

**GEOTECHNICAL DATA REPORT
PROPOSED OSHER MAP & GLICKMAN FAMILY
LIBRARY ADDITION
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE**

by

**Haley & Aldrich, Inc.
Portland, Maine**

for

**University of Southern Maine
Portland, Maine**

**File No. 32553-000
23 October 2006**

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23 October 2006
File No. 32553-000

University of Southern Maine
Facilities Management
96 Falmouth Street, P.O. Box 9300
Portland, Maine 04104-9300

Attention: Ms. Carol M. Potter
Building Construction Engineer

Subject: Proposed Osher Map & Glickman Family Library Addition
University of Southern Maine
Portland, Maine

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Ladies and Gentlemen:

This report presents the results of the subsurface investigation program conducted in support of the proposed Osher Map & Glickman Family Library (OML) Addition at the University of Southern Maine (USM) campus in Portland, Maine. This work was undertaken at your request in accordance with our proposal dated 21 October 2005 and your subsequent authorization. Foundation design recommendations will be provided under separate cover.

ELEVATION DATUM

Elevations referenced herein are in feet and reference Portland City Datum (PCD). Portland City Datum relates to the National Geodetic Vertical Datum of 1929 (NGVD 29) as follows:

$$\text{Elevation in feet (PCD)} = \text{Elevation in ft (NGVD 29)} + 0.02 \text{ ft}$$

EXISTING SITE CONDITIONS & PREVIOUS USE

The site is bound by Bedford Street to the west, Forest Avenue to the north, 20 Bedford Street (Eastern Electric) and 53 Winslow Street (Portland Plastic Pipe) to the south and I-295 to the east. Site location is shown on Figure 1, Project Locus.

Existing buildings present at the site include the Eastern Electric Building (20 Bedford Street) and Portland Plastic Pipe (53 Winslow Street). The remaining portion of the proposed site development area consists of bituminous concrete parking areas. It is our understanding that prior to construction these buildings will be razed.

Prior to its current use, the OML building, constructed circa 1920, housed the Down East Bakery operated by National Biscuit Co. The project site was primarily undeveloped prior to 1920 with the exception of the Boston & Maine rail line which bisected the property from east

to west, running parallel to Forest Avenue. Historic Sanborn Maps of the site are provided in Appendix C. Please note that the Back Cove shoreline north of Forest Avenue was only about 1,000 ft north of the existing OML building in 1909.

Current site grades are relatively flat, ranging from El. 23 at the Eastern Electric Building to El. 21 along the south side of the existing Library.

PROPOSED SITE DEVELOPMENT

The proposed development includes the construction of the Osher Map & Glickman Family Library Addition (Library Addition). The approximate location and orientation of the proposed Library Addition footprint, shown relative to existing conditions is provided on Figure 2.

The proposed Library Addition is planned to be approximately 7,800 square foot (sf) in plan area. The Library Addition will directly abut the western and southern exterior walls of the existing OML Building. It is our understanding that the program space for the Library Addition has not yet been finalized (in particular, the number of above-grade floors has not been determined). Structural loading information and proposed column layout were not available at the time this report was prepared.

SUBSURFACE EXPLORATION PROGRAM

Three test borings, designated HA06-1 through HA06-3 were drilled within the footprint of the proposed Library Addition in August 2006. Test boring locations were determined in the field by taping distances from existing site features. "As-drilled" test boring locations were determined in the field by Haley & Aldrich personnel using global positioning system (GPS) equipment and are shown on Figure 2.

Subsurface explorations were drilled by Maine Test Borings, Inc. of Brewer, Maine using a Mobile Drill B-53 truck-mounted drill rig. Test borings were advanced to depths ranging from 22.0 to 42.7 ft below ground surface (BGS) using 3.0 in. (NW-size) or 4.0 in. (HW-size) inside diameter (ID) steel casing. Soil samples were collected at standard 5-ft intervals by driving a 24-in. long, 1-3/8 in. ID split-spoon sampler with a 140-pound hammer dropped from a height of 30 in. The number of hammer blows required to advance the sampler for each 6-in. interval was recorded and is provided on the test boring logs. The Standard Penetration Test (SPT) N-value is the total number of hammer blows required to advance the sampler through the middle 12-in. of the 24-in. sampling interval.

In-situ vane shear tests were performed in two of the three test borings to provide information on the undrained shear strength and compressibility characteristics of the clay stratum present at the site. In addition, one 2.5-in. diameter, thin-walled Shelby Tube samples was obtained from test boring HA06-2. Results of in-situ vane shear testing are presented on the test boring logs and are summarized in Table II.

One test boring, HA06-3 was advanced 7.7 ft into bedrock using a 2.0 in. (NQ-size) diamond-tipped core barrel.

One observation well was installed in completed borehole HA06-1 to provide information on the static groundwater level within the footprint of the proposed Library Addition. The observation well consisted of a 10-ft long, 2-in. ID, machine-slotted PVC pipe placed in the bottom of the borehole. A solid PVC riser pipe extended from the top of the machine-slotted section to just below existing ground surface. Filter sand was used to backfill the annular space between the borehole wall and the PVC pipe. The observation well was protected using a steel roadway box with a bolted cap.

Haley & Aldrich personnel were present to monitor drilling activities and to prepare logs detailing the soil, bedrock and groundwater conditions encountered in each of the test borings. All soil and bedrock samples were collected and preserved in glass jars (soil) and wooden boxes (bedrock), respectively. The soil and bedrock samples are currently stored at the Haley & Aldrich laboratory facility in Portland, Maine and are available for review upon request.

Test boring logs are provided in Appendix A. Observation well installation and groundwater monitoring reports are provided in Appendix B.

SUBSURFACE CONDITIONS

Soil/Bedrock Conditions

Subsurface explorations encountered the following geologic units, presented in order of increasing depth below ground surface:

- Bituminous Concrete
- Fill
- Marine Clay
- Marine Sand
- Glacial Till
- Bedrock

Not all geologic units were encountered at each exploration location. Refer to Table I for a summary of subsurface explorations and Appendix A for logs of test borings. A brief description of each soil type is provided below.

Bituminous Concrete

A thin layer of bituminous concrete was encountered at each test boring location. The thickness of the layer was typically on the order of 0.2 ft (2.5 in.).

Fill

Fill was encountered in each test boring. The thickness of the material ranged from 4.8 to 12.8 ft and generally increased in thickness to the east (toward I-295). Fill encountered directly beneath the bituminous concrete layer consisted of tan to yellow-brown, well-graded SAND with gravel (SW). This material was typically loose to medium dense with SPT N-values ranging from 6 to 19 blows per foot (bpf). Below this material, fill typically consisted of gray, sandy lean CLAY (CL). Based on visual inspection of the samples, we believe that

this material is reworked marine clay. SPT N-values were generally less than 5 bpf.

Marine Clay

The marine clay deposit was encountered in each of the test borings, but was penetrated in only two of the borings (HA06-2 and HA06-3). The deposit was found to be approximately 30 ft thick at each of these boring locations. The upper 10 ft of the deposit generally consisted of olive-gray, lean CLAY (CL). This portion of the layer was typically medium stiff to very stiff (becoming softer with depth) with SPT N-values ranging from 5 to 25 bpf. The lower portions of the deposit consisted of soft gray, lean CLAY (CL) with SPT N-values ranging from 1 to 2 bpf. The presence of fine sand seams and lenses typically increased with depth. Measured undrained shear strengths in the soft clay deposit generally ranged from 600 to 800 psf. Undrained shear strengths in excess of 1,000 psf were measured at depths where frequent fine sand seams and lenses were encountered.

Marine Sand

A thin layer (i.e., 3.0 to 6.5 ft) of marine sand was encountered directly beneath the marine clay in test borings HA06-2 and HA06-3. The material typically consisted of tan to yellow-brown, well-graded to poorly graded SAND with silt (SW/SP-SM). The soil was medium dense with SPT N-values ranging from 10 to 12 bpf.

Glacial Till

A thin layer (i.e., 3.1 ft) of glacial till was encountered in test boring HA06-3. The material consisted of gray, well graded SAND with silt (SW-SM). The soil was medium dense in nature with SPT N-values on the order of 20 bpf.

Bedrock

Bedrock was encountered in test borings HA06-2 and HA06-3 at a depth of approximately 40 ft BGS (El. -20). Bedrock sampled in test boring HA06-3 consisted of moderately hard to hard, fresh to moderately weathered, gray SCHIST. Primary joint sets were dipping at moderate angles, parallel to foliation. Frequent calcite veins were observed.

Rock Quality Designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of the lengths of pieces of recovered bedrock greater than 4 in., divided by the total length of recovered bedrock. RQD values for the two rock core samples collected ranged between 47 and 48 percent.

Groundwater Conditions

Groundwater levels measured between August and October 2006 in the observation well installed in completed borehole HA06-1 ranged between 6.6 and 11.3 ft BGS (El. 9.7 to El. 14.4). We consider these levels, although quite variable, representative of static groundwater levels at this location and on the date the measurements were made.

Groundwater levels can be expected to fluctuate and are subject to seasonal variations, local

soil conditions, topography and precipitation. Groundwater levels encountered during construction may differ from those observed in the test borings or observation well.

Observation well installation and groundwater monitoring reports are provided in Appendix B.


CLOSURE

This report summarizes the findings of the geotechnical investigation conducted in support of the proposed Osher Map & Glickman Family Library Addition at the University of Southern Maine campus in Portland, Maine. The information presented herein will be the basis for all geotechnical analyses used to evaluate foundation support requirements for the Library Addition. The design team is currently developing conceptual design documents. Upon completion, recommendations for foundation design and other geotechnical-related construction activities will be provided.

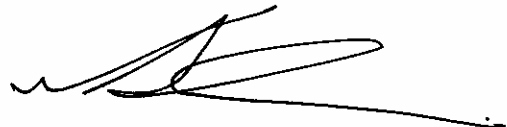
As discussed with you, it will be necessary to conduct several exploratory test pits adjacent or within the existing OML building to determine the foundation support for the existing building. This information will be critical to designing the foundation and structural systems for the proposed Library Addition.

We appreciate the opportunity to provide geotechnical services on this project. Please do not hesitate to call if you have any questions or comments.

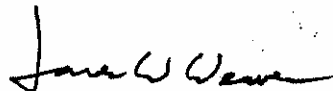
Sincerely yours,
HALEY & ALDRICH, INC.



Bryan C. Steinert
Engineer



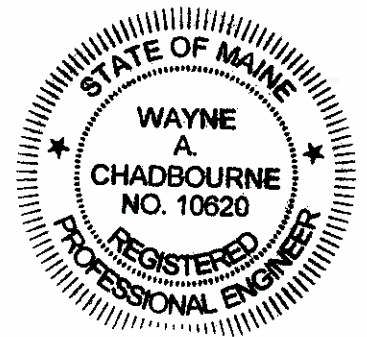
Wayne A. Chadbourne, P.E.
Senior Engineer



James W. Weaver, P.E.
Vice President

Enclosures:

Figure 1	Project Locus
Figure 2	Site and Subsurface Exploration Location Plan
Table I	Subsurface Explorations
Table II	In-Situ Vane Shear Test Results
Appendix A	Test Boring Logs
Appendix B	Observation Well Installation & Groundwater Monitoring Reports
Appendix C	Historic Sanborn Maps



REFERENCES

1. "Preliminary Phase Geotechnical Data Report, University Commons – Proposed Phase II Residence Hall, University of Southern Maine, Portland, Maine," prepared by Haley & Aldrich, Inc. for the University of Southern Maine, dated 31 March 2006.
2. "Report on Subsurface Investigations and Foundation Design Recommendations, University Commons – Muskie & OLLI Building, University of Southern Maine, Portland, Maine," prepared by Haley & Aldrich, Inc. for the University of Southern Maine, dated 17 February 2006.

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TABLE I
 Subsurface Explorations
 University Commons - Proposed Library Addition
 University of Southern Maine
 Portland, Maine

Test Boring No. ¹	Estimated Ground Surface Elevation ^{2,3}	Thickness of Strata (ft)					Approximate Elevation of top of Bedrock ^{2,3}
		Bituminous Concrete	Fill	Marine Deposits		Glacial Till	
				Clay	Sand		
HA06-1(OW)	21.0	0.2	12.8	>9.0	NE	NE	NE
HA06-2	22.0	0.2	4.8	31.0	6.5	NE	-20.5
HA06-3	21.0	0.2	4.8	30.0	3.0	3.1	-20.1

Notes:

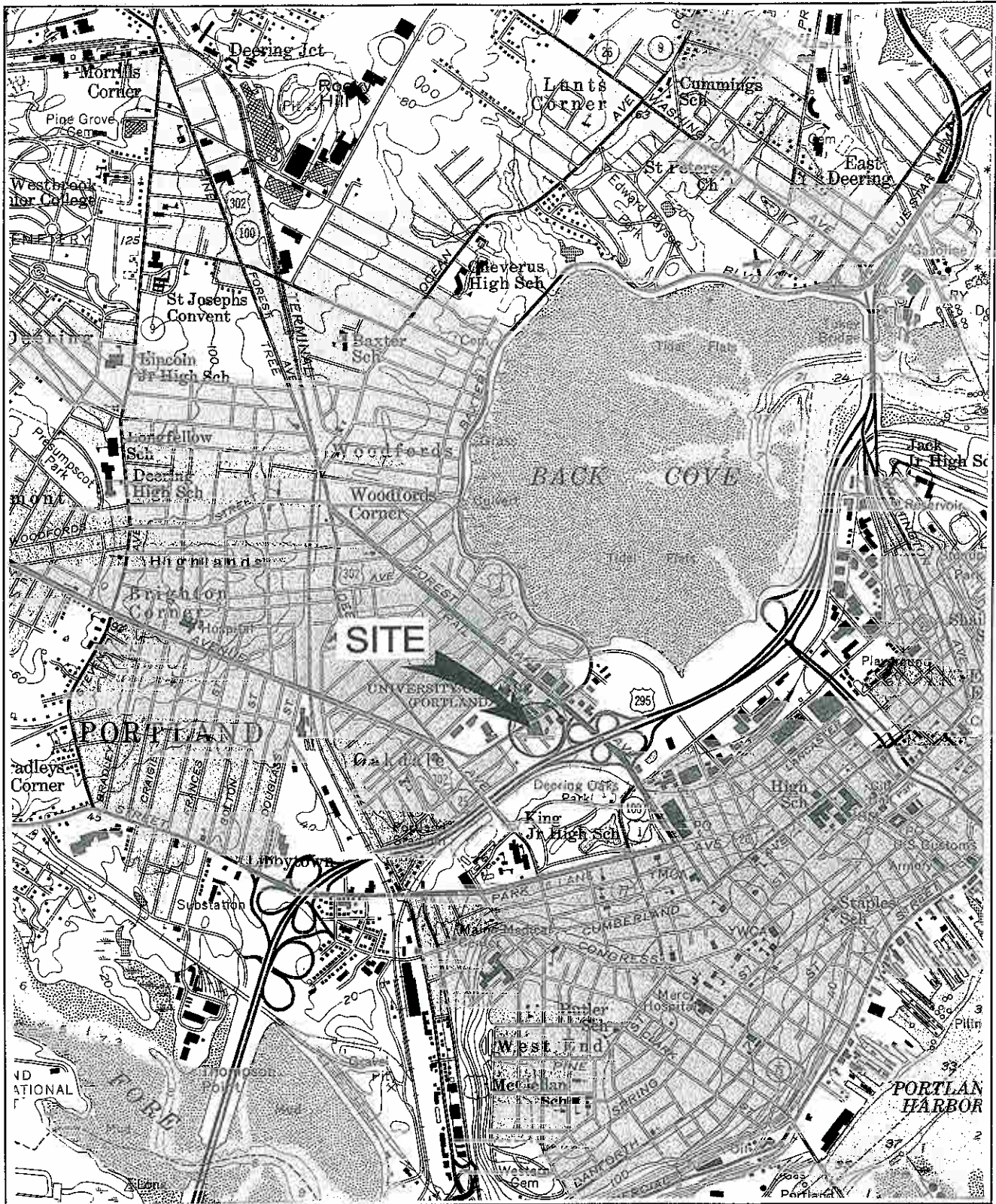
- ¹ Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.
- ² Ground surface elevations at test boring locations are approximate and were estimated by interpolating between elevation contour data provided by Woodard & Curran.
- ³ Elevations are in feet and reference Portland City Datum.
- ⁴ "NE" indicates stratum was not encountered in test boring

TABLE II
In-Situ Vane Shear Test Results
 University Commons - Proposed Library Addition
 University of Southern Maine
 Portland, Maine

Test Boring No.	Estimated Ground Surface Elevation ²	Vane Size ⁷ (in. x in.)	Test No. ³	Depth below ground surface (ft)	Approx. Elevation (ft)	V _{max} ⁴ (in-lbs)	V _{remolded} ⁴ (in-lbs)	S _u ⁵ (psf)	S _{u(remolded)} ⁵ (psf)
HA06-2	22.0	3.5 x 8	FV1	19.4 - 20.0	2.6 - 2.0	>600	190	>690	220
		2 x 8.5	FV2	22.3 - 23.0	-0.3 - -1.0	185	18	620	60
		2 x 8.5	FV3	25.3 - 26.0	-3.3 - -4.0	220	100	750	340
		2 x 8.5	FV4	30.3 - 31.0	-8.3 - -9.0	525	405	1,760	1360
HA06-3	21.0	2 x 8.5	FV1	20.3 - 21.0	0.7 - 0.0	240	140	800	470
		2 x 8.5	FV2	30.3 - 31.0	-9.3 - -10.0	545	285	1,830	960

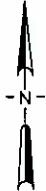
Notes:

- ¹ Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.
- ² Ground surface elevations at test boring locations are approximate and were estimated by interpolating between elevation contour data provided by Woodard & Curran.
- ³ Elevations are in feet and reference Portland City Datum.
- ⁴ Vane readings are provided on the Test Boring Reports presented in Appendix A.
- ⁵ V_{max} and V_{remolded} represent direct peak and remolded vane torque values, respectively.
- ⁶ S_u and S_{u(remolded)} represent corrected undrained peak and residual shear strengths, respectively, rounded to the nearest 10 psf
- ⁷ ft-lbs = foot-pounds of torque, psf = pounds per square foot



FILE NO. 32553-000

SITE COORDINATES: N43°39'42", W70°16'23"



U.S.G.S. QUADRANGLE: PORTLAND WEST, MAINE



PROPOSED UNIVERSITY COMMONS
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

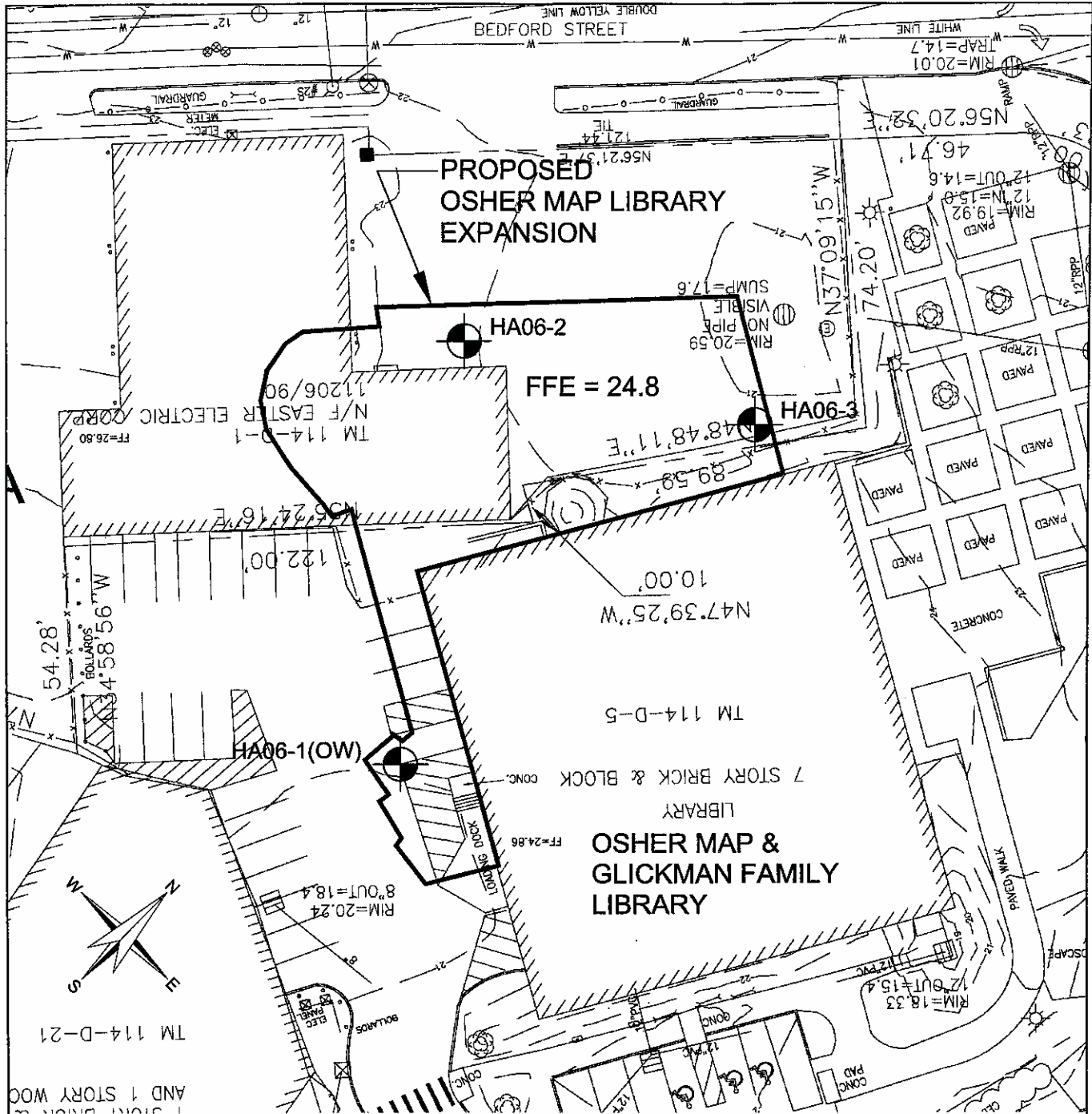
PROJECT LOCUS

UNDERGROUND
ENGINEERING &
ENVIRONMENTAL
SOLUTIONS

APPROX. SCALE: 1:25,000

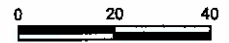
FEBRUARY 2006

FIGURE 1



- NOTES:**
1. EXISTING SITE CONDITIONS, CONTOURS OF EXISTING GROUND SURFACE ELEVATIONS AND LOCATION AND ORIENTATION OF EXISTING SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE "5-111.DWG" PROVIDED BY WOODARD & CURRAN, DATED 8 SEPTEMBER 2005.
 2. PROPOSED SITE CONDITIONS AND LOCATION AND ORIENTATION OF PROPOSED SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE "203840-SD-2000.DWG" PROVIDED BY WOODARD & CURRAN.
 3. PROPOSED FINISH FLOOR SLAB ELEVATIONS PROVIDED BY WEIDLINGER ASSOCIATES, INC. ON 27 DECEMBER 2005.
 4. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH, INC. PERSONNEL.
 5. LOCATIONS OF RECENT TEST BORINGS WERE DETERMINED IN THE FIELD BY HALEY & ALDRICH USING GPS EQUIPMENT.
 6. ELEVATIONS ARE IN FEET AND REFERENCE PORTLAND CITY DATUM.
 7. REFER TO APPENDIX A FOR LOGS OF RECENT TEST BORINGS AND APPENDIX B FOR OBSERVATION WELL INSTALLATION AND GROUNDWATER MONITORING REPORTS.

- LEGEND:**
- HA06-2 DESIGNATION AND LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS OF BREWER, MAINE IN AUGUST 2008
 - 20 ELEVATION CONTOUR OF EXISTING GROUND SURFACE
 - (OW) DENOTES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE



HALEY & ALDRICH UNIVERSITY COMMONS
 PROPOSED OSHER MAP & GLICKMAN FAMILY LIBRARY ADDITION
 UNIVERSITY OF SOUTHERN MAINE
 PORTLAND, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
 OCTOBER 2006

FIGURE 2

S:\132553\DWG\132553_FIN.DWG

APPENDIX A

Test Boring Logs



TEST BORING REPORT

Boring No. HA06-1(OW)

Project University Commons Portland, Maine
 Client University of Southern Maine
 Contractor Maine Test Borings, Inc.

File No. 32553-000
 Sheet No. 1 of 2
 Start August 28, 2006
 Finish August 28, 2006
 Driller D. McKeen

Type	Casing	Sampler	Barrel	Drilling Equipment and Procedures
HW	SS	-	-	Rig Make & Model: Mobile Drill B-53 Truck
Inside Diameter (in.)	4.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	30	30	-	Casing: HW Drive 10.0 ft
				Hoist/Hammer: Winch/ Safety Hammer

H&A Rep. B. Steinert
 Elevation 21.0 +/-
 Datum Portland City
 Location See Plan

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size ² , structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test					
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
0							-BITUMINOUS CONCRETE-	10	5	20	50	10	5					
11		S1	0.2		0.2	SW	Medium dense, tan to yellow brown, well graded SAND with gravel (SW), mps 1 in., no structure, no odor, dry to moist											
10		12	2.2															
9								-FILL-										
6						1.5	SW	Loose to medium dense, gray-brown, well graded SAND with gravel (SW), mps 3/4 in., no structure, no odor, moist, brick and concrete fragments present	0	25	15	40	10	10				
								-FILL-										
								NOTE: Metal fragments observed in drill cuttings from 2 to 5 ft.										
5		S2	5.0				SW	Medium dense, gray-brown, well graded SAND with gravel (SW), mps 1.25 in., no structure, no odor, moist, brick and concrete fragments present, trace wood fibers	30	10	15	25	5	5				
4		6	7.0					-FILL-										
7								NOTE: Refusal on obstruction at 6.5 ft. Move over 3 ft and re-drill. Refusal on obstruction at 6.4 ft. Move hole 17 ft off building and re-drill.										
50 (0.0)																		
10		S3	10.0				CL	Soft, gray, sandy lean CLAY (CL), mps 2 mm, slightly bonded, no odor, wet, brick fragments and brown fine to medium sand present, reworked natural material	0	0	0	25	15	60				
2		6	12.0					-FILL-										
2																		
2																		
2																		
15		S4	15.0		13.0													
4		15	17.0			CL	Very stiff, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, slightly mottled, slight organic odor, wet, organics (rootlets) present, increasing with depth						100					
7							-MARINE DEPOSIT-											
9																		
9																		
18.0																		

Water Level Data

Sample Identification

Well Diagram

Summary

Date	Time	Elapsed Time (hr.)	Depth (ft.) to:			O	T	U	S	G		Overburden (lin. ft.) 22.0
			Bottom of Casing	Bottom of Hole	Water							
												Samples 5S
Boring No. HA06-1(OW)												

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
 Toughness: L-Low, M-Medium, H-High
 Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
 Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCS_TB4.GLB USCS_TB4.GDT G:\PROJECTS\32553\00\32553-000.GPJ Sep 14, 06



TEST BORING REPORT

Boring No. HA06-1(OW)

File No. 32553-000

Sheet No. 2 of 2

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size ² , structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	WOR WOR WOH WOH	S5 24	20.0 22.0			CL	Very soft, gray, lean CLAY (CL), mps 0.075 mm, bonded, no odor, wet, occasional black streaks increasing with depth -MARINE DEPOSIT-						100				
					22.0		-BOTTOM OF EXPLORATION- NOTE: Installed observation well in completed borehole. See Well Installation Report for details. NOTES: 1. WOR = Weight of Rods; WOH = Weight of Hammer.										

¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil Identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA06-1(OW)



TEST BORING REPORT

Boring No. HA06-2

Project University Commons Portland, Maine
Client University of Southern Maine
Contractor Maine Test Borings, Inc.

File No. 32553-000
Sheet No. 1 of 2
Start August 29, 2006
Finish August 29, 2006
Driller D. McKeen

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	SS	-	Rig Make & Model: Mobile Drill B-53 Truck
Inside Diameter (in.)	4.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	30	30	-	Casing: HW Drive 10.0 ft
				Hoist/Hammer: Winch/ Safety Hammer

H&A Rep. B. Steinert
Elevation 22.0 +/-
Datum Portland City
Location See Plan

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size ² , structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test						
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength		
0							-BITUMINOUS CONCRETE-												
	5 8 6 2	S1 6	0.2 2.2		0.2	SW	Medium dense, tan to yellow-brown, well graded SAND with gravel (SW), mps 1 in., no structure, no odor, moist -FILL-		15	30	40	10	5						
		S2	2.2 5.0		3.0	SC	Clayey SAND with brick/concrete fragments, no odor, wet, reworked natural material NOTE: Sample taken from auger cuttings.												
5	8 10 15 18	S3 24	5.0 7.0		5.0	CL	Very stiff, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, blocky structure, mottled, no odor, moist -MARINE CLAY-							100					
				NO WELL INSTALLED															
10	3 4 6 7	S4 24	10.0 12.0				CL	Stiff, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, mottled, no odor, moist to wet, trace organics -MARINE CLAY-							100				
15	2 3 3 3	S5 24	15.0 17.0				CL	Medium stiff, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, mottled, no odor, moist to wet -MARINE CLAY-							100				
						16.5													
20							FV1 (19.4 - 20.0 ft), Su > 690 psf / 220 psf												

Water Level Data				Sample Identification			Well Diagram			Summary										
Date	Time	Elapsed Time (hr.)	Depth (ft.) to:			O	T	U	S	G	Riser Pipe	Screen	Filter Sand	Cuttings	Grout	Concrete	Bentonite Seal	Overburden (lin. ft.)	Rock Cored (lin. ft.)	Samples
			Bottom of Casing	Bottom of Hole	Water															
																		42.7	0.0	7S

Boring No. HA06-2

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USC SLIB4.GLB USC STB-CORE4.GDT G:\PROJECTS\92553\001\92553-000.GPJ Sep 14, 06

TEST BORING REPORT

Boring No. HA06-2
 File No. 32553-000
 Sheet No. 2 of 2

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description <small>(Density/consistency, color, GROUP NAME, max. particle size², structure, odor, moisture, optional descriptions, geologic interpretation)</small>	Gravel		Sand			Field Test					
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
20		U1 24	20.0 22.0				NOTE: Take U1 from 20.0 to 22.0 ft											
							FV2 (22.3 - 23.0 ft), Su = 620 / 60 psf											
25							FV3 (25.3 - 26.0 ft), Su = 750 / 340 psf											
30	WOR 2 WOR 2	S6 24	30.0 32.0			CL	Very soft to soft, gray, sandy lean CLAY (CL), mps 0.42 mm, bonded, no odor, wet, frequent fine sand seams and black streaks -MARINE CLAY- FV4 (30.3 - 31.0 ft), Su = 1760 / 1360 psf					15	85					
35	WOR 6 8 12	S7 24	35.0 37.0			CL	Very soft to soft, gray, sandy lean CLAY (CL), mps 0.42 mm, bonded, no odor, wet, frequent fine sand seams and black streaks -MARINE CLAY-					15	85					
					36.0	SP	Medium dense, tan to yellow-brown, poorly graded SAND with SILT (SP), mps 0.42 mm, no structure, no odor, wet -MARINE SAND-	0	0	0	0	90	10					
					42.5	BR	NOTE: Bedrock encountered at 42.5 ft, roller cone refusal at 42.7 ft -BOTTOM OF EXPLORATION-											
					42.7		NOTES: 1. FV1 (19.4 - 20.0 ft) indicates in-situ field vane performed at depth interval listed, corrected peak / residual shear strengths are provided. See Table II for details. 2. WOR = Weight of Rods; WOH = Weight of Hammer.											

USCS_TB4 USCSJBA.GLB USCSTB+CORE4.GDT G:\PROJECTS\32553\000\32553-000.GPJ Sep 14, 06

¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.
 NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.



TEST BORING REPORT

Boring No. HA06-3

Project University Commons Portland, Maine
Client University of Southern Maine
Contractor Maine Test Borings, Inc.

File No. 32553-000
Sheet No. 1 of 3
Start August 28, 2006
Finish August 29, 2006

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	SS	NQ	Rig Make & Model: Mobile Drill B-53 Truck
Inside Diameter (in.)	3.0	1.375	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	30	30	-	Casing: NW Drive 41.0 ft
				Hoist/Hammer: Winch/ Safety Hammer

H&A Rep. B. Steinert
Elevation 21.0 +/-
Datum Portland City
Location See Plan

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size ² , structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0				NO WELL INSTALLED	0.2	SW	-BITUMINOUS CONCRETE- Medium dense, tan to yellow-brown, well graded SAND with gravel (SW), mps 1/2 in., no structure, no odor, moist -FILL-	0	15	30	45	5	5				
4	4	S1	0.2														
6	6	9	2.0														
5	5																
					3.0		NOTE: Sandy lean CLAY observed in drill cuttings from 3.0 to 5.0 ft -FILL-										
5	7	S2	5.0		5.0	CL	Very stiff to hard, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, blocky structure, mottled, no odor, moist -MARINE DEPOSIT-						100				
	9	24	7.0														
	14																
	16																
10	4	S3	10.0		10	CL	Stiff, olive-gray, lean CLAY (CL), mps 1 in., bonded, mottled, no odor, moist -MARINE DEPOSIT-						100				
	6	24	12.0														
	6																
	7																
15	2	S4	15.0		15	CL	Medium stiff, olive-gray, lean CLAY (CL), mps 0.075 mm, bonded, mottled, no odor, wet -MARINE DEPOSIT-						100				
	2	24	17.0														
	3																
	3																
20					16.5												

Water Level Data

Sample Identification

Well Diagram

Summary

Date	Time	Elapsed Time (hr.)	Depth (ft.) to:			O Open End Rod	T Thin Wall Tube	U Undisturbed Sample	S Split Spoon	G Geoprobe	Riser Pipe	Screen	Filter Sand	Cuttings	Grout	Concrete	Bentonite Seal	Overburden (lin. ft.) 41.1	Rock Cored (lin. ft.) 7.7	Samples 7S
			Bottom of Casing	Bottom of Hole	Water															

Boring No. HA06-3

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High
¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA06-3

File No. 32553-000

Sheet No. 2 of 3

Depth (ft.)	SPT ¹	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description <small>(Density/consistency, color, GROUP NAME, max. particle size², structure, odor, moisture, optional descriptions, geologic interpretation)</small>	Gravel		Sand			Field Test						
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength		
20							FV1 (20.3 - 21.0 ft), Su = 800 / 470 psf												
25	WOH 1 WOR 1	S5 24	25.0 27.0		25.0	CL	Very soft, gray, lean CLAY (CL), mps 1/2 in., bonded, no odor, wet, find sand seam at 25.6 ft, frequent black streaks, occasional stiff clay clod -MARINE DEPOSIT-						100						
30							FV2 (30.3 - 31.0 ft), Su = 1830 / 960 psf												
35	5 4 6 4	S6 12	35.0 37.0		35.0	SP-SM	Medium dense, tan to yellow-brown, poorly graded SAND with SILT (SP-SM), mps 2.0 mm, no structure, no odor, wet -MARINE SAND-			5	85	10							
40	11 11 50 (0.2)	S7 6	40.0 42.0		38.0	SW-SM-BR	Medium dense, gray, well graded SAND with SILT (SW-SM), mps 1/2 in., bonded, no odor, wet -GLACIAL TILL-	0	5	30	30	20	15						
41.1					41.1		NOTE: Bedrock encountered at 41.1 ft. Advanced roller cone to 41.2 ft. Begin NQ rock core at 41.2 ft. See Core Boring Report for details. NOTES: 1. FV1 (19.4 - 20.0 ft) indicates in-situ field vane performed at depth interval listed, corrected peak / residual shear strengths are provided. See Table II for details. 2. WOR = Weight of Rods; WOH = Weight of Hammer.												

USCS_TB4 USCSLIB4.GLB USCSTB-CORE4.GDT G:\PROJECTS\32553\000\32553-000.GPJ Sep 14, 08

¹SPT = Sampler blows per 6 in. ²Maximum particle size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA06-3

CORE BORING REPORT

Boring No. HA06-3
 File No. 32553-000
 Sheet No. 3 of 3

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD		Weathering	Well Dia-gram	Elev./Depth (ft)	Visual Description and Remarks
				in.	%				
									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
40									NOTE: Bedrock encountered at 41.1 ft. Advanced roller cone to 41.2 ft. Begin NQ rock core at 41.2 ft.
2		C1	41.2 45.8	48/23	87/48	Fresh		41.2	Moderately hard to hard, fresh to moderately weathered, aphanitic to fine grained, gray, SCHIST. Primary joints dipping at moderate angles, parallel to foliation, extremely close to moderately spaced, partly open to moderately wide, planar, smooth, frequent calcite veins. Joints weathered with soil infilling in last 1 ft.
2									
2									
2						Slight/Mod			
45									
2									
2		C2	45.8 48.8	36/17	100/47	Fresh			Moderately hard to hard, fresh to moderately weathered, aphanitic to fine grained, gray, SCHIST. Primary joints dipping at moderate angles, parallel to foliation, extremely close to moderately spaced, partly open to moderately wide, smooth, frequent calcite veins.
3									
3									
							NO WELL INSTALLED	48.8	-BOTTOM OF EXPLORATION-

APPENDIX B

**Observation Well Installation & Groundwater
Monitoring Reports**

OBSERVATION WELL INSTALLATION REPORT

Well No.

Boring No.
HA06-1 (OW)

PROJECT	University Commons - Library Addition	H&A FILE NO.	32553-000
LOCATION	Portland, Maine	PROJECT MGR.	WAC
CLIENT	University of Southern Maine	FIELD REP.	BCS
CONTRACTOR	Maine Test Borings, Inc.	DATE INSTALLED	8/28/2006
DRILLER	D. McKeen	WATER LEVEL	

Ground El.	21.0 +/-	ft	Location	See Plan	<input type="checkbox"/>	Guard Pipe
El. Datum	Portland City				<input checked="" type="checkbox"/>	Roadway Box

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL					
0.0	0.0		Type of protective cover/lock	1/2 in. Bolt		
BITUMINOUS CONCRETE	BITUMINOUS CONCRETE		Height/Depth of top of roadway box above/below ground surface	0.0	ft	
0.2	0.2		Depth of top of riser pipe below ground surface	0.3	ft	
	BENTONITE CHIPS		Type of protective casing:	Steel Roadway box		
	DRILL CUTTINGS		Length	0.8	ft	
	3.5		Inside Diameter	6 in.	in	
FILL	BENTONITE CHIPS		Depth of bottom of roadway box	0.8	ft	
	4.5					
			Type of Seals	Top of Seal (ft)	Thickness (ft)	
			Concrete			
			Bentonite Seal	3.5	1.0	
13.0						
MARINE DEPOSIT	FILTER SAND		Type of riser pipe:	Schedule 40 PVC		
			Inside diameter of riser pipe	2.0	in	
			Type of backfill around riser	Filter Sand / Bentonite Chips		
			Diameter of borehole	4.0	in	
18.0			Depth to top of well screen	6.0	ft	
MARINE DEPOSIT			Type of screen	Slotted Schedule 40 PVC		
			Screen gauge or size of openings	0.010	in	
			Diameter of screen	2.0	in	
			Type of backfill around screen	Filter Sand		
			Depth of bottom of well screen	16.0	ft	
			Bottom of Silt trap	16.0	ft	
22	22		Depth of bottom of borehole	22.0	ft	

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

(Not to Scale)

$$\begin{array}{r}
 5.7 \text{ ft} + 10 \text{ ft} + 0 \text{ ft} = 15.7 \text{ ft} \\
 \text{Riser Pay Length (L1)} \quad \text{Length of screen (L2)} \quad \text{Length of silt trap (L3)} \quad \text{Pay length}
 \end{array}$$

COMMENTS:

APPENDIX C
Historic Sanborn Maps

INSURANCE MAPS

Portland

MAINE

VOLUME ONE

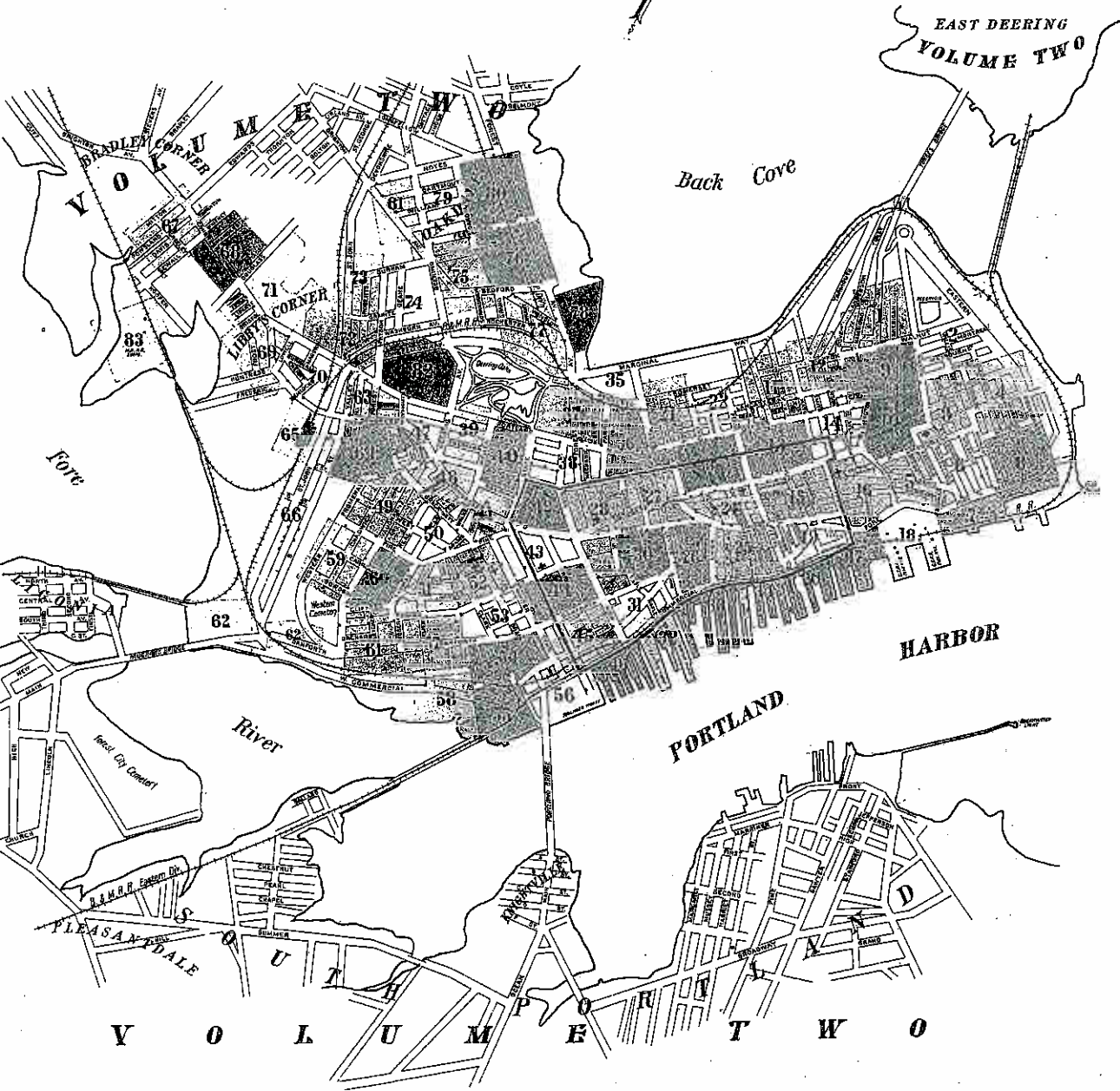
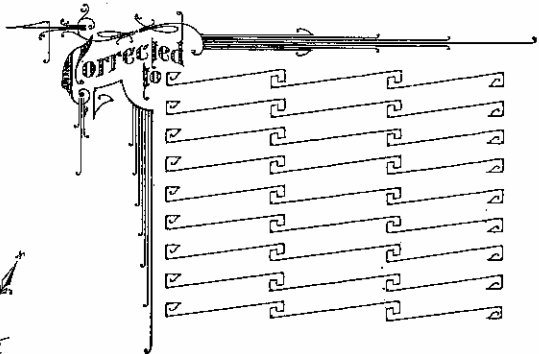
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1914

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KEY			
	Fire proof construction		Hall 1st no openings through it
	Iron building		with openings
	Brick building with metal cornice		Fire wall 6 inches above roof
	Brick building with frame side		12
	Brick building with stone front		18
	Brick special		20
	Brick building with frame side		Opening in division wall with iron door
	Frame building		standard iron door
	Frame building with iron door		Windows with iron shutters
	Special Abbots building		Windows opening in first story
	Stable		second
	Horizontal steam boiler		2nd, 3rd stories
	Vertical boiler		2nd, 3rd, 4th
	Automatic sprinklers		Brick chimney
	Automatic fire alarm		Iron
	Independent electric plant		Fire alarm box
			Hydrant
			Elevation



27
 Reference to
 adjoining sheet.

1909



1950

77 ME 008

76

12

BEDFORD

BAXTER BLVD
(BACK BAY BLVD)

FOREST CITY MOTOR CO.
SALES & SERVICE

NATIONAL BISCUIT CO.
THE DOWN EAST BAKERY

GRAND

WINSLOW

CONANT

LIGHTFOOT

AV. FOREST

78

ROCHESTER

PARK

78

FOREST AV.

DEERING OAKS
(PARK)

35



Scale of Feet
0 50 100 150

0

