier beneath the slab should be based on the slab and concrete mix design in slab-on-grade areas.

Floor slabs should be independently supported from the building foundations to permit slight differential movements to occur between the slabs and foundation elements. Floor slabs should be at least nominally reinforced with steel wire mesh to help reduce cracking and maintain the structural integrity of the slab. Adequate slab joints should also be provided. Slab reinforcement and concrete design should be performed by a qualified professional taking into consideration the expected loading and environment, drainage, and subgrade conditions. We recommend use of a vertical modulus of subgrade reaction of 100 pounds per cubic inch (pci) for design of floor slabs-on-grade. Lightly loaded floor slabs that are constructed in accordance with the preceding recommendations should have a total settlement of less than ¼ inch.

4.5 Below-Grade Walls and Drainage Considerations

We recommend avoiding basement construction on portions of the site, due to the high water levels in borings SB-1 and SB-6 through -9, combined with high-permeability soils. In these areas, we recommend slab-on-grade construction, as described in Section 4.3 of this report. The following recommendations are applicable to areas in the vicinity of borings SB-2 through 5 and SB-10.

Below-grade walls should be designed to resist lateral earth pressures. The active earth pressure coefficient assumes that the wall can deflect at least one (1) percent of wall height. These structures should be designed using the earth pressure coefficients and moist unit weight values presented in Table 2.

TABLE 2

Recommended Below-Grade Wall Design Parameters	
Total Unit Weight, γ_t	120 pcf
Angle of Internal Friction	30°
Active Earth Pressure Coefficient, K_a	0.33
Passive Pressure Coefficient, K_p	3.00
Friction Coefficient between Concrete and Clay Soil	0.35
Friction Coefficient between Concrete and Sand Soil	0.45

Backfill consisting of free-draining granular drainage aggregate such as MDOT Class II sand, having less than seven (7) percent by weight passing the No. 200 sieve, should be placed behind the below-grade walls and extend at least five (5) feet from the face. The backfill should be compacted to a minimum of 95% of the maximum dry density as determined by the modified Proctor method (ASTM D-1557) in structural areas and to 90% in green areas.

Surcharge loads extending from a zone of one (1) horizontal to one (1) vertical from the base of the wall should also be included in the design. This includes surcharge loads induced from the floor slab of the structure. The top of the wall should be braced prior to placement of backfill material, and the size of compactor limited to that of less than 500 pounds total weight to minimize stresses on the wall.

Drainage lines should also be installed along the perimeter of the wall, beside the footing, and drained by gravity or routed to a sump pit and pump system to prevent a buildup of hydrostatic pressure along the wall. The drain lines should consist of a minimum 4-inch diameter closed joint, perforated pipe. The pipe should be surrounded by a minimum of six (6) inches of drainage aggregate, such as that meeting the gradation specified for ASTM C-33 Size 67 material. The drainage aggregate should be wrapped with a non-woven needle punched geotextile having an Apparent Opening Size (AOS) in the range of 70 to 100. The purpose of the geotextile is to minimize the migration of fines into, and subsequent clogging of, the drain line.

4.6 Pavements

After preparing the pavement subgrade, the surface should be examined for evidence of soft or unsuitable soils. We recommend the presence of an experienced field representative from STS Consultants to determine if any subgrade soils should be removed and replaced prior to pavement construction. Replacement soils should be installed in accordance with the recommendations in Section 4.2 Site Preparation. We have not included pavement sections at this time, because no traffic volumes or loadings have been determined. Some general recommendations for pavement construction are presented in the following paragraphs.

The pavement should be designed for the types and volumes of traffic anticipated using a design California Bearing Ratio (CBR) of three (3) for a cohesive subgrade. A modulus of subgrade reaction of 100 pci can be used for the design of any Portland cement concrete pavements. Adequate joint spacing dowels and reinforcing should be provided for rigid pavements.

Pavement subgrades should be sloped to drain. Subdrainage should be provided at any low areas and along the edges of pavements and parking lots to prevent the accumulation of free water within the base course and subgrade, which can result in softening of the subgrade and premature deterioration of the pavement under exposure and repeated traffic conditions.

Inclusion of adequate surface drainage systems is considered imperative in order to maintain the compacted subgrades as close to optimum moisture conditions as possible. Overall, surface grades should be such that no pavement sectors are allowed to impound water. Surface water should be directed to a system of catch basins or retention basins for removal from the site.

All materials to be employed and field operations required in connection with the contemplated pavement structures should follow recommendations and procedural details as per the Michigan Department of Transportation (MDOT), Asphalt Institute and/or American Concrete Institute.

4.7 Construction Considerations

We anticipate that excavations for this project will be performed above the long-term groundwater table. Accumulations of water from runoff or seepage of perched water should be removed by means of sump and pump methods.

We recommend that all earthwork and foundation work for this project be observed and tested by an experienced Geotechnical Engineer or their designated representative to determine if the soil and groundwater conditions encountered are consistent with those anticipated in this report. Foundation subgrades should be tested to check for adequate bearing conditions. Subgrades for slabs and new structural fill should be proofrolled and unsuitable areas improved. New fill and backfill material should be tested for conformance to specified requirements. Fill placement should be monitored and tested to ensure that the resulting material conforms to specified density, strength or compressibility requirements. Structural materials should also be tested for conformance to requirements.

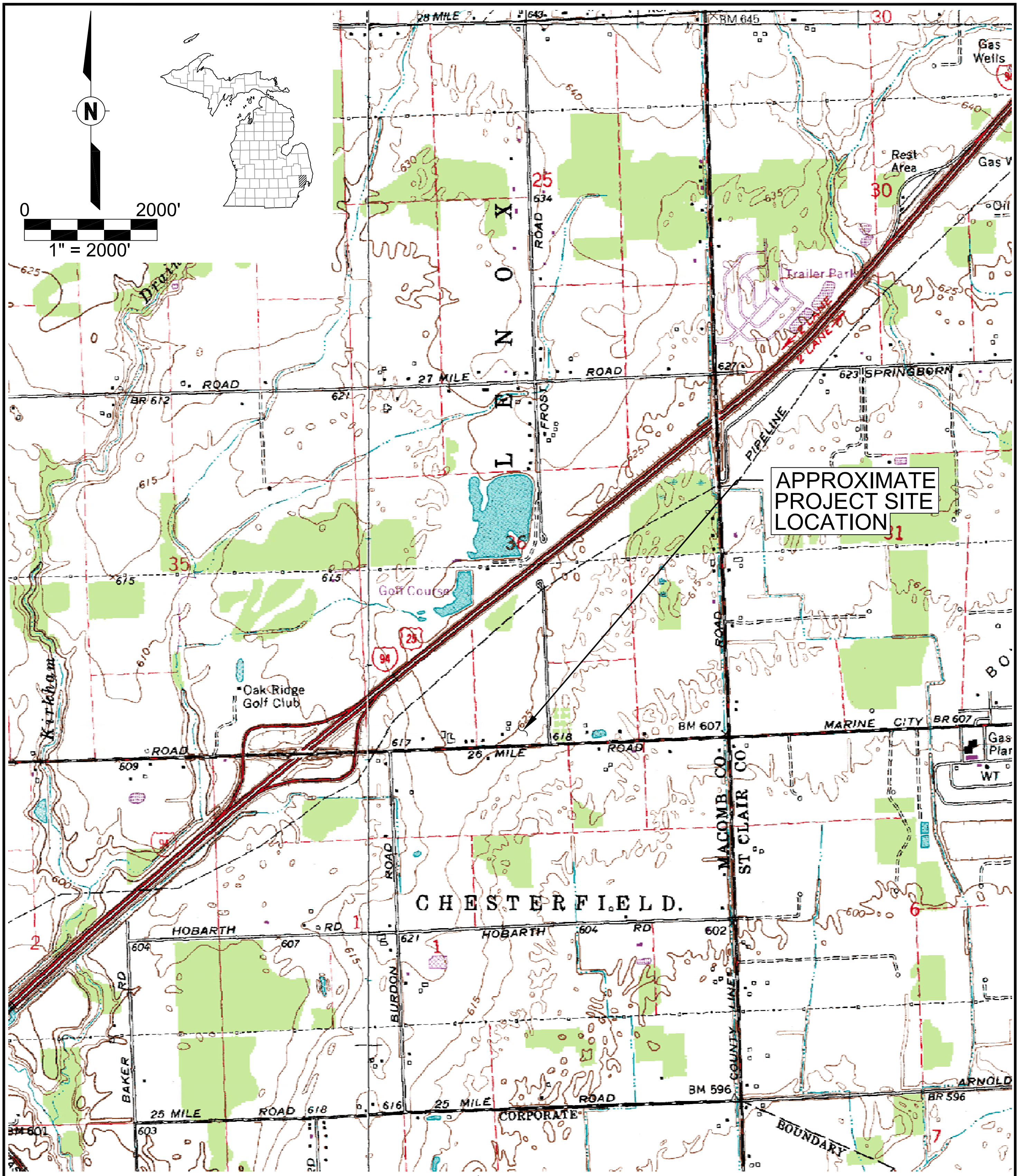
All loose, soft or unsuitable soils should be removed prior to placing structural fill or concrete. Standing water should be removed from excavations prior to placing fill or concrete. Excavations should be cut to provide safe, stable slopes. If there is insufficient space for sloped sides, sheeting and bracing should be provided. Occupational Safety and Health Act (OSHA) has instituted strict standards for temporary construction excavations. These standards are outlined in 29 CFR Part 1926 Subpart P. Excavations within unstable soil conditions or extending five feet or more in depth should be adequately sloped or braced according to these standards. The maximum inclination of the side slopes is dependent on soil type. The cohesive natural soils encountered at this site may be classified as Type B soils within the OSHA regulations. OSHA recommends a maximum slope inclination of 1.0H:1.0V for Type B soils. Sandy soils are classified as Type C within OSHA regulations. A maximum slope inclination of 1.5H:1.0V is recommended for excavations in these soils. In summary, all footing excavations requiring man entry on this project should be either sloped or shored in accordance with the OSHA rules.

5.0 GENERAL QUALIFICATIONS

This report has been prepared in general accordance with generally accepted geotechnical engineering practices to aid in the evaluation of this site and to assist the owner and the architect and/or engineer in the design of this project. No other warranty, either expressed or implied, is made. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects relevant to the geotechnical characteristics. In the event that any changes in the design or location of the facilities as outlined in this report are planned, we should be informed so that the changes can be reviewed and the conclusions of this report modified as necessary in writing by the geotechnical engineer. As a check, we recommend that we be authorized to review the projects plans and specifications to confirm that the recommendations contained in this report have been interpreted in accordance with our intent. Without this review, we will not be responsible for the misinterpretation of our data, our analysis, and/or our recommendations, nor how these are incorporated into the final design.

The analysis and recommendations submitted in this report are based on the data obtained from the soil borings performed at the locations indicated on the location diagram and from the information discussed in this report. This report does not reflect any variations which may occur between the borings. In the performance of subsurface explorations, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between boring locations and that seasonal and annual fluctuations in groundwater levels will likely occur. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, it will be necessary for a re-evaluation of the recommendations contained in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

The geotechnical engineer of record is the professional engineer who authored the geotechnical report. It is recommended that all construction operations dealing with earthwork and foundations be observed by the geotechnical engineer of record or the geotechnical engineer’s appointed representative to confirm that the design requirements are fulfilled in the actual construction. For some projects, this may be required by the governing building code.



NOTE: Base map from New Baltimore, Michigan USGS 7.5' Series Topographic Quadrangle, original date 1978.

STS CONSULTANTS
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PROJECT SITE LOCATION
GEOTECHNICAL EVALUATION
TRINITY MANAGEMENT INC.
LENOX TOWNSHIP
MACOMB COUNTY, MICHIGAN

Drawn :	CJD	06/24/2004
Checked:	BAW	06/24/2004
Approved:	JSM	06/24/2004

PROJECT NUMBER 774511

FIGURE NUMBER 1

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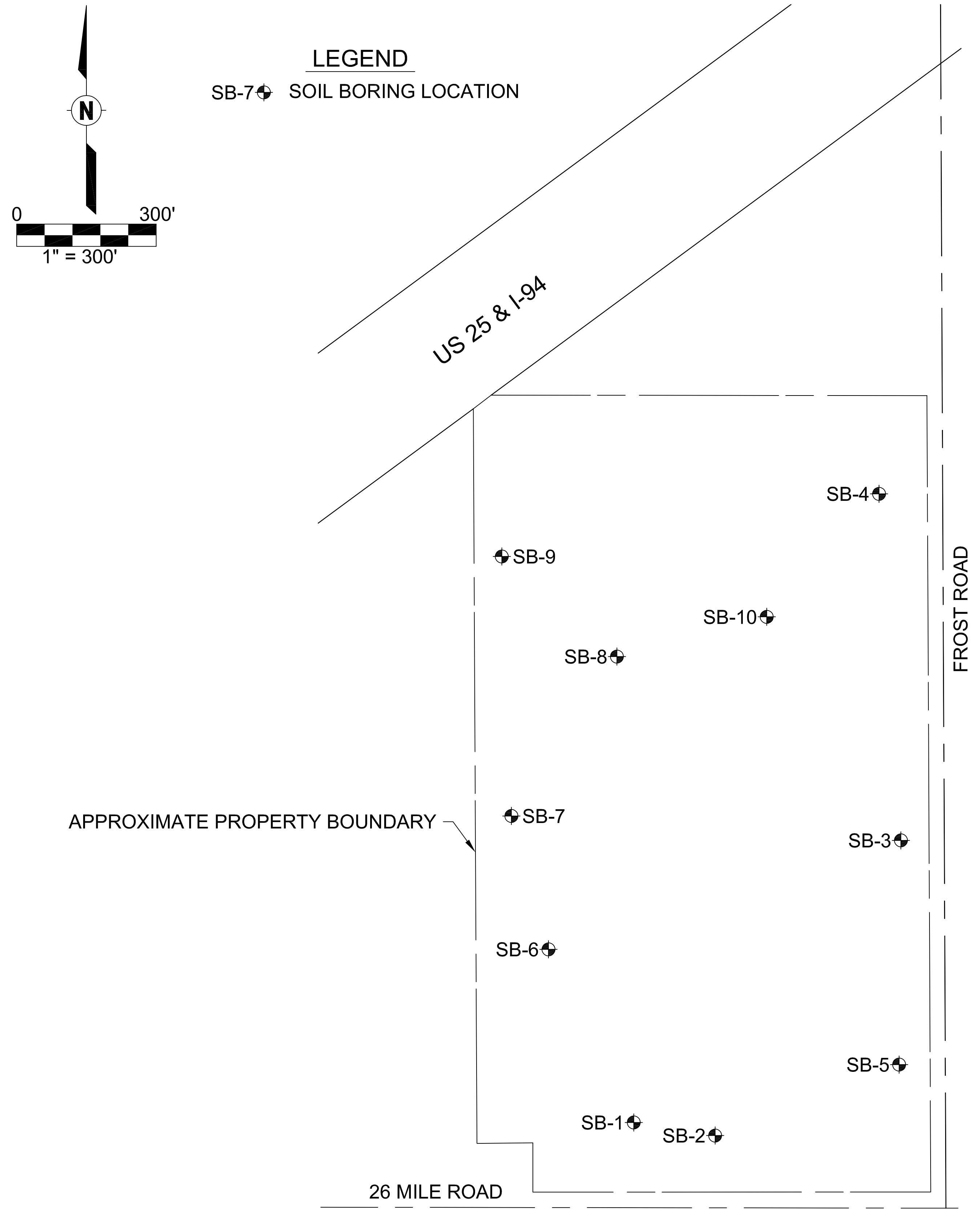

NOTE: Base map from Macomb County Planning and Economic Development Department, revised 8/01.

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PROJECT SITE PLAN AND SOIL BORING LOCATIONS
GEOTECHNICAL EVALUATION
TRINITY MANAGEMENT INC.
LENOX TOWNSHIP
MACOMB COUNTY, MICHIGAN

Drawn : CJD 06/24/2004
Checked: BAW 06/24/2004
Approved: JSM 06/24/2004
PROJECT NUMBER 774511
FIGURE NUMBER 2

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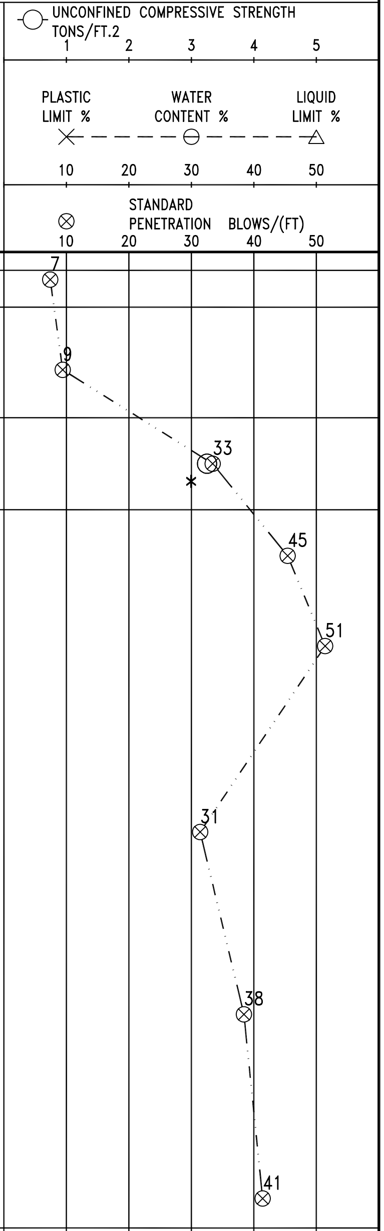
STS Consultants Ltd.	OWNER Trinity Management, Inc.	LOG OF BORING NUMBER	SB-1
	PROJECT NAME 40 Acre Parcel - 26 Mile at Frost Road	ARCHITECT-ENGINEER	

SITE LOCATION
Lenox Township

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
						SURFACE ELEVATION	
						0.5 Topsoil	
		1	SS			1.5 Clayey silt - gray/tan - loose (ML)	
			PA			Clayey silt, little fine to medium sand - gray/orange mottled - loose (ML)	
		2	SS				
5.0			PA			4.5	
		3	SS			Sandy silt - tan - medium dense - moist (ML)	
			PA			7.0	
		4	SS			Silty fine sand - gray - dense - wet (SM)	
10.0			PA				
		5	SS				
			RB				
15.0		6	SS				
			RB				
20.0		7	SS				
			RB				
25.0			SS				
26.5						26.5	



End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 7.0' WD	BORING STARTED 6/21/04	STS OFFICE Lansing	
WL 5.1' BCR	BORING COMPLETED 6/21/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 6.4' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

BORING_LOG 74511.GPJ STS.GDT 2/23/05

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STS Consultants Ltd.

OWNER
Trinity Management, Inc.

PROJECT NAME
40 Acre Parcel – 26 Mile at Frost Road

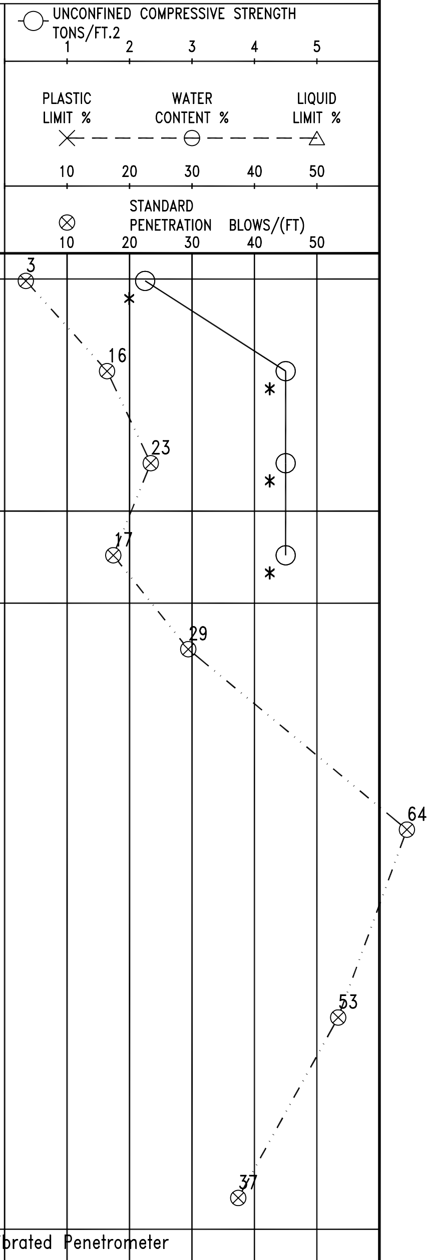
LOG OF BORING NUMBER SB-2

ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

SURFACE ELEVATION

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
		1	SS			0.7 Topsoil Silty clay, trace fine sand – gray–tan – very stiff to hard (CL)	
			PA				
		2	SS				
5.0			PA				
		3	SS				
			PA			7.0 Silty clay, little fine to medium sand, trace fine gravel – gray – hard (CL)	
		4	SS				
10.0			PA			9.5 Silty sand, trace silt – gray – medium dense to very dense – wet (SP)	
		5	SS				
			RB				
15.0		6	SS				
			RB				
20.0		7	SS				
			RB				
25.0			SS				
26.5						26.5	



*Calibrated Penetrometer

End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

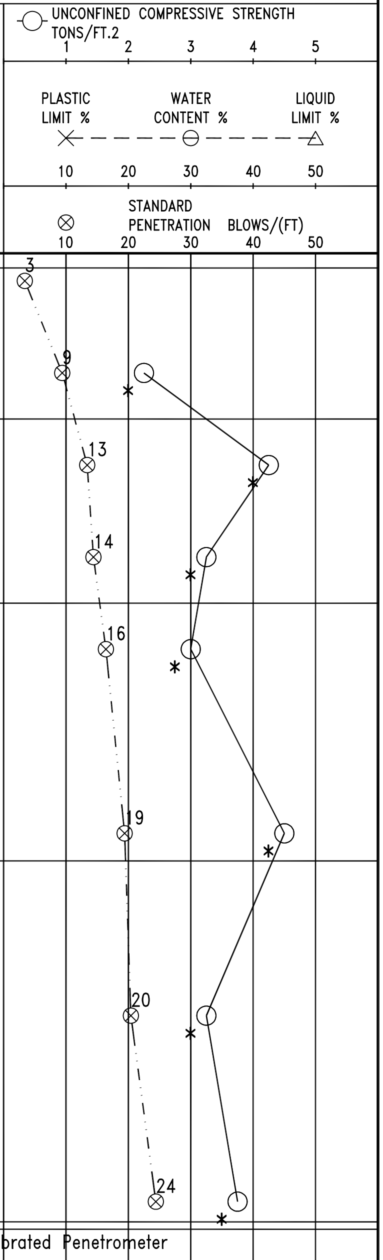
The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 9.5' WD	BORING STARTED 6/21/04	STS OFFICE Lansing	
WL 8.3' BCR	BORING COMPLETED 6/21/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 8.5' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

STS Consultants Ltd.

OWNER Trinity Management, Inc.	LOG OF BORING NUMBER SB-3
PROJECT NAME 40 Acre Parcel – 26 Mile at Frost Road	ARCHITECT–ENGINEER
SITE LOCATION Lenox Township	

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL (SURFACE ELEVATION)
0.4	1	SS	Topsoil
		PA	Silty clay, trace fine sand and roots – gray/orange mottled – very stiff (CL)
	2	SS	
4.5		PA	
5.0	3	SS	Silty clay, trace fine sand, occasional medium sand lenses – gray/orange mottled – hard to very stiff (CL)
		PA	
	4	SS	
9.5		PA	
10.0	5	SS	Silty clay, trace fine sand – brown and gray – very stiff (CL)
		RB	
15.0	6	SS	
16.5		RB	Clayey silt, little fine sand, trace fine gravel – gray – medium dense (ML)
20.0	7	SS	
		RB	
25.0		SS	
26.3			Fine sand – gray – wet (SP)
26.5			End of Boring 26.5 Feet Borehole advanced with solid stem augers. Borehole was backfilled with soil cuttings after completion.



UNIT DRY WT. LBS./FT.3

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 26.3' WS	BORING STARTED 6/21/04	STS OFFICE Lansing	
WL	BORING COMPLETED 6/21/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

BORING_LOG 74511.GPJ STS.GDT 2/23/05

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STS Consultants Ltd.

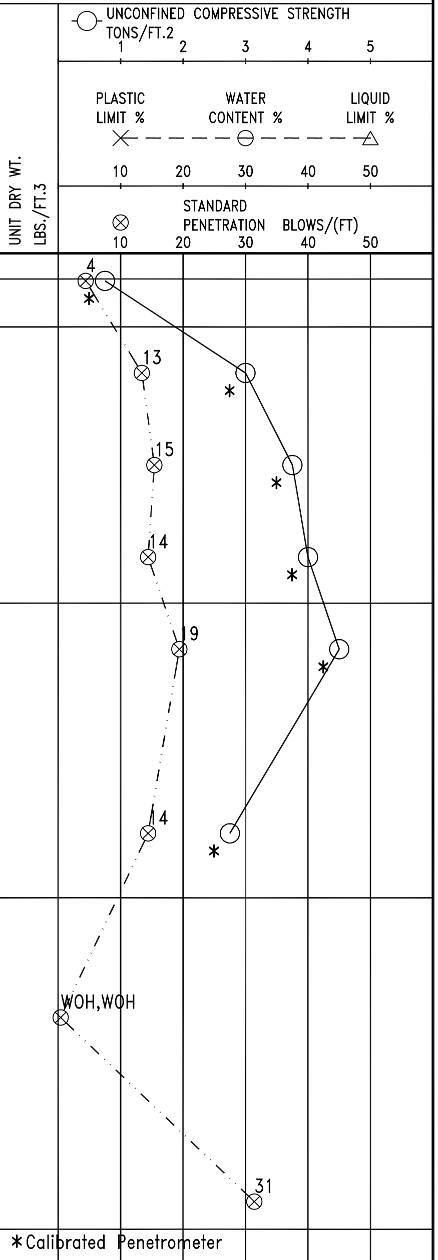
OWNER Trinity Management, Inc.	LOG OF BORING NUMBER SB-4
PROJECT NAME 40 Acre Parcel – 26 Mile at Frost Road	ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY		DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNIT DRY WT. LBS./FT.3
						0.7	Topsoil	
		1	SS			2.0	Silty clay, little fine to medium sand, trace organics – gray/tan mottled – medium (CL)	
			PA			9.5	Silty clay, trace fine to medium sand, trace fine gravel – brown/gray mottled – very stiff (CL)	
		2	SS					
5.0			PA					
		3	SS					
			PA					
		4	SS					
			PA					
10.0		5	SS			17.5	Silty clay, little fine sand, trace fine gravel – brown to gray – hard to very stiff (CL)	
			RB					
15.0		6	SS					
			RB			26.5	Silty sand, trace silt – gray – loose to dense – wet (SP)	
20.0		7	SS					
			RB					
25.0			SS					
26.5								

End of Boring 26.5 Feet

Borehole advanced with solid stem augers. Borehole was backfilled with soil cuttings after completion.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

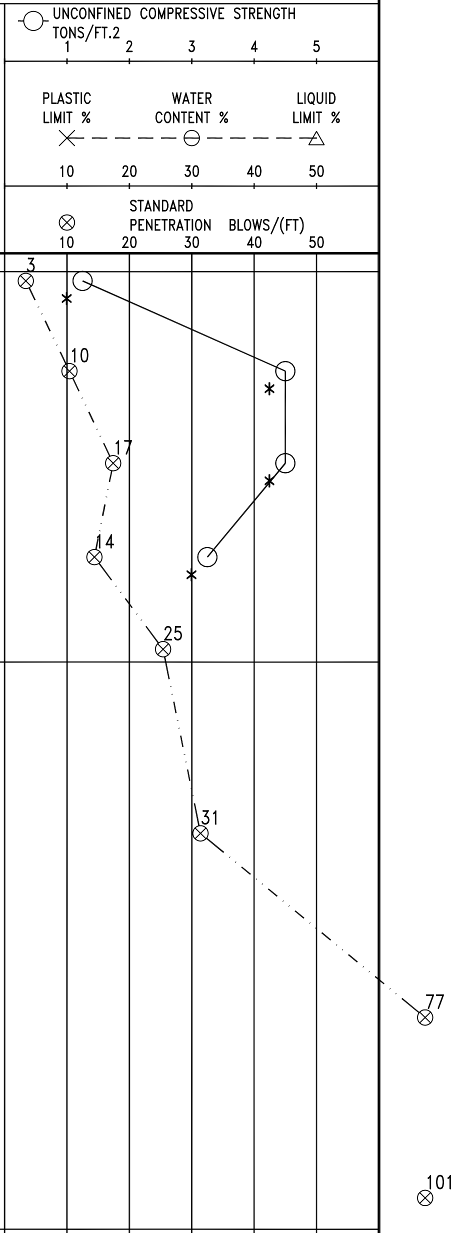
WL 17' WD	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 8.6' AB	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

STS Consultants Ltd.

OWNER Trinity Management, Inc.	LOG OF BORING NUMBER SB-5
PROJECT NAME 40 Acre Parcel – 26 Mile at Frost Road	ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
						SURFACE ELEVATION	
		1	SS			0.5 Topsoil Silty clay, trace fine sand – gray/orange mottled – stiff to hard (CL)	
			PA				
		2	SS				
5.0			PA				
		3	SS				
			PA				
		4	SS				
10.0			PA				
		5	SS			11.1	
15.0			RB			Fine sand, trace silt – gray – dense to extremely dense – wet (SP)	
		6	SS				
20.0			RB				
		7	SS				
25.0			RB				
26.5			SS			26.5	



*Calibrated Penetrometer

End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 13' WD	BORING STARTED 6/21/04	STS OFFICE Lansing	
WL 6.2' BCR	BORING COMPLETED 6/21/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 9.4' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

STS Consultants Ltd.

OWNER
Trinity Management, Inc.

LOG OF BORING NUMBER SB-6

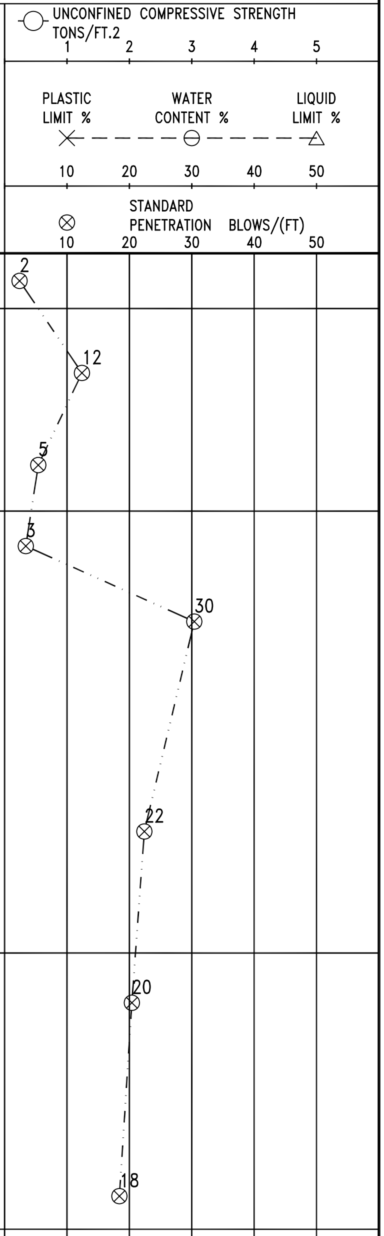
PROJECT NAME
40 Acre Parcel – 26 Mile at Frost Road

ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

SURFACE ELEVATION

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
		1	SS	Silty fine sandy topsoil, trace clay and roots – brown – loose	
1.5			PA	Fine to medium sand, trace silt – light brown – medium dense to loose – wet (SP)	
		2	SS		
5.0			PA		
		3	SS		
7.0			PA	Fine to medium sand – light brown – loose to medium dense – wet (SP)	
		4	SS		
10.0			PA		
		5	SS		
			RB		
15.0		6	SS		
			RB		
19.0				Fine sand – brown – medium dense – wet (SP)	
20.0		7	SS		
			RB		
25.0			SS		
26.5					



End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0' WS	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 2.2' BCR	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 4.0' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

BORING_LOG 74511.GPJ STS.GDT 2/23/05

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STS Consultants Ltd.

OWNER
Trinity Management, Inc.

LOG OF BORING NUMBER SB-7

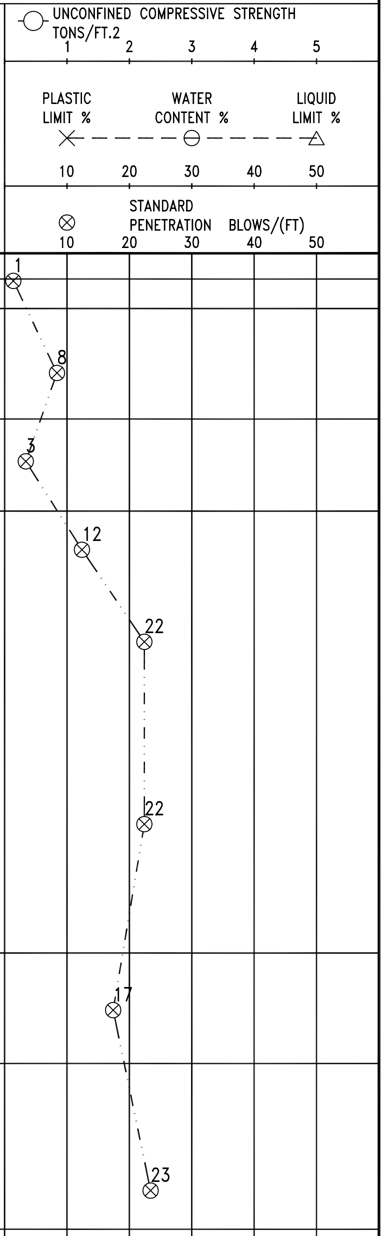
PROJECT NAME
40 Acre Parcel – 26 Mile at Frost Road

ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

SURFACE ELEVATION

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE		DESCRIPTION OF MATERIAL
			0.7	Sandy topsoil
	1	SS	1.5	Fine sand, trace silt – light brown – loose (SP)
		PA		Fine sand, trace silt – light brown – loose – moist (SP)
	2	SS		
5.0		PA	4.5	Fine to medium sand, trace silt – light brown with iron oxidation – loose – wet (SP)
	3	SS		
		PA	7.0	Fine to medium sand – light brown – medium dense – wet (SP)
	4	SS		
10.0		PA		
	5	SS		
		RB		
15.0	6	SS		
		RB	19.0	
20.0				Fine sand, trace silt – gray – medium dense – wet (SP)
	7	SS	22.0	Fine to medium sand – gray – medium dense – wet (SP)
		RB		
25.0				
26.5		SS	26.5	



UNIT DRY WT. LBS./FT.3

End of Boring 26.5 Feet

Borehole advanced with solid stem augers. Borehole was backfilled with soil cuttings after completion.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.5' WD	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 2.6' BCR	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 4.1' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

STS Consultants Ltd.

OWNER
Trinity Management, Inc.

LOG OF BORING NUMBER SB-8

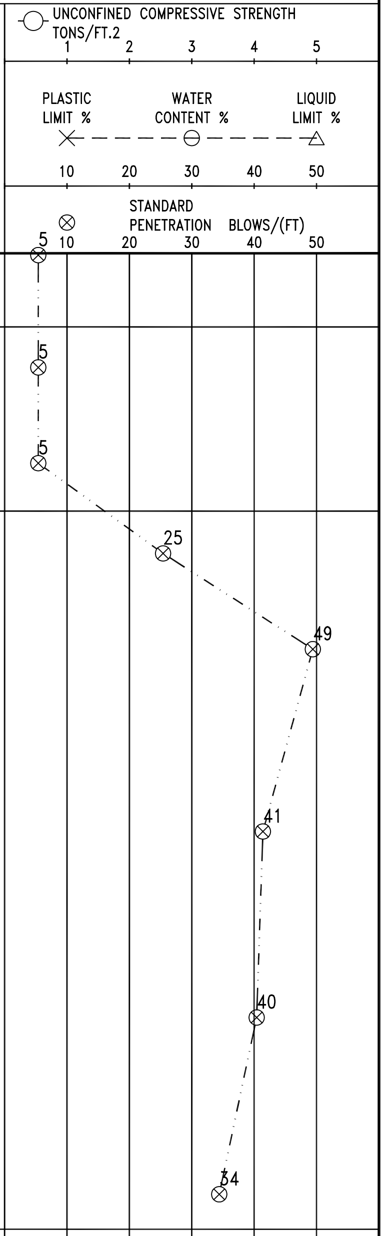
PROJECT NAME
40 Acre Parcel – 26 Mile at Frost Road

ARCHITECT–ENGINEER

SITE LOCATION
Lenox Township

SURFACE ELEVATION

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
		1	SS	Silty sand, trace roots – brown/orange – loose – (SM)	
			PA	2.0	
		2	SS	Fine sand, trace silt – light brown/orange – loose – moist to wet (SP)	
5.0			PA		
		3	SS		
			PA	7.0	
		4	SS	Fine sand – light brown – medium dense to dense – wet (SP)	
10.0			PA		
		5	SS		
			RB		
15.0		6	SS		
			RB		
20.0		7	SS		
			RB		
25.0			SS		
26.5				26.5	



End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 7.5' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 5.0' WD	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 3.2' BCR	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 4.8' ACR	RIG/FOREMAN STS/D–120/John D.	APP'D BY DNH	STS JOB NO. 74511

STS Consultants Ltd.

OWNER
Trinity Management, Inc.

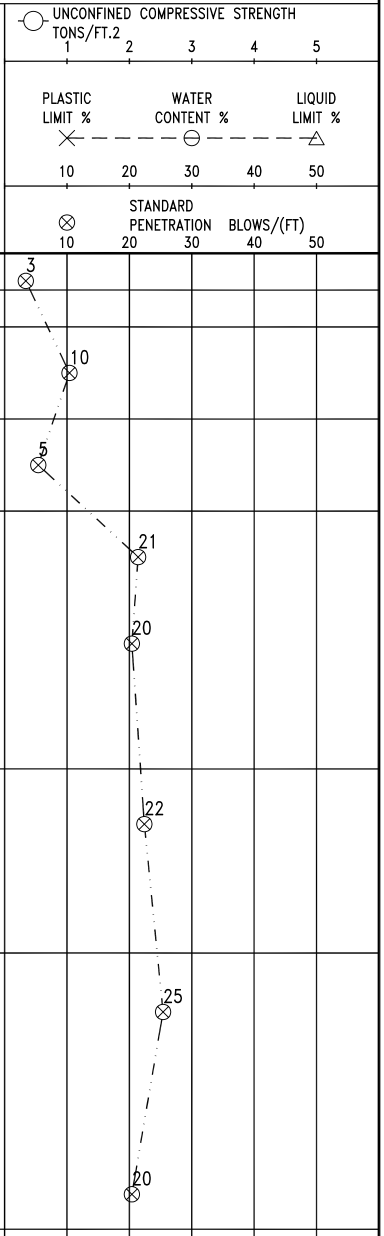
LOG OF BORING NUMBER SB-9

PROJECT NAME
40 Acre Parcel - 26 Mile at Frost Road

ARCHITECT-ENGINEER

SITE LOCATION
Lenox Township

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY		DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNIT DRY WT. LBS./FT.3
		1	SS			1.0	Sandy topsoil - brown	
			PA			2.0	Fine to medium sand, little silt - light brown - loose (SP-SM)	
		2	SS				Fine to medium sand, trace silt - light brown - loose - moist (SP)	
5.0			PA			4.5	Fine to coarse sand, trace silt - brown - loose - wet (SP)	
		3	SS					
			PA			7.0	Fine to medium sand - light brown - medium dense - wet (SP)	
		4	SS					
10.0			PA					
		5	SS					
			RB			14.0		
15.0							Fine to coarse sand - brown - medium dense - wet (SP)	
		6	SS					
			RB			19.0		
20.0							Fine to medium sand - brown - medium dense - wet (SP)	
		7	SS					
			RB					
25.0			SS					
26.5						26.5		



End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.5' WD	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 3.8' BCR	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 4.5' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

BORING_LOG 74511.GPJ STS.GDT 2/23/05

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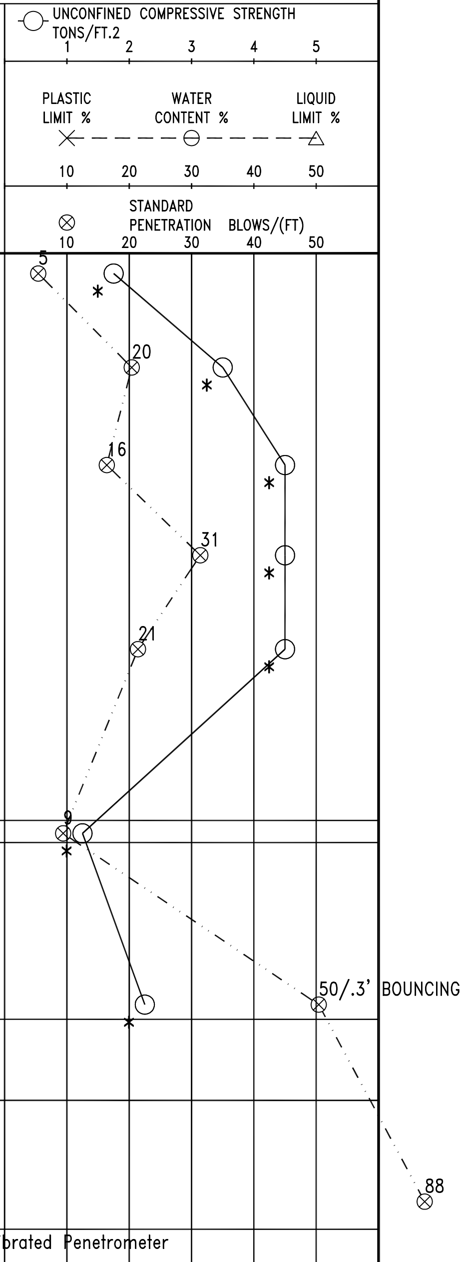
STS Consultants Ltd.

OWNER Trinity Management, Inc.	LOG OF BORING NUMBER SB-10
PROJECT NAME 40 Acre Parcel – 26 Mile at Frost Road	ARCHITECT-ENGINEER

SITE LOCATION
Lenox Township

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNIT DRY WT. LBS./FT.3
		1	SS			Silty clay, trace fine sand – gray/tan mottled – stiff to hard (CL)	
			PA				
		2	SS				
5.0			PA				
		3	SS				
			PA				
		4	SS				
10.0			PA				
		5	SS				
			RB				
15.0						15.4	
		6	SS			16.0 Fine sand, trace silt – gray – wet (SP)	
						Silty clay – gray – medium (CL)	
			RB				
20.0		7	SS			20.8	
						Silty clay, little fine sand – gray – stiff (CL)	
						23.0	
			RB			Fine sand, trace silt – gray – very dense (SP)	
25.0							
26.5			SS			26.5	



End of Boring 26.5 Feet

Borehole advanced with solid stem augers until saturated soils were encountered. Steel casing was driven into the ground to 8.0' bgs. A tricone bit and mud rotary drilling techniques were used to complete drilling to termination depth. Borehole was backfilled with soil cuttings after completion.

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 15.4' WD	BORING STARTED 6/19/04	STS OFFICE Lansing	
WL 9.3' BCR	BORING COMPLETED 6/19/04	ENTERED BY BAW	SHEET NO. 1 OF 1
WL 9.3' ACR	RIG/FOREMAN STS/D-120/John D.	APP'D BY DNH	STS JOB NO. 74511

BORING_LOG 74511.GPJ STS.GDT 2/23/05

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STS General Notes

STS CONSULTANTS

DRILLING & SAMPLING SYMBOLS:

SS : Split Spoon - 1-3/8" I.D. 2" O.D.
Unless otherwise noted
ST : Shelby Tube-2" O.D.
Unless otherwise noted
PA : Power Auger
DB : Diamond Bit-NX, BX, AX
AS : Auger Sample
JS : Jar Sample
VS : Vane Shear

OS : Osterberg Sampler
HS : Hollow Stem Auger
WS : Wash Sample
FT : Fish Tail
RB : Rock Bit
BS : Bulk Sample
PM : Pressuremeter Test
GS : Giddings Sampler

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WS : While Sampling
WD : While Drilling
AB : After Boring

WCI : Wet Cave In
DCI : Dry Cave In
BCR : Before Casing Removal
ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

GRADATION DESCRIPTION AND TERMINOLOGY:

Coarse grained or granular soils have more than 50% of their dry weight retained on a #200 sieve; they are described as boulders, cobbles, gravel or sand. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as clay or clayey silt if they are cohesive and silt if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range
Boulders	Over 8 in. (200 mm)
Cobbles	8 inches to 3 inches (200 mm to 75 mm)
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)
Clay	Smaller than 0.005 mm

Description of Other Components Present in Sample	Percent Dry Weight
Trace	1-9
Little	10-19
Some	20-34
And	35-50

CONSISTENCY OF COHESIVE SOILS:

Unconfined Compressive Strength, Qu, tsf	Consistency
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium (firm)
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

RELATIVE DENSITY OF GRANULAR SOILS:

N-Blows per foot	Relative Density
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50 - 80	Very Dense
>80	Extremely Dense

FIELD SAMPLING PROCEDURES

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) - (ASTM Standard D-1586-99)

In the split-barrel sampling procedure, a 2-inch O.D. split barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - ASTM Standard D-1587-94

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are identified, sealed and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

LABORATORY PROCEDURES

Water Content (Wc)

The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)

In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)

In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γd)

The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples

In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in accordance with the STS Soil Classification System which is described on a separate sheet. The soil descriptions on the boring logs are derived from this system as well as the component gradation terminology, consistency of cohesive soils and relative density of granular soils as described on a separate sheet entitled "STS General Notes". The estimated group symbols included in parentheses following the soil descriptions on the boring logs are in general conformance with the Unified Soil Classification System (USCS) which serves as the basis of the STS Soil Classification System.

STS Standard Boring Log Procedures

STS CONSULTANTS, LTD.

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soil engineers, and differences between the field logs and the final logs may exist.

The engineer preparing the report reviews the field and laboratory logs, classifications and test data, and using judgment and experience in interpreting this data, may make further changes.

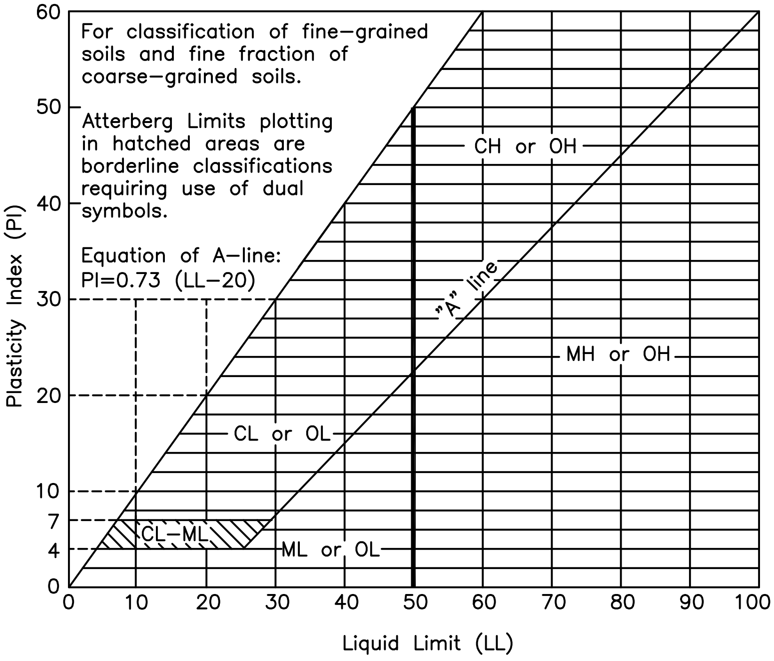
Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

It is common practice in the geotechnical engineering profession that field logs and laboratory data sheets are not included in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs are retained in our office for review by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have been and typically are made in the preparation of our final reports, to the contractor or subcontractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

The descriptive terms and symbols used on the logs are described on the attached sheet, entitled: "General Notes".

STS Soil Classification System(1)

STS Consultants

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria		
Coarse–grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravel (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW	Well–graded, gravel, gravel–sand mixtures, little or no fines	Determine percentages of sand and gravel from grain–size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse–grained soils are classified as follows: Less than 5 percent . . . . . GW, GP, SW, SP More than 12 percent . . . . GM, GC, SM, SC 5 to 12 percent . . . . Borderline cases *requiring* dual symbols(3)	$C_u=\frac{D_{60}}{D_{10}}$ greater than 4; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			GP	Poorly graded gravel, gravel–sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravel with fines (Appreciable amount of fines)	GM	Silty gravel, gravel–sand–silt mixtures		Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are ***borderline*** cases requiring use of dual symbols
			GC	Clayey gravel, gravel–sand–clay mixtures		Atterberg limits above "A" line or PI greater than 7	
	Sand (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sand (Little or no fines)	SW	Well–graded sand, gravelly sand, little or no fines		$C_u=\frac{D_{60}}{D_{10}}$ greater than 6; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3	
			SP	Poorly graded sand, gravelly sand, little or no fines		Not meeting all gradation requirements for SW	
		Sand with fines (Appreciable amount of fines)	SM	Silty sand, sand–silt mixtures		Atterberg limits below "A" line or PI less than 4	Limits plotting in hatched zone with PI between 4 and 7 are ***borderline*** cases requiring use of dual symbols
			SC	Clayey sand, sand–clay mixtures		Atterberg limits above "A" line or PI greater than 7	
Fine–grained soils (More than half of material is *smaller* than No. 200 sieve size)	Silt and clay (Liquid limit less than 50)		ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity	Plasticity Chart (2) 		
			CL	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay			
			OL	Organic silt and organic silty clay of low plasticity			
	Silt and clay (Liquid limit greater than 50)		MH	Inorganic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silt			
			CH	Inorganic clay of high plasticity, fat clay			
			OH	Organic clay of medium to high plasticity, organic silt			
	Highly organic soils		PT	Peat and other highly organic soil			

For classification of fine–grained soils and fine fraction of coarse–grained soils.

Atterberg Limits plotting in hatched areas are borderline classifications requiring use of dual symbols.

Equation of A–line:
PI=0.73 (LL–20)

1) See STS General Notes for component gradation terminology, consistency of cohesive soils and relative density of granular soils.

2) Reference: Unified Soil Classification System

3) Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW–GC, well–graded gravel–sand mixture with clay binder.

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