Materials Testing & Consulting, Inc.

Geotechnical Engineering & Consulting • Materials Testing • Special Inspection • Environmental Consulting

February 23, 2010

Mr. Garner Miller, AIA LEED AP
MSGS Architects
510 Capitol Way South
Olympia, WA 98501

Geotechnical Services – FINAL Memorandum
The Evergreen State College – Boat Storage Building
Centralia, Washington

Project No.: 10S013

Dear Mr. Miller:

In accordance with your request, Materials Testing & Consulting, Inc. (MTC) has conducted a soils investigation and stormwater infiltration analysis for the referenced project. The results of this investigation, together with our recommendations, are contained in the following memorandum.

The work described in this memorandum was conducted following consultation with The Evergreen State College (TESC) facilities department, project civil engineer, and in general accordance with the requirements of the Thurston County Drainage and Design Manual (2009).

As detailed in our proposal for geotechnical services dated February 2, 2010, the scope of services included:

- Field Exploration
  - Call (800) 424-5555 to request public utility locates
  - Log one or two test pits
  - Collect disturbed grab samples
- Laboratory testing consisting of:
  - Sieve analysis with #200 wash
  - Natural moisture content
  - Hydrometer analysis
- Geotechnical Memorandum containing:
  - Subsurface conditions
  - Groundwater conditions
  - Infiltration recommendations

We were not requested to provide an Environmental Site Assessment for this property. Any comments concerning on-site conditions and/or observations, including soil appearances and odors, are provided as general information. Information in this report is not intended to describe, quantify or evaluate any environmental concern or situation.

Project Understanding

The proposed boat storage building will be constructed in the northwest corner of the maintenance yard, which is essentially flat and situated northeast of Driftwood Road NW (see Site Vicinity & Location Plan). This area is currently a gravel-surfaced uncovered storage area. Per TESC facilities staff, stormwater runoff from the existing gravel yard is collected in a catch basin, treated by an oil-water separator, and discharged to the natural area north of the site. No previous geotechnical information from the site is available.

The purpose of our work is to evaluate the existing site soil conditions to aid the design engineer in determining stormwater disposal capacity for the proposed improvements which include the 1,584 square foot storage building and covered storage area.

Field Investigation and Subsurface Conditions

On February 4th, 2010 we visited the site and advanced a boring on the north side of the planned improvements (see Boring Location). The boring was located by pacing off existing site features and is accurate to within a few feet. The boring was excavated by hand auger to a depth of 11.25 feet. During the excavation, we logged the soils encountered in accordance with the Unified Soil Classification System, obtained representative samples of the soils, sealed the samples in plastic bags to preserve their moisture and transported them to our laboratory for re-examination and testing. The soils encountered were silty sand to silt with interbedded poorly graded medium-fine sand below about 5 feet (see Boring Log). Groundwater was encountered at 4.5 feet and is presumed to be representative of the seasonal high water table. No standing surface water was observed.

Laboratory Testing

In the laboratory, the samples were re-examined to verify their field classifications and selected samples tested to measure their moisture content (ASTM D 2216) grain size distribution (ASTM C117, C136, D422), including hydrometer analysis for USDA textural classification. The results of this testing is presented after the boring log.

Research

In addition to the field investigation, we conducted a document search which included review of geologic maps, soil survey maps, water well logs from nearby properties, and interviews with TESC facilities personnel regarding soil conditions typically encountered throughout the site and their performance during previous storm events. During the preparation of this memorandum MTC reviewed "Comprehensive Foundation Investigation, The Evergreen State College" which was prepared by Shannon & Wilson (1971?) as well as Department of Ecology well logs from TESC Motor Pool site study near the intersection of Driftwood Road SW and Evergreen Parkway SW (1999).

Geology

The soil survey by the U.S. Department of Agriculture indicates that the surficial soils consist of Yelm fine sandy loam. This unit is derived from glacial outwash and is typically deposited as outwash

terraces and in depressions. It is typically well-drained with a high capacity to transmit water (about 2-6 inches per hour).[1]

According to the Geologic Map of Washington – Southwest Quadrant, the geology of the site consists of Pleistocene glacial drift deposited during the Vashon stade of continental glaciation (about 13,500 to 15,000 year ago).[2]

The results of our field and laboratory investigation agree with the Geologic Map of Washington but ***do not agree*** with the soil survey map. The soils encountered in our boring are comparable to the Skipopa Silt Loam which is noted on the soil survey map as terminating just north of this site. This unit is derived from volcanic ash and glaciolacustrine deposits and is typically deposited on outwash terraces. This unit is somewhat poorly drained and its capacity to transmit water is described as very low.

Conclusions and Recommendations

Based on the results of our field and laboratory investigation and library research, we conclude that the site soils are not suitable for infiltration based on USDA textural classification. The limiting layer encountered was silt (ML, $D_{(10)} = 0.009$ mm) at a depth of 2.5 feet, with groundwater encountered at 4.5 feet. The Thurston County Drainage and Design Manual (2009) recommends consulting the Department of Ecology Stormwater Management Manual for Western Washington (2005) for finer soils where $D_{(10)} < 0.05$ mm, which recommends a long-term design infiltration rate of about 0.2 inches per hour for this type of soil. See the accompanying labwork for additional information.

Based on a review of both the Thurston County Drainage and Design Manual (2009) and the Department of Ecology Stormwater Management Manual for Western Washington (2005) Volume III, section 3.1.2, a roof downspout dispersion system may be suitable for this site considering the large vegetated area surrounding the proposed development and that site soils are not suitable for infiltration. Additional review of this section is recommended to assess the design feasibility and compliance with Thurston County stormwater requirements.

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[1] *Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)*; United States Department of Agriculture – Natural Resources Conservation Service

[2] *Geologic Map of Washington – Southwest Quadrant*; WA State Department of Natural Resources; Joe D. Dragovich and others; 1987

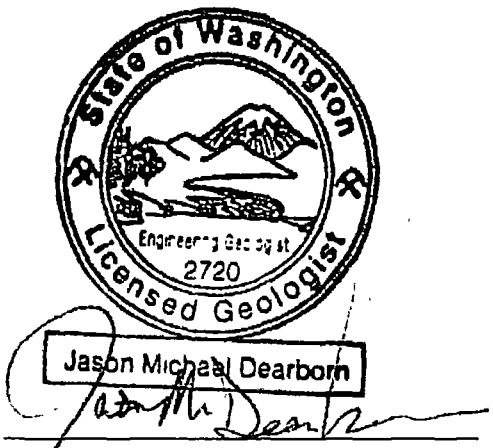
Additional Services and Limitations

We recommend that MTC be engaged to test and evaluate the subgrade soils before installing structures to verify that unexpected soil conditions are not present.

MTC should be notified of any revision in the plans for the proposed improvements and/or foundations from those presented in this report so that we may determine if changes in our recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to our attention.

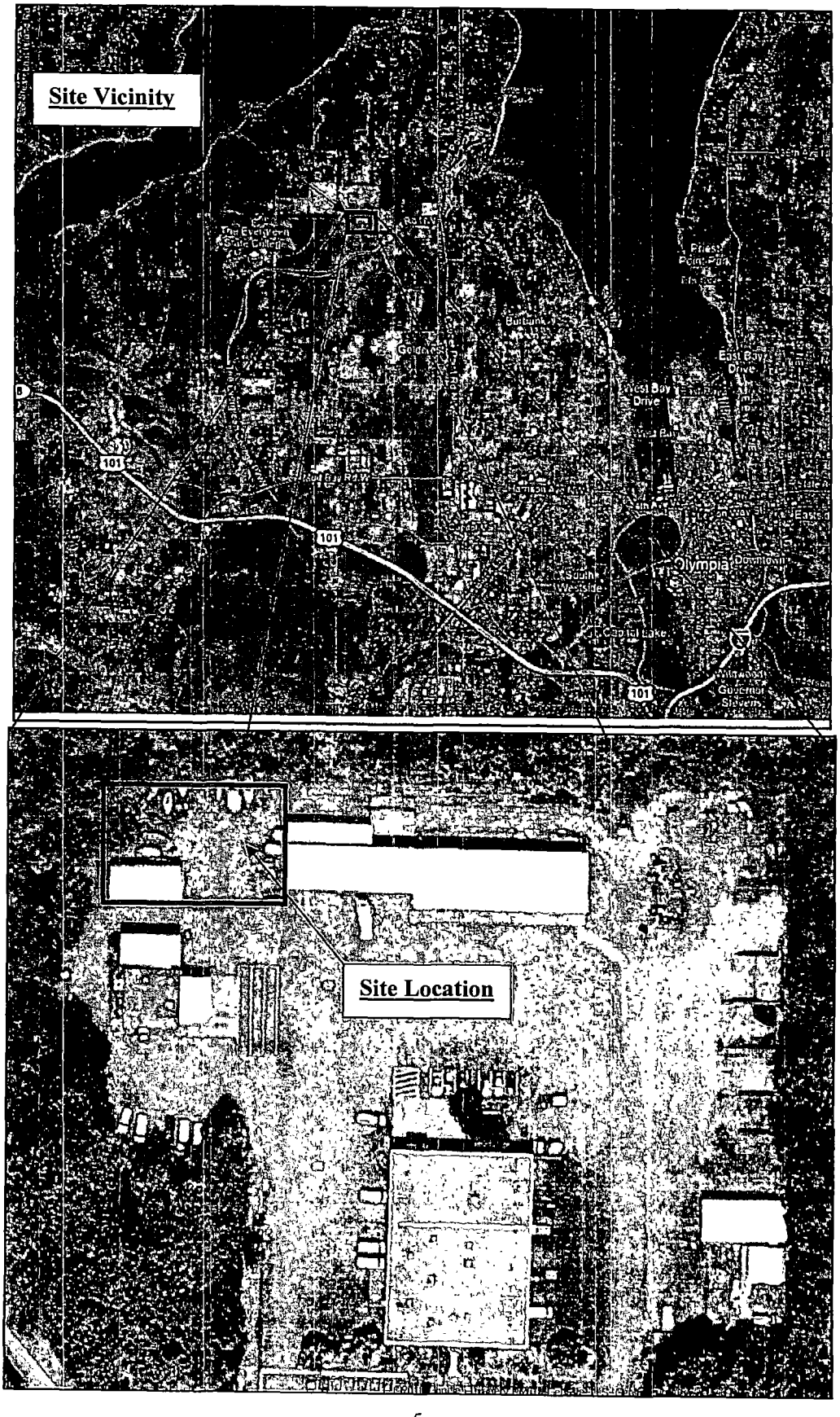
MTC warrants that the findings, recommendations, specifications, or professional advice contained in this report have been developed after being prepared in accordance with generally accepted professional practice in the fields of soil mechanics and engineering geology. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of MSGS Architects, Inc. and their retained design consultants. Findings and recommendations within this report are for specific application to this site and proposed project.

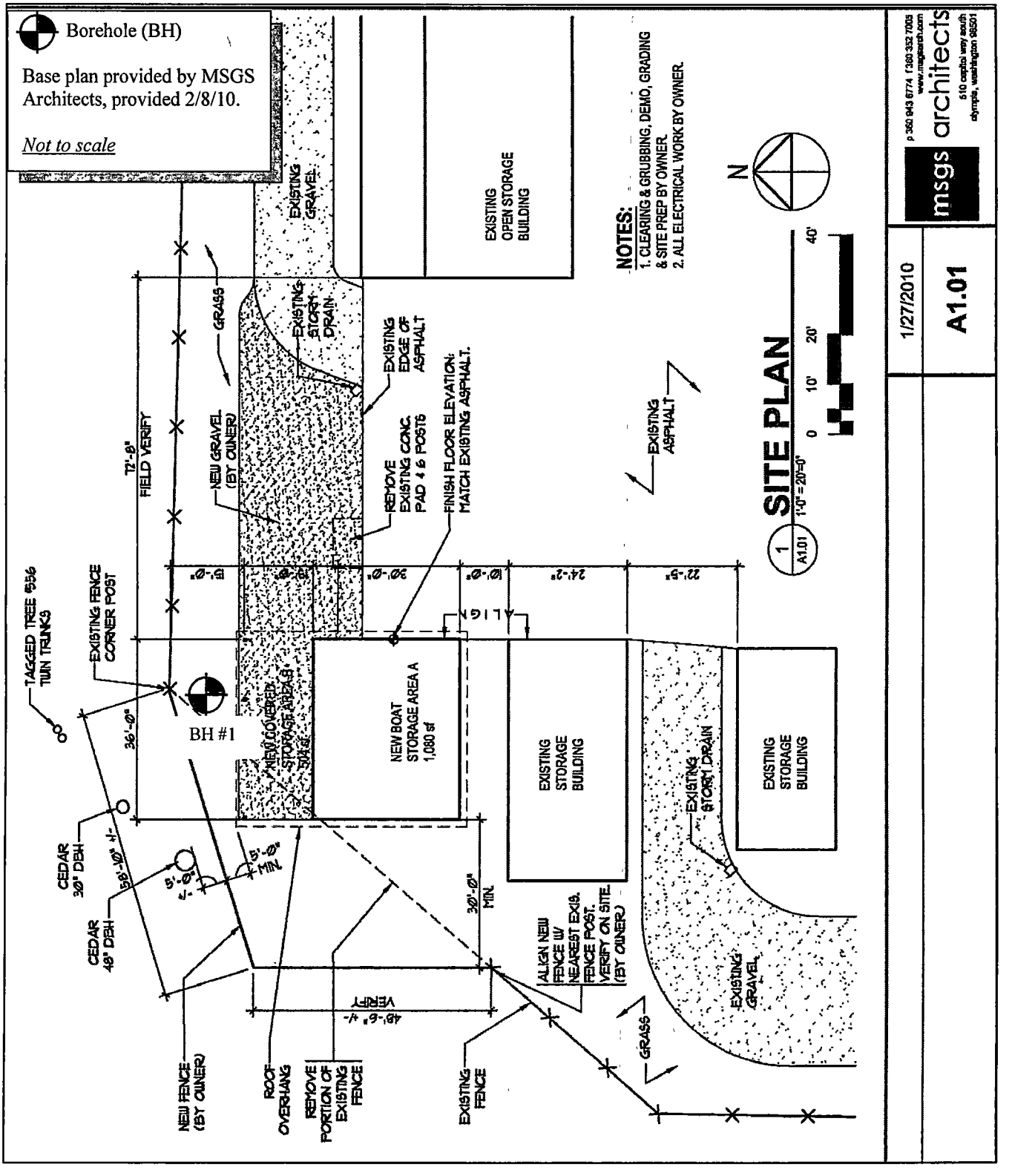


Jason M. Dearborn, L.E.G
Engineering Geologist

Site Vicinity & Location



Boring Locations



Logs of Boring

Unified Soil Classification System Chart

Major Divisions			Graph	USCS	Typical Description
Coarse Grained Soils More Than 50% Retained On No 200 Sieve	**Gravel** More Than 50% of Coarse Fraction Retained On No 4 Sieve	Clean Gravels		GW	Well-graded Gravels, Gravel-Sand Mixtures
				GP	Poorly-Graded Gravels, Gravel-Sand Mixtures
		Gravels With Fines		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand More Than 50% of Coarse Fraction Passing No 4 Sieve	Clean Sands		SW	Well-graded Sands, Gravelly Sands
				SP	Poorly-Graded Sands, Gravelly Sands
		Sands With Fines		SM	Silty Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Clay Mixtures
Fine Grained Soils More Than 50% Passing The No 200 Sieve	**Silts & Clays**	Liquid Limit Less Than 50		ML	Inorganic Silts, rock Flour, Clayey Silts With Low Plasticity
				CL	Inorganic Clays of Low To Medium Plasticity
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	Silts & Clays	Liquid Limit Greater Than 50		MH	Inorganic Silts of Moderate Plasticity
				CH	Inorganic Clays of High Plasticity
				OH	Organic Clays And Silts of Medium to High Plasticity
Highly Organic Soils				PT	Peat, Humus, Soils with Predominantly Organic Content

Sampler Symbol Description

- Standard Penetration Test (SPT)
- Shelby Tube
- Grab or Bulk
- California (3 0" O D)
- Modified California (2 5" O D)

Stratigraphic Contact

- Distinct Stratigraphic Contact Between Soil Strata
- Gradual Change Between Soil Strata
- Approximate location of stratagraphic change

- Groundwater observed at time of exploration
- Measured groundwater level in exploration, well, or piezometer
- Perched water observed at time of exploration

Modifiers

Description	%
Trace	>5
Some	5-12
With	>12

Soil Consistency

Granular Soils		Fine-grained Soils	
Density	***SPT Blowcount***	***Consistency***	***SPT Blowcount***
Very Loose	0-4	Very Soft	0-2
Loose	4-10	Soft	2-4
Medium Dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very Dense	> 50	Very Stiff	15-30
		Hard	> 30

Grain Size

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than a basketball
Cobbles		3 - 12"	3 - 12"	Fist to basketball
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb to fist
	Fine	#4 - 3/4"	0 19 - 0 75"	Pea to thumb
Sand	Coarse	#10 - #4	0 079 - 0 19"	Rock salt to pea
	Medium	#40 - #10	0 017 - 0 079"	Sugar to rock salt
	Fine	#200 - #40	0 0029 - 0 017"	Flour to Sugar
Fines		Passing #200	< 0 0029"	Flour and smaller

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Log of Boring 1

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Evergreen State College
Boat Storage Building
Job No 10S013

Geotechnical Investigation

Date Started	02/04/10
Date Completed	02/04/10
Sampling Method	Grab sampling
Location	12' S of N Fence, 1' SE of SW Fence
Logged By	C Jordan

Depth in Feet	Surf Elev 1*	USCS	GRAPHIC	DESCRIPTION	Samples	Water Level
0	1	SW		Dark grey well graded SAND with gravel, moist, with trace silt and some organics, with grass roots to 6", gravel crushed (Fill)	1	
1	0	SM		Reddish brown mottled silty fine SAND, medium dense, moist, with organics	2	
2	-1	SM		Light brown silty fine SAND, medium dense, wet, mottled	3	
3	-2	ML		Tan clayey SILT, sith some fine sand, mottled	4	
4	-3					
5	-4	CL		SANDY CLAY, Light grey silty CLAY, stiff to very stiff, saturated, mottled, with some fine sand With layers grey medium to fine grained sand to 6" thick, with trace silt, medium dense	5	
6	-5				6	
7	-6				7	
8	-7					
9	-8				8	
10	-9					
11	-10					
				Bottom of boring at 11 25' Water level encountered at 4 5'		
12	-11			*Pavement elevation assumed = 0 0'		
13	-12					
14	-13					
15						

02-08-2010

Hydrometer Report

Project: TESC Boat Storage	**Date Sampled:** 4-Feb-10	**ASTM D 2487 Soils Classification**
Project #: 10S013	**Sampled By:** C Jordan	ML, Silt
Client : MSGS Architects	**Date Tested:** 10-Feb-10	**Sample Color**
Source: B-1 5 @ 60"	**Tested By:** V Duran / T Baggerman	light brown
Sample#: 10-0131		

ASTM D-422, HYDROMETER ANALYSIS

Assumed Sp Gr :	2 65	
Sample Weight:	67 48	grams
Hydroscopic Moist.:	1 50%	
Adj. Sample Wgt :	66 48	grams

ACCREDITED
Certificate #. 1366 01 1366 02 & 1366 03

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
2	35 5	45 9%	0 0314 mm
5	29	37 5%	0 0207 mm
15	24	31 0%	0 0124 mm
30	21	27 1%	0 0090 mm
60	17	22 0%	0 0065 mm
250	9	11 6%	0 0033 mm
1440	3 5	4 5%	0 0014 mm

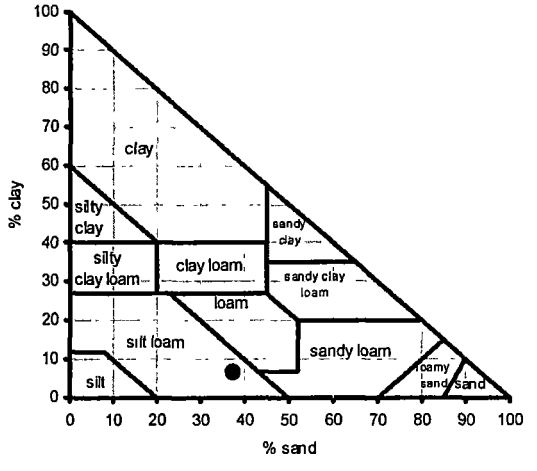
% Gravel:	0 0%	**Liquid Limit:**	0 0 %
% Sand:	14 1%	**Plastic Limit:**	0 0 %
% Silt:	68 8%	**Plasticity Index:**	0 0 %
% Clay:	17 1%		

ASTM C-136

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3 0"	100%	75 000 mm
2 0"	100%	50 000 mm
1 5"	100%	37 500 mm
1 25"	100%	31 500 mm
1 0"	100%	25 000 mm
3/4"	100%	19 000 mm
5/8"	100%	16 000 mm
1/2"	100%	12 500 mm
3/8"	100%	9 500 mm
1/4"	100%	6 300 mm
#4	100%	4 750 mm
#10	100%	2 000 mm
#20	100%	0 850 mm
#40	100%	0 425 mm
#100	89%	0 150 mm
#200	85 9%	0 075 mm
Silts	85 0%	0 074 mm
	62 9%	0 050 mm
	36 9%	0 020 mm
Clays	17 1%	0 005 mm
	6 7%	0 002 mm
Colloids	3 2%	0 001 mm

USDA Soil Textural Classification



		Particle Size
% Sand:	37 1%	2 0 - 0 05 mm
% Silt:	56 3%	0 05 - 0 002 mm
% Clay:	6 7%	< 0 002 mm

USDA Soil Textural Classification
Silt Loam

Comments:

Reviewed by: J Dearborn, L E G

Sieve Report

Project: TESC Boat Storage	**Date Received:** 4-Feb-10	**ASTM D-2487 Unified Soils Classification System**	
Project #: 10S013	**Sampled By:** C Jordan	ML, Silt	
Client: MSGS Architects	**Date Tested:** 10-Feb-10	**Sample Color:**	
Source: B-1 5 @ 60"	**Tested By:** V Duran / T Baggerman	light brown	
Sample#: 10-0131			

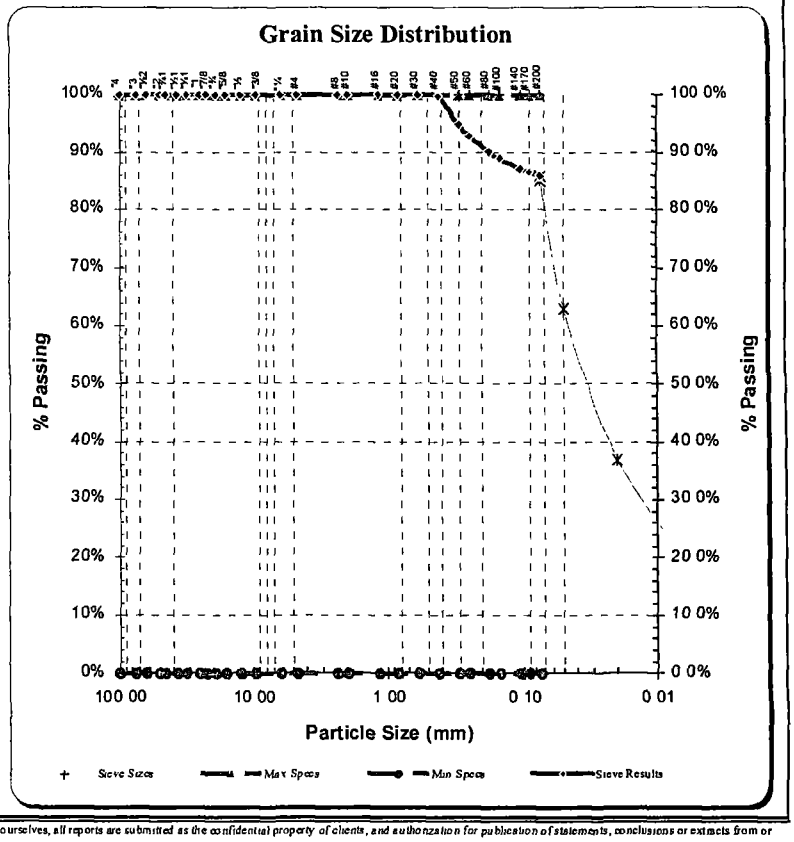
ACCREDITED
Certificate # 1368.01 1368.02 & 1368.03

Specifications
No Specs
Sample Meets Specs ? Yes

$D_{(5)}$ = 0 004 mm	% Gravel = 0 0%	Coeff of Curvature, C_C = 1 50
$D_{(10)}$ = 0 009 mm	% Sand = 14 1%	Coeff of Uniformity, C_U = 6 00
$D_{(30)}$ = 0 026 mm	% Silt & Clay = 85 9%	Fineness Modulus = 0 16
$D_{(50)}$ = 0 044 mm	Fracture % = n/a	Liquid Limit = 0 0%
$D_{(60)}$ = 0 052 mm	Moisture %, as sampled = 26 1%	Plastic Limit = 0 0%
$D_{(90)}$ = 0 179 mm	Sand Equivalent= n/a	Plasticity Index = 0 0%

ASTM C-136, ASTM D-4318

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6 00"	150 00		100%	100 0%	0 0%
4 00"	100 00		100%	100 0%	0 0%
3 00"	75 00		100%	100 0%	0 0%
2 50"	63 00		100%	100 0%	0 0%
2 00"	50 00		100%	100 0%	0 0%
1 75"	45 00		100%	100 0%	0 0%
1 50"	37 50		100%	100 0%	0 0%
1 25"	31 50		100%	100 0%	0 0%
1 00"	25 00		100%	100 0%	0 0%
7/8"	22 40		100%	100 0%	0 0%
3/4"	19 00		100%	100 0%	0 0%
5/8"	16 00		100%	100 0%	0 0%
1/2"	12 50		100%	100 0%	0 0%
3/8"	9 50		100%	100 0%	0 0%
1/4"	6 30		100%	100 0%	0 0%
#4	4 75		100%	100 0%	0 0%
#8	2 360		100%	100 0%	0 0%
#10	2 000		100%	100 0%	0 0%
#16	1 180		100%	100 0%	0 0%
#20	0 850		100%	100 0%	0 0%
#30	0 600		100%	100 0%	0 0%
#40	0 425	100%	100%	100 0%	0 0%
#50	0 300		95%	100 0%	0 0%
#60	0 250		93%	100 0%	0 0%
#80	0 180		90%	100 0%	0 0%
#100	0 150		89%	100 0%	0 0%
#140	0 106		87%	100 0%	0 0%
#170	0 090		87%	100 0%	0 0%
#200	0 075	85 9%	85 9%	100 0%	0 0%



Comments: _____

Reviewed by: J Dearborn, L E G

Hydrometer Report

Project:	TESC Boat Storage	**Date Sampled:**	4-Feb-10	**ASTM D 2487 Soils Classification**	
Project #:	10S013	**Sampled By:**	C Jordan	ML, Silt	
Client :	MSGS Architects	**Date Tested:**	10-Feb-10	**Sample Color**	
Source:	B-1 4 @ 39"	**Tested By:**	V Duran / T Baggerman	light brown	
Sample#:	10-0132				

ASTM D-422, HYDROMETER ANALYSIS

Assumed Sp Gr :	2 65	
Sample Weight:	68 28	grams
Hydroscopic Moist.:	1 00%	
Adj. Sample Wgt :	67 60	grams

ACCREDITED
Certificate #: 1366 01, 1366 02 & 1366 03

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
2	42 5	53 6%	0 0296 mm
5	38	47 9%	0 0194 mm
15	30	37 8%	0 0119 mm
30	26	32 8%	0 0086 mm
60	20	25 2%	0 0064 mm
250	12	15 1%	0 0033 mm
1440	5 5	6 9%	0 0014 mm

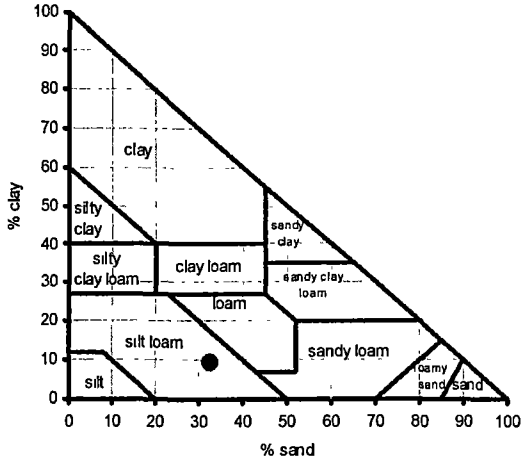
% Gravel:	0 0%	**Liquid Limit:**	0 0 %
% Sand:	14 8%	**Plastic Limit:**	0 0 %
% Silt:	64 4%	**Plasticity Index:**	0 0 %
% Clay:	20 8%		

ASTM C-136

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3 0"	100%	75 000 mm
2 0"	100%	50 000 mm
1 5"	100%	37 500 mm
1 25"	100%	31 500 mm
1 0"	100%	25 000 mm
3/4"	100%	19 000 mm
5/8"	100%	16 000 mm
1/2"	100%	12 500 mm
3/8"	100%	9 500 mm
1/4"	100%	6 300 mm
#4	100%	4 750 mm
#10	100%	2 000 mm
#20	100%	0 850 mm
#40	100%	0 425 mm
#100	88%	0 150 mm
#200	85 2%	0 075 mm
Silts	84 5%	0 074 mm
	67 8%	0 050 mm
	48 2%	0 020 mm
Clays	20 8%	0 005 mm
	9 5%	0 002 mm
Colloids	4 9%	0 001 mm

USDA Soil Textural Classification



		Particle Size
% Sand:	32 2%	2 0 - 0 05 mm
% Silt:	58 3%	0 05 - 0 002 mm
% Clay:	9 5%	< 0 002 mm

USDA Soil Textural Classification
Silt Loam

Comments: _____

Reviewed by: J Dearborn, L E G

Laboratory Results

Sieve Report

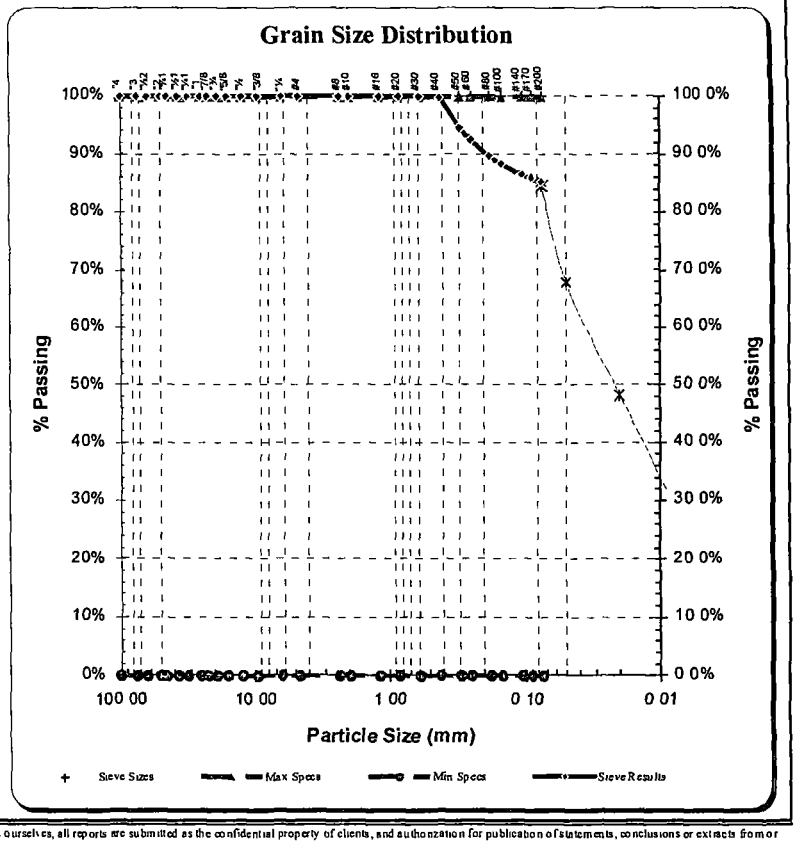
Project: TESC Boat Storage	**Date Received:** 4-Feb-10	**ASTM D-2487 Unified Soils Classification System**	
Project #: 10S013	**Sampled By:** C Jordan	ML, Silt	
Client: MSGS Architects	**Date Tested:** 10-Feb-10	**Sample Color:**	
Source: B-1.4 @ 39"	**Tested By:** V Duran / T Baggerman	light brown	
Sample#: 10-0132			

ACCREDITED
Certificate # 1368.01, 1368.02 & 1368.03

Specifications	$D_{(5)}$ = 0.004 mm	% Gravel = 0.0%	Coeff of Curvature, C_C = 1.50
No Specs	$D_{(10)}$ = 0.009 mm	% Sand = 14.8%	Coeff of Uniformity, C_U = 6.00
Sample Meets Specs ? Yes	$D_{(30)}$ = 0.026 mm	% Silt & Clay = 85.2%	Fineness Modulus = 0.17
	$D_{(50)}$ = 0.044 mm	Fracture % = n/a	Liquid Limit = 0.0%
	$D_{(60)}$ = 0.053 mm	Moisture %, as sampled = 29.6%	Plastic Limit = 0.0%
	$D_{(90)}$ = 0.191 mm	Sand Equivalent= n/a	Plasticity Index = 0.0%

ASTM C-136, ASTM D-4318

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
7/8"	22.40		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75		100%	100.0%	0.0%
#8	2.360		100%	100.0%	0.0%
#10	2.000		100%	100.0%	0.0%
#16	1.180		100%	100.0%	0.0%
#20	0.850		100%	100.0%	0.0%
#30	0.600		100%	100.0%	0.0%
#40	0.425	100%	100%	100.0%	0.0%
#50	0.300		95%	100.0%	0.0%
#60	0.250		92%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150		88%	100.0%	0.0%
#140	0.106		86%	100.0%	0.0%
#170	0.090		86%	100.0%	0.0%
#200	0.075	85.2%	85.2%	100.0%	0.0%



Comments: _____

Reviewed by: J Dearborn, L E G

Limitations and Use of This Report

The following is adapted from "Important Information About Your Geotechnical Report" provided by ASFE The Best People On Earth; www.asfe.org; and "The Geotechnical Engineering and Environmental Services Standards of Care with Respect to Mold Potentials 1998 – 2003" by ASFE The Best People On Earth.

Geotechnical Services are Performed for Specific Purposes, Persons, and Projects

Materials Testing & Consulting, Inc. (MTC) services are structured to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, prepared solely for the client, no one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. This report may not be applied to any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report is Based on a Unique Set of Project-Specific Factors

The scope of study for which this geotechnical report was prepared considered several unique, project-specific factors. These factors include, but are not limited to: the clients goals, objectives, and risk management preferences; the general nature of the structure involved, its size and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless MTC specifically indicates otherwise, do not rely on this report if it was: not prepared for you; not prepared for your project; not prepared for the specific site explored; or completed before important project changes were made.

Typical changes that can reduce the reliability and application of this report include those that affect: the function of the proposed structure; elevation, configuration, location, orientation, or weight of the proposed structure; compositions of the design team; or project ownership.

Changes made to the project following completion of this report should be made known to MTC so that MTC can assess the potential impact of such changes and make any necessary modifications to our interpretations and recommendations in writing.

Subsurface Conditions Can Change

This report is based on conditions that existed at the time the study was performed. The interpretations, conclusions, and recommendations in this report may be affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. MTC should always be contacted to determine if the report is still reliable.

Most Geotechnical Findings Are Professional Opinions

Site exploration utilizes test borings and/or test pits that are widely spaced over ground area relevant to a unique scope of work; additionally, soil samples are taken at variable spacing over the depth of exploration. The variability of subsurface conditions may exceed that of the site investigation program. MTC reviews field and laboratory data and then apply professional judgment to render an opinion about subsurface conditions throughout the site. Actual site subsurface conditions may significantly deviate from those indicated in this report. Retaining MTC to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not over-rely on the construction recommendations included in this report. The recommendations in this report are not final; they are developed principally from the judgment and opinion of MTC staff. MTC's recommendations are contingent upon observing actual subsurface conditions revealed during construction. MTC cannot assume responsibility or liability for the report's recommendations if MTC does not perform construction observation.

A Geotechnical Report May be Subject to Misinterpretation

Misinterpretation of this report by members of the project design team not employed by MTC can result in costly problems. This risk may be reduced by having MTC confer with appropriate members of the design team after submittal of this report. MTC should be retained to review pertinent elements of the design team's plans and specifications. To avoid misinterpretation of this report by contractors, MTC may be retained to participate in pre-bid and pre-construction conferences, and by providing construction monitoring.

Do Not Redraw The Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproductions are acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors A Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposed of bid development and that the report's accuracy is limited; encourage them to confer with MTC and/or to conduct additional study to obtain the specific type of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some financial responsibilities stemming from unanticipated conditions.

Read Limitations Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering and engineering geology are far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have lead to disappointments, claims, and disputes. To help reduce the risk of such outcomes, MTC includes *limitations* in this report. Read the limitations closely and contact MTC if you have any questions regarding these provisions.

Environmental Concerns Are Not Addressed In This Report

The equipment, techniques, and personnel used to perform an environmental site assessment study differ significantly from those used to perform a geotechnical study. For that reason, a geotechnical engineering report does not usually relate any environmental findings, conclusions, or recommendations.