PERMIT ISSUED

JAN 31 2003

CITY OF PORTLAND

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
03-0070	JAN 31 2003	~~115 B009001~~ 114 A 004

Location of Construction:	Owner Name:	Owner Address:	Phone:
88 Bedford St	University Of Maine	107 Maine Ave	228-8412
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Granger Northern, Inc.	84 Middle St. Portland	2077743500
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		Foundation Only/Commercial	

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Parking lot	FOUNDATION ONLY For parking garage See permit ~~#0301~~ #030011		$0.00	2

FIRE DEPT: ☐ Approved ☐ Denied

See #030011

Signature:

INSPECTION:
Use Group: S2 Type: 2C

1/31/03

Signature:

Proposed Project Description:
FOUNDATION ONLY For parking garage See permit ~~#0301~~ #030011

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
mjn	01/31/2003

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☐ Shoreland	☐ Variance	☐ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☐ Flood Zone	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☐ Site Plan	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐	☐ Denied	☐ Denied
Date: APPROVED See Permit #030011	Date:	Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

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03-0070	01/31/2003	114A004 -115 B009001

Location of Construction:	Owner Name:	Owner Address:	Phone:
88 Bedford St	University Of Maine	107 Maine Ave	( ) 228-8412
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Granger Northern, Inc.	84 Middle St. Portland	(207) 774-3500
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Foundation Only/Commercial	

Proposed Use:	Proposed Project Description:
FOUNDATION ONLY For parking garage See permit #030011	FOUNDATION ONLY For parking garage See permit #030011

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Marge Schmuckal **Approval Date:** 01/08/2003

Note: **Ok to Issue:** ☑

1) See Permit # 030011

Dept: Building **Status:** Approved with Conditions **Reviewer:** Mike Nugent **Approval Date:** 01/31/2003

Note: **Ok to Issue:** ☑

1) Alternative pile testing method must be formally approved as a Alternative method. Discussed method and have conceptually approved, formal approval forthcoming. MJN

Comments:

1/31/2003-gg: Permit has been paid in full, see permit # 030011. /gg

UNDERGROUND
ENGINEERING &
ENVIRONMENTAL
SOLUTIONS

Haley & Aldrich, Inc.
500 SouthBorough Drive, Suite 10
South Portland, ME 04106-6935
Tel: 207.772.5439
Fax: 207.871.5999
www.HaleyAldrich.com

HALEY & ALDRICH

Letter of Transmittal

Date	31 January 2003
File Number	28438-002
From	Kenneth L. Recker

To	City of Portland 389 Congress Street Portland, Maine 04101
Attention	Mr. Mike Nugent, Inspection Services Manager
Copy to	John Rasmussen, University of Southern Maine (Transmittal only)
Subject	Parking Garage University of Southern Maine Portland, Maine

Copies	Date	Description
1 ea	12 July 2002	Report on Subsurface and Foundation Investigation
	9 Jan 2003	Pile Driving Submittal by H.B. Fleming

Transmitted via ☐ First class mail ☐ Overnight express ☒ Hand delivery ☐ Other

Remarks

Per request of John Rasmussen of University of Southern Maine

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
03-0070	01/31/2003	114A004 ~~115 B009001~~

Location of Construction:	Owner Name:	Owner Address:	Phone:
88 Bedford St	University Of Maine	107 Maine Ave	( ) 228-8412
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Granger Northern, Inc.	84 Middle St. Portland	(207) 774-3500
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	

Proposed Use:	Proposed Project Description:
FOUNDATION ONLY For parking garage See permit #03011	FOUNDATION ONLY For parking garage See permit #03011

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Marge Schmuckal **Approval Date:** 01/08/2003

Note:

Ok to Issue: ☑

1) See Permit # 030011

Dept: Building **Status:** Approved with Conditions **Reviewer:** Mike Nugent **Approval Date:** 01/31/2003

Note:

Ok to Issue: ☑

1) Alternative pile testing method must be formally approved as a Alternative method. Discussed method and have conceptually approved, formal approval forthcoming. MJN

H.B. FLEMING
89 PLEASANT AVE
SOUTH PORTLAND, MAINE 04106
Phone: 207-799-8514 Fax: 207-799-8538
www.HBFLEMING.com

Granger Northern, Inc.
84 Middle St.
Portland, ME 04101

January 9, 2003

Re: USM Parking Garage Pile Driving Criteria

Attn: Rick Bergeron

Dear Rick,

The intent of this letter is to communicate H.B. Fleming's intended pile driving criteria. We have included in our submittal the following:

- Pile Driving Equipment Data Sheet describing in detail the individual elements of the pile driving system
- Manufacturer's cut sheet for the intended pile hammer
- Pile Profile drawing describing pertinent elements of in-place piles
- Manufacturer's cut sheet for the cast steel points
- Two WEAP analyses

Piles will be HP14x89 ASTM A572 Gr. 50 steel and will be fitted with cast steel driving points. The piles will be driven to an Ultimate Capacity of 300 tons (2.0 times the design load of 150 tons). GZA GeoEnvironmental, Inc., of Norwood, MA, will perform dynamic testing on six piles to verify capacity.

We propose using an MKT DE-42 open-ended diesel pile hammer to drive the piles. The DE-42 has a ram weight of 4,200 lbs, a maximum stroke of 10'-6", and a rated energy of 42,000 ft-lbs. The hammer cushioning consists of 2.5 inches of Hamortex material.

NOT IN COMPLIANCE W/GEOTEC REPORT H+A PLEASE COMMENT

In order to anticipate capacities and stresses of various length piles on site, we have completed two WEAP analyses. One analysis is based on a pile length of 50', and another is based on a pile length of 10'. In order to achieve the required 600 kip ultimate capacity, the 50' piles will be driven to 13 blows per inch for three consecutive inches. Using the same driving criteria for the 10' piles (13 blows/in) results in higher compressive stresses than in the 50' piles. We have included a summary of the WEAP results below in a table.

PILE LENGTH	CAPACITY (KIPS)	BLOWS PER INCH	MAX. COMPRESSION STRESS (KSI)
50'	600	12.9	40.02
10'	+/-690	12.9	+/-45

H & A PLEASE COMMENT

Respectfully,

Dave Gifford

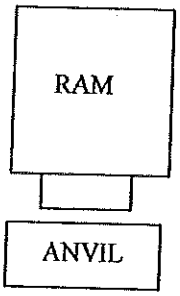
Reviewed by Haley & Aldrich, Inc. 1/27/03
Acceptable, KLR

H.B. FLEMING PILE EQUIPMENT DATA SHEET

Project: USM Parking Garage
Location: Portland, ME

Date: 1/7/03
Client: Grainger Northern Inc.

HAMMER



Manufacturer:	MKT
Model:	DE-42
Type:	Single Acting Diesel
Length of Stroke:	10' - 6"
Rated Energy at Given Stroke:	42,000 ft-lb
Modifications:	None

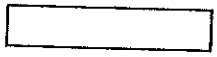
HAMMER CUSHION

Material:	Hamortex
Thickness:	2.5"
Area:	285 in^2
Modulus of Elasticity:	29,000 psi
Coefficient of Restitution:	0.8

DRIVE HEAD

Weight:	1300 lb

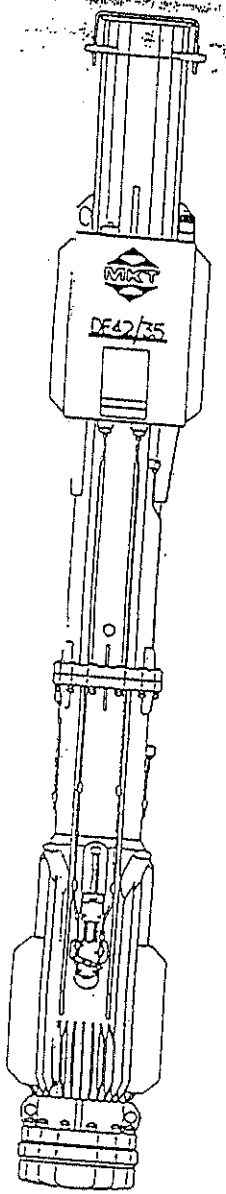
PILE CUSHION



Cushion Material:	N/A
Thickness:	N/A
Modulus of Elasticity:	N/A
Coefficient of Restitution:	N/A

PILE

Pile Type:	HP14x89
Length in Leads:	Up to 65'
Weight/LF:	89 lb
Wall Thickness:	0.615"
Taper:	N/A
Cross Sectional Area:	26.1 in^2
Design Capacity of Pile:	150 tons
Splice Description:	Full Penetration Butt Weld
Tip Treatment Description:	Cast Steel Point



INTRODUCING THE NEW

DE42/35

MAXIMUM DIESEL HAMMER FLEXIBILITY FITTING IN 8 x 20 LEADS WITH RAM WEIGHTS TO 4,200 LBS.

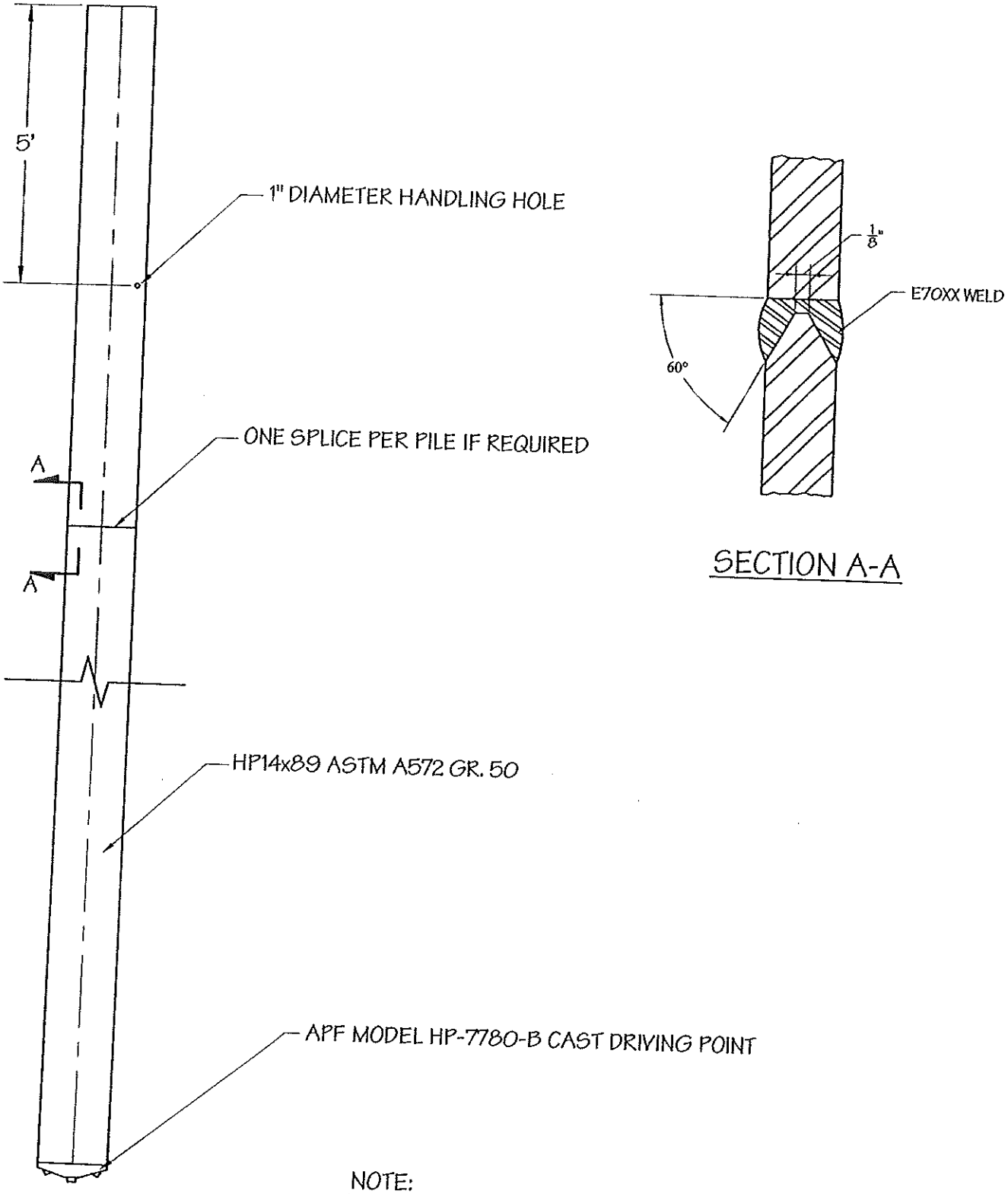
ONE HAMMER... MULTIPLE RAM SIZES... AND ENERGY RANGES. ANOTHER MKT FIRST PROVIDING THE CONTRACTOR WITH HAMMER SIZE FLEXIBILITY AND REDUCED EQUIPMENT INVESTMENT COSTS. MKT DIESEL HAMMERS CONTINUE TO OFFER FEATURES WHICH INSURE DEPENDABLE AND PRODUCTIVE OPERATION. USING EITHER STANDARD OR REMOTE FUEL DELIVERY SYSTEMS.

SPECIFICATIONS DE-42/35		
RAM-PISTON WEIGHT (LBS.)	3,500	4,200
ENERGY RATING (FT.LBS.)	35,000	42,000
BEARING BASED ON ENGINEERING NEWS FORMULA (TONS)	230	230
MAXIMUM OBTAINABLE STROKE	10'-6"	10'-6"
OVERALL LENGTH WITH DRIVE CAP	16'-7"	16'-7"
WEIGHT, HAMMER ONLY (LBS.)	8,600	9,300
WEIGHT, HAMMER AND UNIVERSAL DRIVE CAP (LBS.)	9,550	10,250

PUBLISHED ENERGY RATINGS ARE EQUAL TO RAM WEIGHT X 10.0 FT. RAM STROKE. ACTUAL ENERGIES DELIVERED ARE A FUCTION OF THE OVERALL JOB CONDITIONS. BEARING RATINGS ARE BASED UPON ENGINEERING NEWS FORMULA. PILE SET EQUAL TO 0.1 IN./BLOW.

PRODUCT LIST

SINGLE ACTING DIESEL PILE HAMMERS
AIR PILE HAMMERS
VIBRATORY PILE DRIVERS/EXTRACTORS
VIBRATORY HAMMER ACCESSORIES
PILE DRIVING LEAD SYSTEMS
CUSTOM ENGINEERED PRODUCTS
DOUBLE ACTING DIESEL PILE HAMMERS
DRIVE CAPS AND ACCESSORIES
HYDRAULIC POWER UNITS
HYDRAULIC AUGER SYSTEMS
BOTTOM BRACES
LEAD ACCESSORIES



SECTION A-A

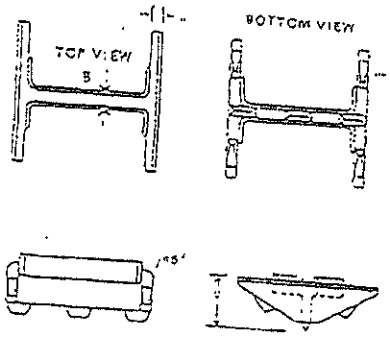
NOTE:

DYNAMIC TESTING WILL BE PERFORMED ON SIX PILES.

H.B. FLEMING
89 PLEASANT AVENUE
SO. PORTLAND, ME 04106
P: 207-799-8514 F: 207-799-8538
www.hbfleming.com

TITLE: HP14x89 PILE PROFILE
PROJECT: USM PARKING GARAGE
LOCATION: PORTLAND, ME
DATE: 1/7/03
SCALE: N/A

Dimensions



Material Cast Steel
ASTM A148 90/60... HEAT-TREATED

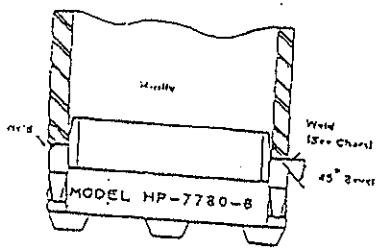
	12"
A	3/4"
B	3/4"
C	1-5/8"

MADE IN U.S.A.

Installation Instructions

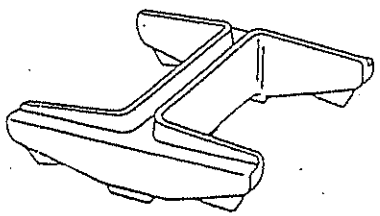
HARD-BITE POINT MODEL HP-7780-8....

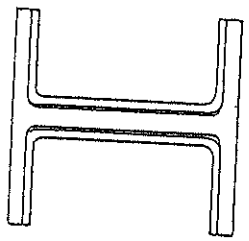
1. Set point onto tip end of square cut pile end.
2. Weld points to the pile in either flat or vertical position using E60 or E70XX electrodes.
3. Weld across full width of flange following chart below for minimum size weld.

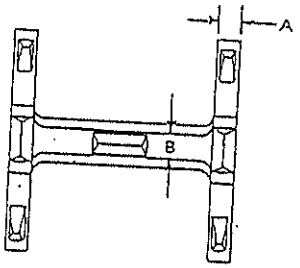


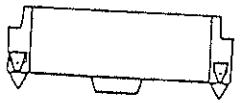
Pile Size	Flange Thickness	Min. Size Groove Weld
HP 12 x 84	.685	3/8
x 74	.610	3/8
x 63	.515	3/8
x 53	.435	5/16
HP 10 x 57	.565	5/16
x 42	.420	5/16
HP 8 x 36	.445	5/16

HARD-BITE® HP 77600





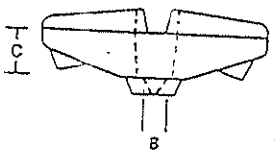




Commercially manufactured H-pile driving points shall have the following characteristics:

1. Material: Points shall be made in one piece of ASTM A27 65/35 or AAR M-201 Grade B.
2. Design:
   - 2.01 Points shall have continuous backup on the entire inner edges of the H for the purposes of:
     - a. Backing up welds along the outside of the flanges.
     - b. Encasing the web of the pile to assure alignment and prevent separation.
   - 2.02 The soil bearing surface of the driving points shall have seven integrally cast tapered cutting wedges, three to be located on each flange, one to be centered on the web.
   - 2.03 Minimum overall widths of the flanges of 8", 10", 12" and 14" points shall be as in chart, line A.
   - 2.04 Minimum width of the web (exclusive of protruding cutting wedge of 8", 10", 12" and 14" points shall be as in chart, line B.
   - 2.05 Minimum height of the point (exclusive of the protruding cutting wedges) from the soil bearing surface of the web to point-pile interface shall be as in chart, line C.
   - 2.06 Chart

	8"	10"	12"	14"
A	1-1/16"	1-1/8"	1-1/8"	1-1/8"
B	15/16"	1"	1"	1-1/4"
C	1-7/8"	2-1/16"	2-1/2"	2-7/8"



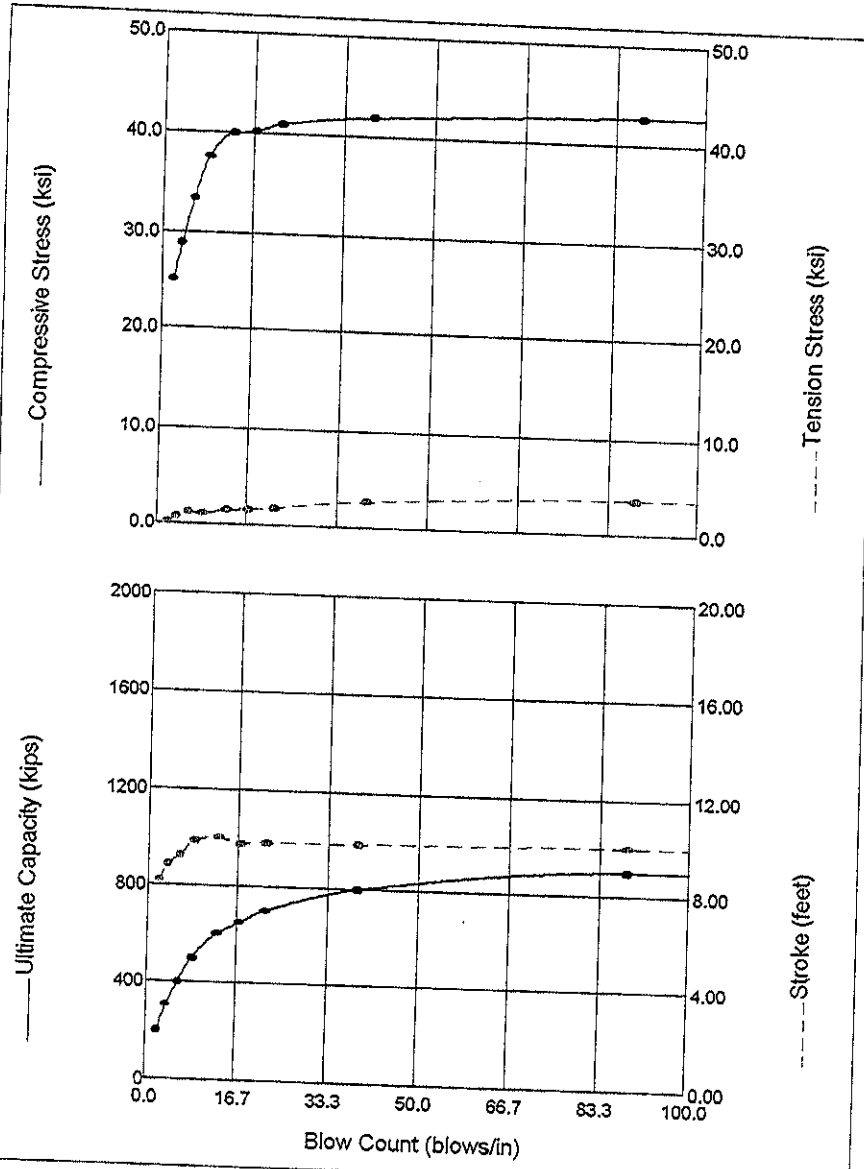
NOT TO SCALE

SAMPLE SPECIFICATION
PROVIDED AS A CONVENIENCE
TO ENGINEERS & DESIGNERS

ASSOCIATED PILE & FITTING CORP.
Box 1048, Clifton, N.J. 07014
201-773-8400

H.B. FLEMING
: 12/16/2002 :

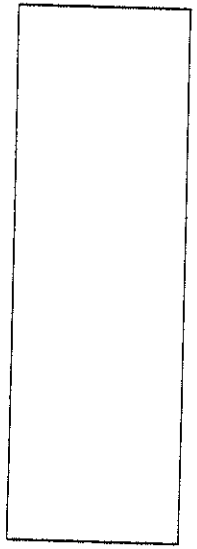
07-Jan-2003
GRLWEAP (TM) Version 1998-2



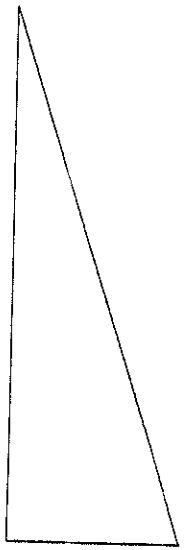
MKT DE 42/35

Efficiency	0.720
Helmet	1.30 kips
Hammer Cushion	14175 kips/in
Skin Quake	0.100 in
Toe Quake	0.040 in
Skin Damping	0.070 sec/ft
Toe Damping	0.150 sec/ft
Pile Length	50.00 ft
Pile Top Area	26.10 in2

Pile Model



Skin Friction Distribution



Res. Shaft = 15 %
(Proportional)

H.B. FLEMING
: 12/16/2002 :

07-Jan-2003
GRLWEAP(TM) Version 1998-2

Ulitmate Capacity kips	laximum ssion tress ksi	ım on Stress ksi	Blow Count lows/in	troke feet	nergy kips-ft
200.0	25.237	0.198	2.3	8.20	16.91
300.0	28.916	0.728	3.9	8.89	16.78
400.0	33.470	1.234	6.0	9.24	17.30
500.0	37.539	1.064	8.5	9.85	18.57
600.0	40.020	1.517	12.9	10.00	18.73
650.0	40.201	1.633	17.1	9.75	18.14
700.0	41.023	1.837	21.6	9.82	18.27
800.0	41.936	2.754	38.8	9.85	18.30
900.0	42.735	3.686	88.2	10.00	18.42
1000.0	41.943	3.994	9999.0	9.74	17.81

Input File: C:\H.B. FLEMING\PROJECTS\BIDDING\USM PILES\USM1489.GW
Hammer File: C:\Program Files\GRL & PDI\GRLWEAP\HAMMER.ALT

Echo Print of Input Data

: 12/16/2002 :
-100 0 154 0 0 0 0 0 0 1 15 0 0 0 0 0 0 0 0.000
1.300 283.500 125.0 2.500 0.800 0.010 0.0
0.000 0.0 0.000 0.000 0.000 0.0
50.000 26.100 29000.000 492.000 4.750 50.000 0.850 0.010
MKT DE 42/35 1 3 0
4.20 150.00 12.00 10.0000 0.0000 0.7200 0.0000
0.80 23.50 11.22 0.9000 0.0100
18.59 113.10 185.63 0.0010 0.0020 1.2500 0.0000 0.0000
14.70 1450.00 0.00 0.00 0.00 0.00 1
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.100 0.040 0.070 0.150 0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000
0.000 0.000 0.000 0.000
0.00 0.00 50.00 50.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
50.00 1.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
200.0 300.0 400.0 500.0 600.0 650.0 700.0 800.0 900.0 1000.0

ABOUT THE WAVE EQUATION ANALYSIS RESULTS

The GRLWEAP program simulates the behavior of an impact driven pile. The program contains mathematical models which describe hammer, driving system, pile and soil during the hammer blow. Under certain conditions, the models only crudely approximate often complex dynamic situations.

A wave equation analysis also relies on input data which represents normal situations. The data may be the best available information at the time of the analysis, however, it may greatly differ from actual field conditions.

The program authors, therefore, recommend prudent use of GRLWEAP results. Soil response and hammer performance should be verified by static and/or dynamic measurements. Estimates of bending or other local non-axial stresses and prestress effects must also be accounted for by the user.

Finally, the GRLWEAP capacities are ultimate values. They MUST be reduced by means of a safety factor to yield a design or working load.

GRLWEAP: WAVE EQUATION ANALYSIS OF PILE FOUNDATIONS
Version 1998-2
English Units

: 12/16/2002 :

Hammer Model: DE 42/35 Made by: MKT

No.	Weight kips	Stiffn k/inch	CoR	C-Slk ft	Dampg k/ft/s
1	1.400				
2	1.400	65596.5	1.000	0.0100	
3	1.400	65596.5	1.000	0.0100	
Imp Block	0.800	42661.1	0.900	0.0100	
Helmet	1.300	14175.0	0.800	0.0100	6.0

HAMMER OPTIONS:

Hammer File ID No.	154	Hammer Type	1
Stroke Option	0	Stroke Convergence Crit.	0.020
Fuel Pump Setting	1	Hammer Damping	2

HAMMER DATA:

Ram Weight	(kips)	4.20	Ram Length	(inch)	150.00
Maximum Stroke	(ft)	10.00	Actual Stroke	(ft)	5.00
		Efficiency	0.720		
Maximum Pressure	(psi)	1450.00	Actual Pressure	(psi)	1450.00
Compression Exponent		1.350	Expansion Exponent		1.250
Ram Diameter	(inch)	12.00	Minimum Stroke	(ft)	5.00
Combustion Delay	(s)	0.00100	Ignition Duration	(s)	0.00200

The Hammer Data Includes Estimated (NON-MEASURED) Quantities

HAMMER CUSHION			PILE CUSHION		
Cross Sect. Area	(in2)	283.50	Cross Sect. Area	(in2)	0.00
Elastic-Modulus	(ksi)	125.0	Elastic-Modulus	(ksi)	0.0
Thickness	(inch)	2.50	Thickness	(inch)	0.00
Coeff of Restitution		0.8	Coeff of Restitution		0.0
RoundOut	(ft)	0.0	RoundOut	(ft)	0.0
Stiffness	(kips/in)	14175.0	Stiffness	(kips/in)	0.0

PILE PROFILE:

L ft	b Top in2	Area	E-Mod ksi	Spec Wt lb/ft3	ft	Circmf ksi	Strength ft/s	Wave Sp k/ft/s	EA/c
0.0	26.10	29000.	492.0	4.8	50.000	16524.	45.8		
50.0	26.10	29000.	492.0	4.8	50.000	16524.	45.8		

Wave Travel Time 2L/c (ms) = 6.052

Pile and Soil Model — Total Capacity Rut (kips) 200.0

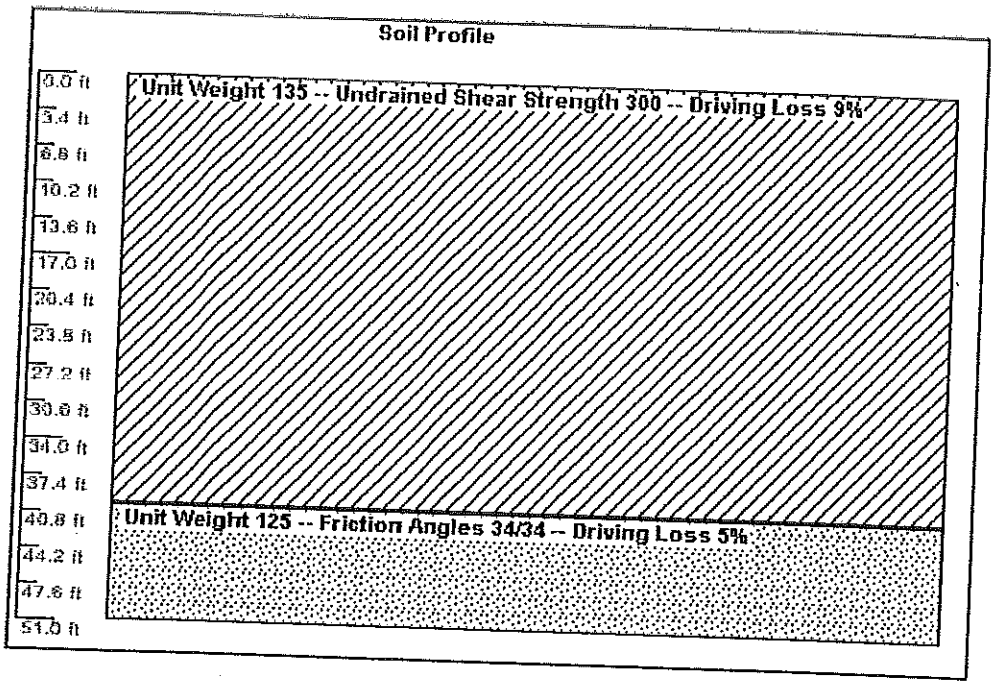
No.	Weight kips	Stiffn k/in	C-Slk ft	T-Slk ft	CoR kips	Soil-S s/ft	Soil-D inch	Quake ft	LbTop ft	Circmf ft	Area in2
1	0.297	18923.	0.010	0.000	0.85	0.1	0.070	0.100	3.33	4.8	26.1
2	0.297	18923.	0.000	0.000	1.00	0.4	0.070	0.100	6.67	4.8	26.1
3	0.297	18923.	0.000	0.000	1.00	0.7	0.070	0.100	10.00	4.8	26.1
4	0.297	18923.	0.000	0.000	1.00	0.9	0.070	0.100	13.33	4.7	26.1
5	0.297	18923.	0.000	0.000	1.00	1.2	0.070	0.100	16.67	4.7	26.1
6	0.297	18922.	0.000	0.000	1.00	1.5	0.070	0.100	20.00	4.8	26.1
7	0.297	18922.	0.000	0.000	1.00	1.7	0.070	0.100	23.33	4.8	26.1
8	0.297	18922.	0.000	0.000	1.00	2.0	0.070	0.100	26.67	4.8	26.1
9	0.297	18922.	0.000	0.000	1.00	2.3	0.070	0.100	30.00	4.8	26.1
10	0.297	18922.	0.000	0.000	1.00	2.5	0.070	0.100	33.33	4.8	26.1
11	0.297	18923.	0.000	0.000	1.00	2.8	0.070	0.100	36.67	4.7	26.1
12	0.297	18923.	0.000	0.000	1.00	3.1	0.070	0.100	40.00	4.7	26.1
13	0.297	18923.	0.000	0.000	1.00	3.3	0.070	0.100	43.33	4.7	26.1
14	0.297	18923.	0.000	0.000	1.00	3.6	0.070	0.100	46.67	4.7	26.1
15	0.297	18923.	0.000	0.000	1.00	3.9	0.070	0.100	50.00	4.7	26.1
Toe				170.0	0.150	0.04					

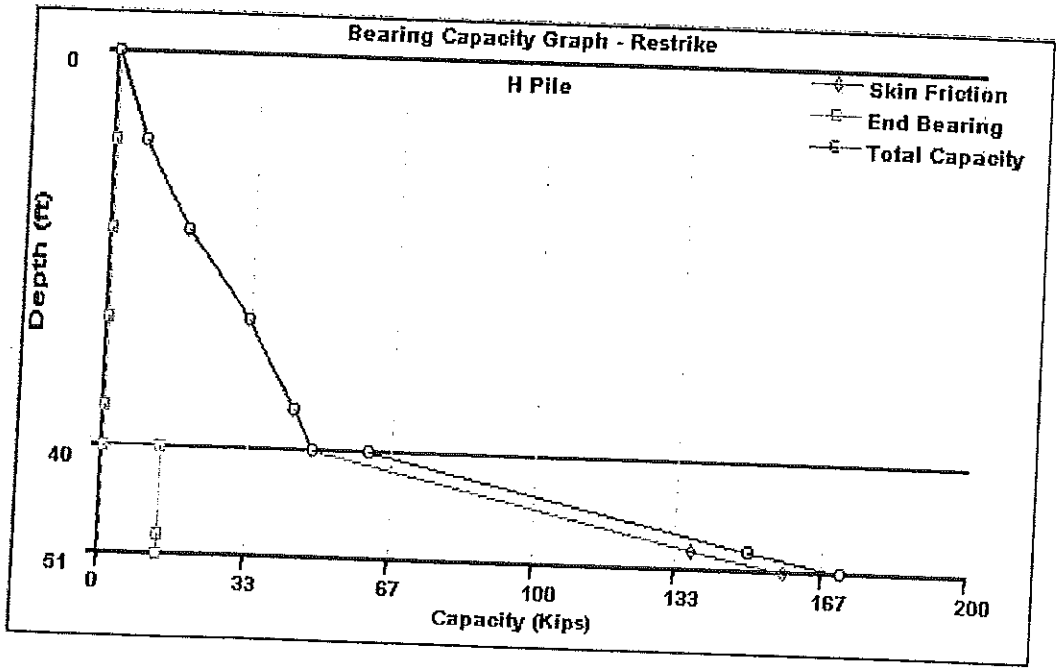
PILE, SOIL, ANALYSIS OPTIONS:

Uniform/Non-Uniform/2-Pile 0 Pile Segments: Automatic
No. of Slacks/Splices 0 Pile Damping (%) 1
Pile Damping Fact.(k/ft/s) 0.916
% Skin Friction 15 % End Bearing 85
Soil Resistance Distr. No. 0
Soil Damping Option Smith
Max No Analysis Iterations 0 Time Increment/Critical 160
Residual Stress Analysis 0 Output Option 0
Output Time Interval 1 Analysis Time-Input (ms) 0
Output Segment Generation Automatic

: 12/16/2002 :
H.B. FLEMING 01/07/2003
1998-2 GRLWEAP(TM) Version

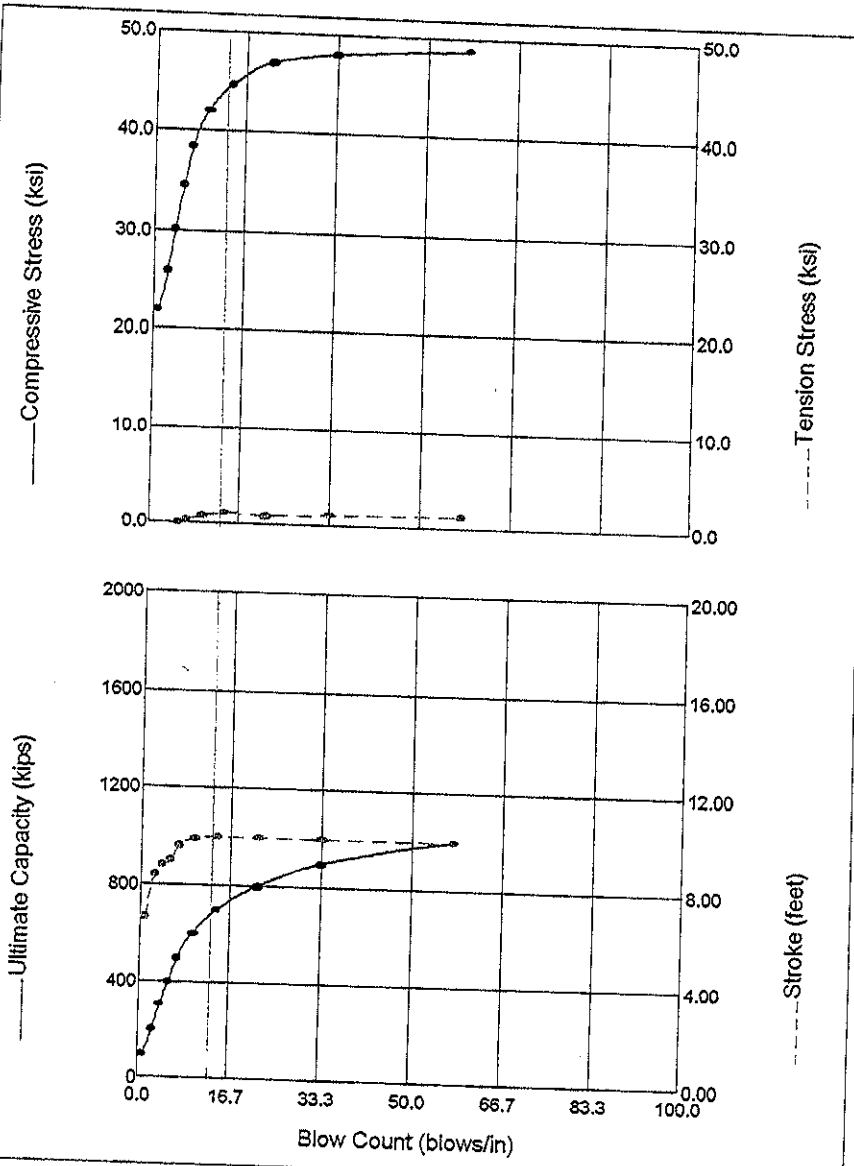
Rut (kips)	Bl Ct (bpf)	Stroke (ft) down	up	Ten Str (ksi)	i,t	Comp Str (ksi)	i,t	ENTHRU (kip-ft)	Bl Rt (b/min)
200.0	27.4	8.20	8.16	-0.20(11, 41)		25.24(7, 3)		16.9	41.2
300.0	47.4	8.89	8.87	-0.73(7, 35)		28.92(15, 5)		16.8	39.6
400.0	71.9	9.24	9.39	-1.23(11, 15)		33.47(15, 5)		17.3	38.7
500.0	101.9	9.85	9.91	-1.06(4, 34)		37.54(15, 5)		18.6	37.7
600.0	155.0	10.00	9.60	-1.52(11, 18)		40.02(15, 5)		18.7	37.9
650.0	205.5	9.75	9.72	-1.63(11, 18)		40.20(15, 5)		18.1	38.0
700.0	259.4	9.82	9.85	-1.84(11, 18)		41.02(15, 5)		18.3	37.8
800.0	465.9	9.85	10.06	-2.75(7, 17)		41.94(15, 5)		18.3	37.6
900.0	1058.4	10.00	9.63	-3.69(7, 17)		42.73(15, 5)		18.4	37.8
1000.0	9999.0	9.74	9.69	-3.99(7, 17)		41.94(15, 5)		17.8	38.0


Soil Profile
0.0 ft
3.4 ft
6.8 ft
10.2 ft
13.6 ft
17.0 ft
20.4 ft
23.8 ft
27.2 ft
30.6 ft
34.0 ft
37.4 ft
40.8 ft
44.2 ft
47.6 ft
51.0 ft
Unit Weight 135 -- Undrained Shear Strength 300 -- Driving Loss 9%
Unit Weight 125 -- Friction Angles 34/34 -- Driving Loss 5%


Bearing Capacity Graph - Restrike
H Pile
Skin Friction
End Bearing
Total Capacity
Depth (ft)
0
40
51
0
33
67
100
133
167
200
Capacity (Kips)

H.B. FLEMING
: 12/16/2002 :

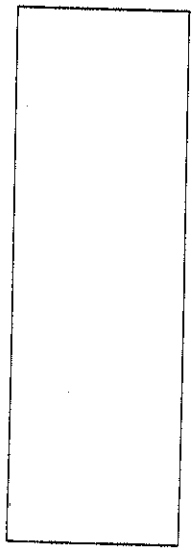
07-Jan-2003
GRLWEAP (TM) Version 1998-2



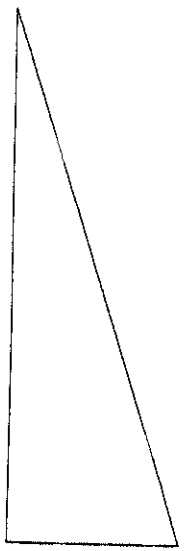
MKT DE 42/35

Efficiency	0.720
Helmet	1.30 kips
Hammer Cushion	14175 kips/in
Skin Quake	0.100 in
Toe Quake	0.040 in
Skin Damping	0.200 sec/ft
Toe Damping	0.150 sec/ft
Pile Length	10.00 ft
Pile Top Area	26.10 in2

Pile Model



Skin Friction Distribution



Res. Shaft = 15 %
(Proportional)

H.B. FLEMING
: 12/16/2002 :

07-Jan-2003
GRLWEAP(TM) Version 1998-2

Ulitmate Capacity kips	faximum ssion tress ksi	am on Stress ksi	Blow Count lows/in	troke feet	nergy kips-ft
100.0	21.974	0.000	1.0	6.70	18.15
200.0	26.095	0.000	2.7	8.45	15.37
300.0	30.180	0.000	4.0	8.85	14.78
400.0	34.526	0.064	5.6	9.05	13.98
500.0	38.479	0.284	7.1	9.62	13.84
600.0	42.004	0.749	9.7	9.90	12.99
700.0	44.696	1.079	14.1	10.00	12.46
800.0	47.050	0.953	21.4	10.00	11.91
900.0	47.964	1.089	33.1	10.00	11.39
1000.0	48.685	1.314	57.7	10.00	11.03

Input File: C:\H.B. FLEMING\PROJECTS\BIDDING\USM PILES\1489_10.GW
Hammer File: C:\Program Files\GRL & PDI\GRLWEAP\HAMMER.ALT

Echo Print of Input Data

```
    : 12/16/2002 :
-100  0 154  0  0  0  0  0  0  1 15  0  0  0  0  0  0  0  0.000
   1.300  283.500   125.0   2.500   0.800   0.010     0.0
   0.000     0.0   0.000   0.000   0.000     0.0
  10.000   26.100 29000.000  492.000   4.750  50.000   0.850   0.010
MKT    DE 42/35  1  3  0
   4.20   150.00   12.00  10.0000   0.0000   0.7200   0.0000
   0.80   23.50   11.22   0.9000   0.0100
  18.59   113.10   185.63   0.0010   0.0020   1.2500   0.0000   0.0000
  14.70  1450.00     0.00     0.00     0.00     0.00  1
 0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000   0.0000
  0.100    0.040    0.200    0.150    0.000    0.000    0.000    0.000
  0.000    0.000    0.000    0.000
  0.000    0.000    0.000    0.000
 0.00   0.00  10.00  10.00   0.00   0.00   0.00   0.00   0.00   0.00
 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
10.00   1.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
100.0  200.0  300.0  400.0  500.0  600.0  700.0  800.0  900.0 1000.0
```

ABOUT THE WAVE EQUATION ANALYSIS RESULTS

The GRLWEAP program simulates the behavior of an impact driven pile. The program contains mathematical models which describe hammer, driving system, pile and soil during the hammer blow. Under certain conditions, the models only crudely approximate often complex dynamic situations.

A wave equation analysis also relies on input data which represents normal situations. The data may be the best available information at the time of the analysis, however, it may greatly differ from actual field conditions.

The program authors, therefore, recommend prudent use of GRLWEAP results. Soil response and hammer performance should be verified by static and/or dynamic measurements. Estimates of bending or other local non-axial stresses and prestress effects must also be accounted for by the user.

Finally, the GRLWEAP capacities are ultimate values. They MUST be reduced by means of a safety factor to yield a design or working load.

GRLWEAP: WAVE EQUATION ANALYSIS OF PILE FOUNDATIONS
Version 1998-2
English Units

: 12/16/2002 :

Hammer Model: DE 42/35 Made by: MKT

No.	Weight kips	Stiffn k/inch	CoR ft	C-Slk k/ft/s	Dampg
1	1.400				
2	1.400	65596.5	1.000	0.0100	
3	1.400	65596.5	1.000	0.0100	
Imp Block	0.800	42661.1	0.900	0.0100	
Helmet	1.300	14175.0	0.800	0.0100	6.0

HAMMER OPTIONS:

Hammer File ID No.	154	Hammer Type	1
Stroke Option	0	Stroke Convergence Crit.	0.020
Fuel Pump Setting	1	Hammer Damping	2

HAMMER DATA:

Ram Weight	(kips)	4.20	Ram Length	(inch)	150.00
Maximum Stroke	(ft)	10.00	Actual Stroke	(ft)	5.00
		Efficiency	0.720		
Maximum Pressure	(psi)	1450.00	Actual Pressure	(psi)	1450.00
Compression Exponent		1.350	Expansion Exponent		1.250
Ram Diameter	(inch)	12.00	Minimum Stroke	(ft)	5.00
Combustion Delay	(s)	0.00100	Ignition Duration	(s)	0.00200

The Hammer Data Includes Estimated (NON-MEASURED) Quantities

HAMMER CUSHION			PILE CUSHION		
Cross Sect. Area	(in2)	283.50	Cross Sect. Area	(in2)	0.00
Elastic-Modulus	(ksi)	125.0	Elastic-Modulus	(ksi)	0.0
Thickness	(inch)	2.50	Thickness	(inch)	0.00
Coeff of Restitution		0.8	Coeff of Restitution		0.0
RoundOut	(ft)	0.0	RoundOut	(ft)	0.0
Stiffness	(kips/in)	14175.0	Stiffness	(kips/in)	0.0

PILE PROFILE:

L b Top ft	Area in2	E-Mod ksi	Spec Wt lb/ft3	Circmf ft	Strength ksi	Wave Sp ft/s	EA/c k/ft/s
0.0	26.10	29000.	492.0	4.8	50.000	16524.	45.8
10.0	26.10	29000.	492.0	4.8	50.000	16524.	45.8

Wave Travel Time 2L/c (ms) 1.210

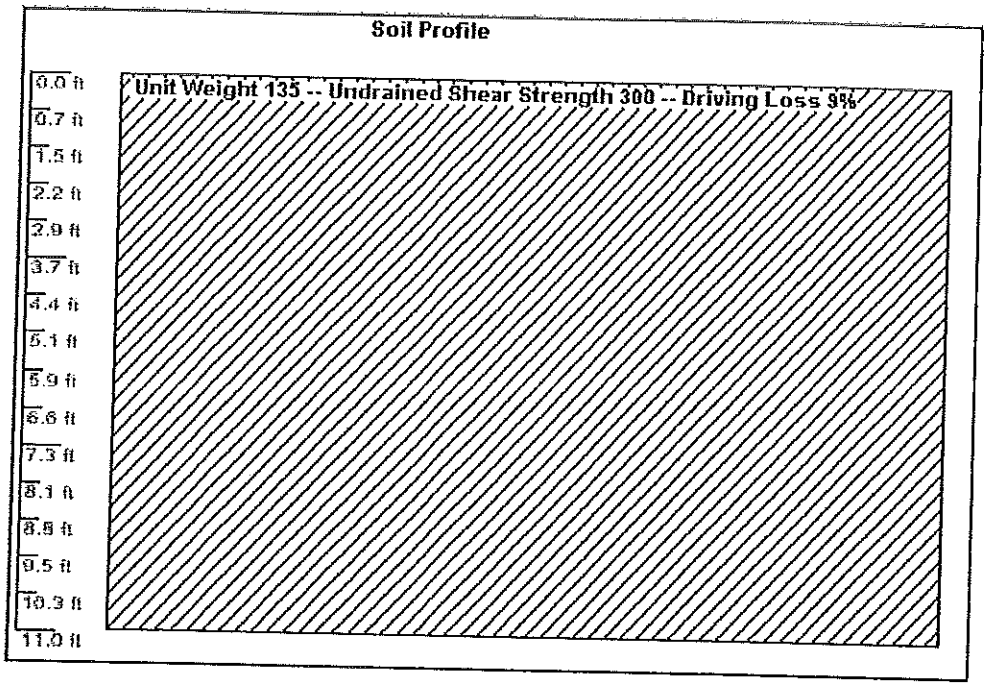
Pile and Soil Model Total Capacity Rut (kips) 100.0

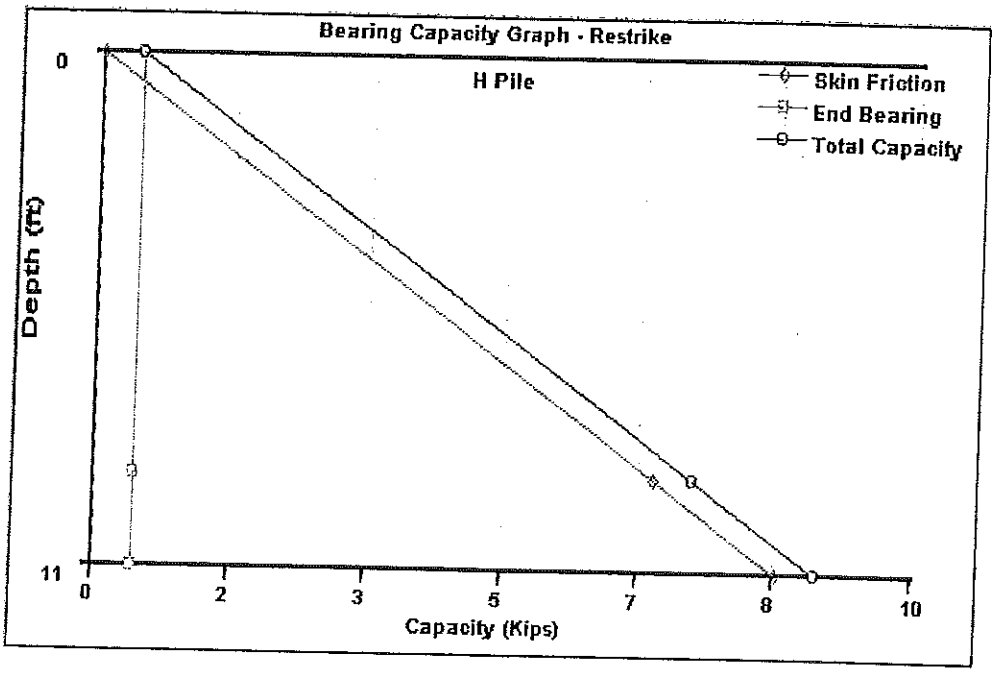
No.	Weight kips	Stiffn k/in	C-Slk ft	T-Slk ft	CoR kips	Soil-S s/ft	Soil-D inch	Quake ft	LbTop ft	Circmf ft	Area in2
1	0.297	18923.	0.010	0.000	0.85	1.7	0.200	0.100	3.33	4.8	26.1
2	0.297	18923.	0.000	0.000	1.00	5.0	0.200	0.100	6.67	4.8	26.1
3	0.297	18923.	0.000	0.000	1.00	8.3	0.200	0.100	10.00	4.8	26.1
Toe					85.0	0.150	0.04				

PILE, SOIL, ANALYSIS OPTIONS:
Uniform/Non-Uniform/2-Pile 0 Pile Segments: Automatic
No. of Slacks/Splices 0 Pile Damping (%) 1
Pile Damping Fact.(k/ft/s) 0.916
% Skin Friction 15 % End Bearing 85
Soil Resistance Distr. No. 0
Soil Damping Option Smith
Max No Analysis Iterations 0 Time Increment/Critical 160
Residual Stress Analysis 0 Output Option 0
Output Time Interval 1 Analysis Time-Input (ms) 0
Output Segment Generation Automatic

: 12/16/2002 :
H.B. FLEMING 01/07/2003
1998-2 GRLWEAP(TM) Version

Rut (kips)	Bl Ct (bpf)	Stroke (ft) down	up	Ten Str (ksi)	i,t	Comp Str (ksi)	i,t	ENTHRU (kip-ft)	Bl Rt (b/min)
100.0	12.1	6.70	6.72	0.00(	1, 0)	21.97(	1, 2)	18.1	45.4
200.0	32.3	8.45	8.46	0.00(	1, 0)	26.09(	1, 2)	15.4	40.6
300.0	48.5	8.85	8.85	0.00(	1, 0)	30.18(	3, 2)	14.8	39.8
400.0	66.8	9.05	9.20	-0.06(	2, 47)	34.53(	3, 2)	14.0	39.2
500.0	85.8	9.62	9.62	-0.28(	3, 9)	38.48(	3, 2)	13.8	38.2
600.0	116.6	9.90	10.05	-0.75(	2, 9)	42.00(	1, 3)	13.0	37.6
700.0	169.1	10.00	9.72	-1.08(	2, 11)	44.70(	1, 3)	12.5	37.8
800.0	257.1	10.00	10.05	-0.95(	2, 11)	47.05(	1, 3)	11.9	37.5
900.0	397.0	10.00	9.61	-1.09(	2, 8)	47.96(	1, 3)	11.4	38.0
1000.0	692.1	10.00	9.85	-1.31(	3, 9)	48.69(	1, 3)	11.0	37.7


Soil Profile
0.0 ft
0.7 ft
1.5 ft
2.2 ft
2.9 ft
3.7 ft
4.4 ft
5.1 ft
5.9 ft
6.6 ft
7.3 ft
8.1 ft
8.8 ft
9.5 ft
10.3 ft
11.0 ft
Unit Weight 135 -- Undrained Shear Strength 300 -- Driving Loss 9%


Bearing Capacity Graph - Restrike
H Pile
Skin Friction
End Bearing
Total Capacity
Depth (ft)
0
11
0
2
3
5
7
8
10
Capacity (Kips)

Form # P 01

ELECTRICAL PERMIT
City of Portland, Me.

114A 004

To the Chief Electrical Inspector, Portland Maine:
The undersigned hereby applies for a permit to make electrical installations in accordance with the laws of Maine, the City of Portland Electrical Ordinance, National Electrical Code and the following specifications: 86 Bedford

Date 4/29/03
Permit # 2003-4371
CBL# 115 B009

LOCATION: USM, Parking Garage **METER MAKE & #**
CMP ACCOUNT # **OWNER** USM
TENANT **PHONE #**

								TOTAL	EACH FEE
OUTLETS		Receptacles		Switches		Smoke Detector		.20	
FIXTURES		Incandescent		Fluorescent		Strips		.20	
SERVICES		Overhead		Underground		TTL AMPS	<800	15.00	
		Overhead		Underground			>800	25.00	
Temporary Service	1	Overhead		Underground		TTL AMPS	1	25.00	25.00
METERS		(number of)						25.00	
MOTORS		(number of)						1.00	
RESID/COM		Electric units						2.00	
HEATING		oil/gas units		Interior		Exterior		1.00	
APPLIANCES		Ranges		Cook Tops		Wall Ovens		5.00	
		Insta-Hot		Water heaters		Fans		2.00	
		Dryers		Disposals		Dishwasher		2.00	
		Compactors		Spa		Washing Machine		2.00	
		Others (denote)						2.00	
MISC. (number of)		Air Cond/win						2.00	
		Air Cond/cent						3.00	
		HVAC		EMS		Pools		10.00	
		Signs				Thermostat		5.00	
		Alarms/res						10.00	
		Alarms/com						5.00	
		Heavy Duty(CRKT)						15.00	
		Circus/Carnv						2.00	
		Alterations						25.00	
		Fire Repairs						5.00	
		E Lights						15.00	
		E Generators						1.00	
								20.00	
PANELS		Service		Remote		Main		4.00	
TRANSFORMER		0-25 Kva						5.00	
		25-200 Kva						8.00	
		Over 200 Kva						10.00	
						TOTAL AMOUNT DUE			25.00
		MINIMUM FEE/COMMERCIAL 45.00				**MINIMUM FEE**	**35.00**		45.00

CONTRACTORS NAME Milliken Bros., Inc. **MASTER LIC. #** MC60003818
ADDRESS 474 Riverside Industrial Parkway **LIMITED LIC. #**
TELEPHONE (207) 797-8375

SIGNATURE OF CONTRACTOR

White Copy - Office • Yellow Copy - Applicant

Form # P 01

ELECTRICAL PERMIT
City of Portland, Me.

114 A 004

To the Chief Electrical Inspector, Portland Maine:
The undersigned hereby applies for a permit to make electrical installations in accordance with the laws of Maine, the City of Portland Electrical Ordinance, National Electrical Code and the following specifications:

Date 4/25/03
Permit # 2003-4366
CBL# 116 B009

LOCATION: USM, Parking Garage 96 Bedford
METER MAKE & #
CMP ACCOUNT # 441-1690042-001
OWNER USM
TENANT
PHONE #

									TOTAL	EACH	FEE
OUTLETS	61	Receptacles	16	Switches	24	Smoke Detector			101	.20	20.20
FIXTURES		Incandescent	591	Fluorescent		Strips			591	.20	118.20
SERVICES		Overhead		Underground		TTL AMPS		<800		15.00	
		Overhead	1	Underground				>800	1	25.00	25.00
Temporary Service		Overhead		Underground		TTL AMPS				25.00	
METERS	1	(number of)								25.00	
MOTORS	5	(number of)							1	1.00	1.00
RESID/COM		Electric units							5	2.00	10.00
HEATING		oil/gas units		Interior		Exterior				1.00	
APPLIANCES		Ranges		Cook Tops		Wall Ovens				5.00	
		Insta-Hot		Water heaters		Fans				2.00	
		Dryers		Disposals		Dishwasher				2.00	
		Compactors		Spa		Washing Machine				2.00	
		Others (denote)								2.00	
MISC. (number of)		Air Cond/win								3.00	
		Air Cond/cent				Pools				10.00	
		HVAC		EMS		Thermostat				5.00	
		Signs								10.00	
		Alarms/res								5.00	
	2	Alarms/com							2	15.00	30.00
		Heavy Duty(CRKT)								2.00	
		Circus/Carnv								25.00	
		Alterations								5.00	
		Fire Repairs								15.00	
		E Lights								1.00	
	1	E Generators							1	20.00	20.00
PANELS	6	Service		Remote	1	Main			7	4.00	28.00
TRANSFORMER		0-25 Kva								5.00	
	2	25-200 Kva							2	8.00	16.00
	1	Over 200 Kva							1	10.00	10.00
						TOTAL AMOUNT DUE					
		MINIMUM FEE/COMMERCIAL 45.00				**MINIMUM FEE**		**35.00**			278.40

CONTRACTORS NAME Milliken Bros., Inc.
MASTER LIC. # MC60003818
ADDRESS 474 Riverside Industrial Parkway
LIMITED LIC. #
TELEPHONE (207) 797-8375

SIGNATURE OF CONTRACTOR

White Copy - Office • Yellow Copy - Applicant

REPORT ON
SUBSURFACE AND FOUNDATION INVESTIGATION
PROPOSED COMMUNMITY EDUCATION FACILITY AND PARKING GARAGE
BEDFORD STREET
PORTLAND, MAINE

by

Haley & Aldrich, Inc.
South Portland, Maine

for

University of Southern Maine
Portland, Maine

File No. 28438-001
July 2002

HALEY & ALDRICH

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ENGINEERING &
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Haley & Aldrich, Inc.
500 SouthBorough Drive
Suite 10
South Portland, ME 04106-6935
Tel: 207.772.5439
Fax: 207.871.5999
www.HaleyAldrich.com

HALEY & ALDRICH

12 July 2002
File No. 28438-001

University of Southern Maine
Department of Facilities Management
25 Bedford Street
P.O. Box 9300
Portland, Maine 04104-9300

Attention: Mr. John Rasmussen

Subject: Proposed Community Education Facility and Parking Garage
Bedford Street
Portland, Maine

Ladies and Gentlemen:

This report presents the results of our subsurface and foundation investigation for final design of the Community Education Facility and Parking Garage on Bedford Street in Portland, Maine. These services were performed in accordance with our proposal dated 23 April 2002.

In summary, it is our opinion that the garage may be supported on high capacity piles driven to bearing in the underlying glacial till and bedrock and the Community Education Facility may be supported on spread footings bearing on the undisturbed, naturally deposited soil or compacted structural fill placed after removal of unsuitable material or raises-in-grade. In addition, earth-supported bituminous pavement may be used for the lowest level in the parking garage and an earth-supported slab-on-grade may be used in the lowest level of the Community Education Facility. Specific recommendations for foundation design and construction are presented below.

INTRODUCTION

The site is located on Bedford Street and is bounded by Bedford Street, Surrenden Street, I-295, Conant Street and Winslow Street as shown on Figure 1, Project Locus. The site is presently a paved parking lot, except for Powers House at 86 Winslow Street. We understand that residential buildings previously occupied portions of the site along Bedford Street and Surrenden Street. We understand that basement walls and previous foundations remain below the present ground surface. Ground surface elevations vary from approximately El. 24 in the southeast corner to El. 44 in the northwest corner.

Elevations in this report are in feet and referenced to National Geodetic Vertical Datum (NGVD).

PROPOSED CONSTRUCTION

The proposed facility will include community meeting rooms and auditorium and a five-level, 1200-space parking garage. The Community Education Facility will have a plan area of approximately 16,600 sq. ft. The lowest floor level in the Community Education Facility varies from approximately El. 33 to El. 45. The Parking Garage will have a plan area of approximately 75,600 sq. ft. Columns in the parking garage will be spaced at approximately 60-ft. by 35-ft. Column loads vary from as much as 1800 kips in the interior to as much as 1400 kips on the exterior. Maximum wall loads are on the order of 50 kips per ft. Uplift loads due to seismic loading may be up to 400 kips. The lowest floor level in the garage is El. 27. The Community Education Facility will be constructed adjacent to the Parking Garage but with a separate structural system and foundation.

SUBSURFACE EXPLORATIONS

Recent Explorations

During 24 to 26 June 2002, Maine Test Borings, Inc. (MTB) of Brewer, Maine, drilled six test borings, B101 to B106, at the site at locations shown on Figure 2, Site and Subsurface Exploration Plan. MTB drilled the borings to depths below ground surface varying from 9.0 ft. to 60.6 ft. Haley & Aldrich monitored the borings and prepared the logs included in Appendix A. Table I summarizes the results of borings.

Borings B101 and B103 were drilled with 3-in. diameter casing by wash boring techniques. A core of bedrock was recovered in each boring. The remaining borings were drilled with hollow stem augers to refusal. Soil samples were typically obtained at 5-ft. intervals in the borings. Standard Penetration Resistance (N) was measured at each sample interval in accordance with ASTM test designation D1586. The undrained shear strength of the clay was measured by field vane shear at various depths.

Previous Borings

During 2 to 4 January 2002, MTB drilled seven borings, B1 to B7, at the site at locations shown on Figure 2. MTB drilled the borings to depths below ground surface varying from 6.1 ft. to 63.0 ft. Haley & Aldrich monitored the borings and prepared the logs included in Appendix B. Table I summarizes the results of borings.

Borings were drilled with hollow stem augers. Soil samples were typically obtained at 5-ft. intervals in the borings. Standard Penetration Resistance (N) was measured at each sample interval in accordance with ASTM test designation D1586. The undrained shear strength of

the clay was measured by field vane shear at various depths. A groundwater observation well was installed in completed boring B3. The observation well installation and groundwater monitoring reports are included in Appendix C.

Haley & Aldrich determined the locations of borings by pacing from existing site features. Haley & Aldrich estimated the ground surface elevations at borings by linear interpolation between ground surface contours near the plotted locations.

The boring logs and related information depict subsurface conditions and water levels encountered at the locations and during the times indicated on the logs. Subsurface conditions at other locations may differ from those encountered in the borings. The passage of time may result in a change in groundwater conditions at the exploration locations.

SUBSURFACE CONDITIONS

The explorations encountered four principal soil units below the bituminous pavement at the site: fill, marine deposit, glacial till, and weathered bedrock. Encountered thickness and generalized descriptions of the soil units are presented below in order of increasing depth below ground surface.

Fill – Fill consists of loose to very dense, brown, well-graded SAND (SW) with gravel; to grayish brown silty SAND (SM) with gravel; to gray brown sandy lean CLAY (CL). Fill thickness, including the bituminous pavement, varied from 0.8 ft. to 5.3 ft. Boring B7 encountered an old concrete foundation at a depth of 4.5 ft. below ground surface. We understand that buried foundations from previous structures on the site are located along Bedford Street and Surrenden Street.

Marine Deposit – The marine deposit consists of medium dense, gray brown, poorly-graded SAND (SP); to medium stiff to stiff, gray, lean CLAY (CL). Encountered thickness varied from 0.5 ft. to 46.0 ft.

Glacial Till – The glacial till stratum consists of medium dense to very dense, brown to gray, silty SAND (SM) with gravel and oversized pieces of cobbles and boulders. Encountered thickness varied from 0.3 ft. to 11.0 ft.

Weathered Bedrock – Weathered bedrock consists of very dense, gray to black, sand and gravel size pieces of weathered and decomposed bedrock. Augers penetrated up to 2.0 ft. into weathered bedrock.

All borings, except B101 and B103, terminated on what was judged to be sound bedrock. A 4.6-ft. and 5.0-ft. core of bedrock was recovered from B103 and B101, respectively. Estimated contours of the top of sound bedrock are presented on Figure 3, Bedrock Contour Plan.

Water was observed in the borings at depths below ground surface varying from 5.3 ft. to 41.0 ft. Water in the observation well was measured at a depth of 5.6 ft. below ground surface 3 days after installation. Observations of water level in the borings were made over a relatively short period of time and may not represent the stabilized groundwater level. Groundwater levels at the site will vary with season, precipitation, temperature and construction activity in the area. Therefore, water levels during and following construction will vary from those observed in the borings and observation well.

STRENGTH AND COMPRESSIBILITY CHARACTERISTICS OF CLAY STRATUM

The undrained shear strength of the clay stratum was determined by field vane shear tests in the borings. Measured undrained shear strength varied from 371 lbs. per sq. ft. (psf) to 1,300 psf. The stress history of the deposit was estimated by comparing the measured undrained shear strength with correlations for strength and stress history of clay from other projects with similar conditions.

The stress-strain or compressibility characteristics of clays are highly dependent upon their stress history. If clay is stressed within the limits of the maximum previous stress, σ_{vm}, the strain (settlement) will be a function of the recompression ratio (RR) of the clay. If the applied stress exceeds the maximum previous stress, the strain will be proportional to the virgin compression ratio (CR). The stress history and appropriate compression ratios were estimated for the clay deposit as discussed above. The correlations indicate that the deposit is overconsolidated, that is, the maximum previous stress is on the order of 1,000 psf greater than the existing overburden stress. The deposit likely became overconsolidated due to desiccation (drying) resulting from a lowering of the groundwater level at some time in the geologic past which also increased the effective overburden stress throughout the stratum.

RECOMMENDATIONS FOR FOUNDATION DESIGN

Recommended Foundation Type

Garage

In order to consider foundations above the clay stratum, we made estimates of the settlement of the clay from the superimposed load of the garage. We estimate that settlement below the most heavily loaded columns would be on the order of 6 in. to 10 in. We anticipate that settlement of this magnitude is unacceptable. Therefore, we recommend that the structure be founded on piles driven through the clay to end bearing in the glacial till or bedrock. We considered supporting the structure on drilled shafts socketed into bedrock but the preliminary estimated costs of this foundation system was significantly greater than that for end-bearing piles.

In our opinion, steel H-piles are the most appropriate pile type. We anticipate that HP14x89 piles, 50-ksi steel, with a design capacity of 300 kips and an ultimate capacity of 600 kips will be the most economical pile size. H-piles should be fitted with driving points to protect the tips. Anticipated pile lengths vary from approximately 10 ft. on the northwest side up to 55 ft. on the southeast side. Piles should be spaced at least 3-ft. on center when groups are required. The bottoms of pile caps should be founded a minimum of 4.5 ft. below the lowest surface exposed to freezing.

The piles should be driven to bearing in the glacial till or bedrock with a hammer delivering a minimum of 55,000 ft. lbs. of energy per blow. A final penetration resistance equal to 10 blows per in. for the final 6 in. of driving should be required. If abrupt refusal is encountered, driving may be terminated when the pile penetration is less than ½-in. for 10 successive blows.

Prior to installation, one of the H-piles should be load tested to twice the design capacity. In our opinion, in lieu of a pile load test, the contractor may monitor the installation of a minimum of six production piles using the Case-Goble Pile Driving Analyzer (PDA) equipment to verify that the piles achieve twice the design capacity with acceptable driving stresses. Monitoring with PDA in lieu of a load test will require the approval of local building officials.

We anticipate that some columns in the northwest portion of the garage may be supported on spread footings bearing on the undisturbed glacial till or bedrock or on compacted structural fill placed after removal of fill and marine sand and clay. Recommended bearing pressures are presented below. Footings should be founded a minimum of 4.5 ft. below the lowest surface exposed to freezing.

Permanent rock anchors such as high-strength steel threadbar rock anchors may resist uplift forces. Rock anchors should consist of grouted, grade 150 ksi, continuous upset threaded steel bars with double corrosion protection. Bars should be installed in minimum 4-in. diameter holes drilled through the overburden soils into sound bedrock and grouted with high-strength cement grout having a minimum 28-day compressive strength of 6,000 psi. All anchors should be proof tested to 125 percent of design load capacity prior to lock off. We can provide rock anchor details when the anticipated uplift loads are finalized.

Community Education Facility

The bituminous concrete and existing fill are not considered suitable for support of the building. All bituminous concrete and existing fill should be removed from within the building area.

We recommend that the building be supported on spread footings bearing on the naturally deposited, inorganic soil, bedrock, or compacted structural fill placed after removal of unsuitable soil or for raises-in-grade.

For uniformity, we recommend that footings be proportioned for an allowable bearing stress equal to 1,500 lbs. per sq. ft. multiplied by the least lateral dimension of the footing in feet, up to a maximum of 4,500 lbs. per sq. ft. All foundations should be at least 2 ft. wide. In some areas, bedrock may be above, at or near the proposed bottom of footing. For footings bearing on bedrock, the maximum slope of the bedrock surface should not be steeper than 4 horizontal to 1 vertical. Steeper slopes should be benched or tapered to the above criteria.

Individual footings should be founded either on soil or bedrock. Continuous footings may span both soil and rock provided a transition from soil to rock is provided. Tapering the bedrock to a slope of 4 horizontal to 1 vertical and backfilling with soil to a minimum depth of 1 ft. would be acceptable.

Exterior footings bearing on soil should be founded at least 4.5 ft. below the lowest adjacent ground surface exposed to freezing. Interior footings should be founded a minimum of 1.5 ft. below the floor slab. Exterior footings bearing on sound, intact bedrock may be founded at least 2.0 ft. below the lowest adjacent ground surface exposed to freezing.

We anticipate that portions of the Community Education Facility will overlie foundations of previous structures. All previous construction and fill should be removed from within the area of the Facility and be replaced with compacted structural fill. Compacted structural fill supporting footings should extend laterally from the footings to at least the limits defined by 1 horizontal to 1 vertical lines slopped outward and downward from points located at least 2 ft. horizontally beyond the bottom edges of the footings.

Footings adjacent to the Parking Garage should bear at the same elevation as the parking garage or the walls of the parking garage should be design for the lateral thrust of footings bearing at higher elevations. Transition to typical bearing level away from the Garage should be accomplished in several steps.

Ground Floor Slab

Garage

We understand that the lowest floor will be a bituminous concrete surface bearing on the existing subgrade or fill. We recommend that the floor have a pavement section as follows:

3 in. bituminous concrete, placed in two layers
3 in. screened or crushed gravel base course
12 in. sand or gravel subbase course

Existing fill materials may remain in place but all debris should be removed from the surface. The exposed subgrade should be proofrolled as described below. Base and subbase course materials should conform to the following gradations:

Screened or Crushed Gravel (Maine DOT Standard Specification, Highways and Bridges; Section 703.06a, Type A)

Sieve Size	Percent Finer by Weight
2 in.	100
½ in.	45 to 70
¼ in.	30 to 55
No. 40	0 to 20
No. 200	0 to 5

Sand or Gravel (Maine DOT, Section 703.06b, Type E)

Sieve Size	Percent Finer by Weight
6 in.	100
¼ in.	25 to 100
No. 40	0 to 50
No. 200	0 to 7

(Note: Compacted structural fill may be substituted for gravel subbase course)

All raises-in-grade below the floor should be accomplished with compacted structural fill.

Although groundwater was not observed above the lowest floor level, we anticipate that groundwater infiltrates at the higher elevations of the site and flows south. We recommend that a perimeter foundation drain be constructed on the outside of the foundation walls where the lowest floor level is below the exterior grade level. Gravity discharge and normal damp-proofing measures should be provided.

It should be noted that the subgrade soils are considered frost-susceptible. Therefore, pavement roughness due to non-uniform frost movement may occur. To eliminate such non-uniform frost movement would require approximately 4.5 ft. of structural fill subbase. However, it is common practice to tolerate seasonal movement to avoid the high cost of the added thickness of subbase.

Community Education Facility

We recommend that the floor slabs be designed as earth-supported slabs-on-grade bearing on a minimum of 6 in. of compacted structural fill. All previous construction and fill should be removed from within the building limits. All fill placed below the floor slab for raises-in-grade should consist of compacted structural fill. Normal dampproofing and vapor barriers should be provided below the slabs.

We recommend that a perimeter foundation drain be constructed on the outside of the foundation walls where the lowest floor level is below the exterior grade level. Gravity discharge and normal damp-proofing measures should be provided.

Seismic Design Considerations

We recommend that the building be designed according to the seismic requirements of the latest edition of the BOCA National Building Code. The site coefficient, S, is 1.5; the effective peak velocity-related acceleration coefficient, Av, is 0.10; and the effective peak acceleration, Aa, is 0.10. The subsurface soils are not considered liquefaction susceptible.

Lateral Foundation Loads

Garage

We recommend that lateral loads be resisted by earth pressure against pile caps and grade beams as follows:

$$P_r = (1/2\gamma K_p H^2)\ 1/3$$

Where P_r = Passive force in lbs. per ft. of beam, shaft or pile cap
γ = Soil unit weight in lbs. per cu. ft. (use $\gamma = 120$)
K_p = Passive earth pressure coefficient (use 3.0)
H = Thickness of pile cap or depth of beam in ft. below ground surface

In addition, a lateral resistance of 2 kips per pile may be used for piles. If this does not provide sufficient resistance to lateral forces, it may be necessary to install the piles as batter piles. Pile batter should be no flatter than 1 horizontal to 4 vertical.

Community Education Facility

We recommend that lateral loads be resisted by bottom friction on footings and that a coefficient of friction equal to 0.4 be used for footings bearing on soil. If this does not

provide sufficient lateral resistance, we will consider the problem in more detail, to take into account other factors.

Lateral Soil Pressure

We recommend that foundation walls, which are free to rotate at the top and backfilled, be designed to resist a lateral earth pressure calculated on the basis of an equivalent fluid unit weight of 40 lbs. per cu. ft. Foundation walls, which are restrained at the top and backfilled, should be designed to resist a lateral earth pressure calculated on the basis of an equivalent fluid unit weight of 55 lbs. per cu. ft. These fluid unit weights assume a free-draining granular backfill and an effective drainage system. Foundation walls in the garage adjacent to the ground floor of the Community Education Facility may be subject to surcharge due to the floor loads from the adjacent facility or footing loads if foundations are not lowered. The walls should be designed for a uniform lateral pressure acting over the full height of wall, calculated on the basis of 0.5 times the surcharge pressure, in addition to the lateral soil pressure recommended above.

Backfill Materials

Structural fill used below foundations and floor slabs and for backfill adjacent to walls should consist of sandy gravel to gravelly sand. It should be free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material, and should conform to the following gradation:

Sieve Size	Percent Finer by Weight
6 in.	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

Compacted structural fill should be placed in layers not exceeding 8 in. in loose measure and compacted by self-propelled vibratory equipment at the approximate optimum moisture content to a dry density of at least 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557. In confined areas, the maximum particle size should be reduced to 3 in. and the loose layer thickness should be reduced to 6 in. and compaction performed by hand-guided equipment.

Compacted structural fill on the outside of the foundation walls should extend laterally a minimum of 2 ft. from the wall. Backfill beyond this limit on the outside of the building may consist of common fill. The top 12-in. of fill on the exterior of the building should consist of

low permeability material to minimize water infiltration next to the building. Grading should provide for runoff away from the building.

Common fill may consist of inorganic mineral soil that can be placed in layers not exceeding 12 in. in thickness and compacted with a minimum of four systematic passes of the equipment placing the fill.

CONSTRUCTION CONSIDERATIONS

General

The primary purpose of this section of the report is to comment on items related to excavation, earthwork, pile driving and related geotechnical aspects of proposed construction. It is written primarily for the engineer having responsibility for preparation of plans and specifications. Since it identifies potential construction problems related to foundations and earthwork, it will also aid personnel who monitor the construction activity. Prospective contractors for this project must evaluate the construction problems on the basis of their own knowledge and experience in the Portland, Maine area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel.

Excavation, Lateral Support and Control of Water

We anticipate that foundation excavation can be accomplished with sloped open excavation through the overburden soils provided safe side slopes can be maintained. Some sloughing and raveling should be anticipated in temporary slopes. Temporary excavations should be made in accordance with all OSHA and other applicable regulatory agency requirements.

We anticipate that groundwater may be encountered at proposed subgrade level or bottom of pile caps and grade beams. If encountered, open pumping from sumps can likely control groundwater. In general, the contractor should control groundwater and water from runoff and other sources by methods, which prevent disturbance of bearing surfaces or adjacent soils and allow construction in-the-dry.

Pile Installation

Pile driving may encounter obstructions in the form of previous foundations such as concrete walls, footings and slabs. Obstruction will likely be near the ground surface and may be removed by excavation.

Preparation of Slab Areas

All bituminous pavement and fill should be removed from the slab subgrade of the Community Education Facility. All bituminous concrete and fill containing debris should be removed from the slab subgrade of the Garage. The exposed subgrade should be systematically proofrolled with a minimum of two coverages of a fully loaded ten-wheel dump truck or similar equipment. Any soft or yielding areas encountered should be excavated and replaced with compacted structural fill prior to raising the grade for construction.

Construction Monitoring

The foundation recommendations contained herein are based on the known and predictable behavior of a properly engineered and constructed foundation. Monitoring of the foundation construction is required to enable the geotechnical engineer to keep in contact with procedures and techniques used in construction. Therefore, we recommend that a person qualified by training and experience be present to provide monitoring at the site during pile driving, subgrade preparation and placement of compacted structural fill.

LIMITATIONS OF RECOMMENDATIONS

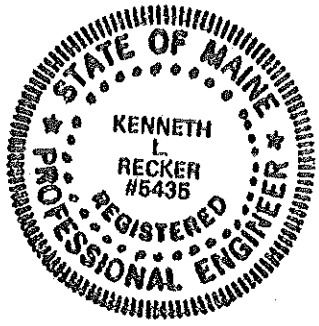
This report has been prepared for specific application to the subject project in accordance with generally accepted geotechnical engineering practices. In the event that any changes in the nature, design or location of the building is planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The recommendations presented herein are based in part upon the data obtained from the referenced test borings. The nature and extent of variations from that disclosed by the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

We recommend that we be provided with the opportunity for a general review of final design and specifications in order to determine that our earthwork and foundation recommendations have been interpreted and implemented in the design and specifications as they were intended.

It has been a pleasure to work with you on this project. Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely yours,
HALEY & ALDRICH, INC.



Kenneth L. Recker, P.E.
Vice President

Enclosures:

Table I	- Summary of Borings
Figure 1	- Project Locus
Figure 2	- Site sand Subsurface Exploration Plan
Figure 3	- Bedrock Contour Plan
Appendix A	- Logs of Recent Borings
Appendix B	- Logs of Previous Borings
Appendix C	- Observation Well Installation and Groundwater Monitoring Report

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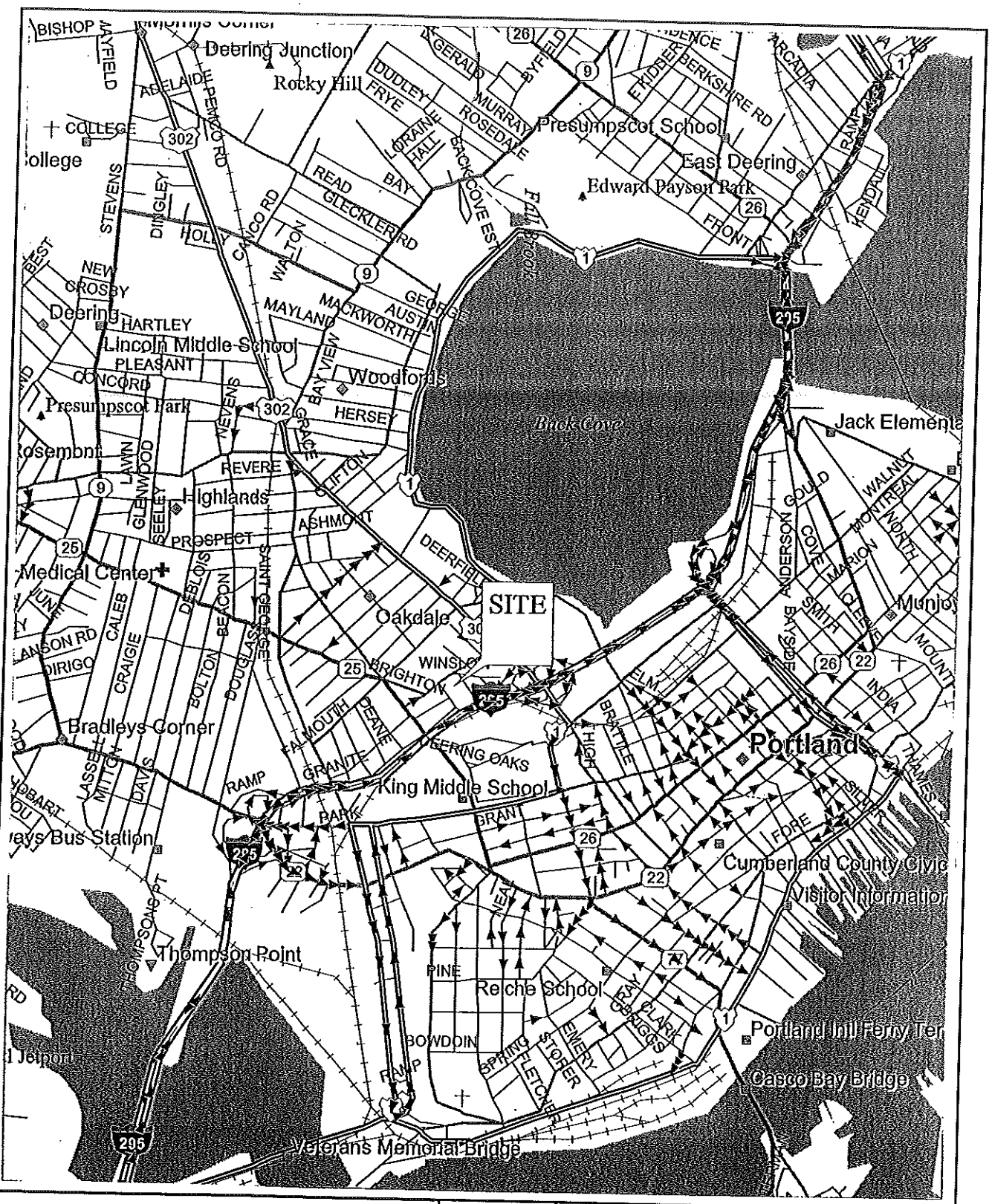
TABLE I
SUMMARY OF BORINGS
COMMUNITY EDUCATION FACILITY AND PARKING GARAGE
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

BORING NO.	DEPTH (FT)	APPROX. GROUND SUR. EL. (FT)	DEPTH TO WATER (FT)	STRATA THICKNESS (FT)					APPROX. EL. TOP OF SOUND BEDROCK (FT)
				FILL	MARINE DEPOSIT	GLACIAL TILL	WEATHERED BEDROCK	SOUND BEDROCK	
B101	60.6	24.8	12.3	4.0	41.8	9.8	--	5.0*	-30.8
B102	40.5	25.3	31.5	3.5	29.5	5.5	2.0	0.0*	-15.2
B103	38.0	27.1	10.9	3.0	21.0	9.4	--	4.6*	-6.3
B104	14.5	32.3	10.9	1.5	9.0	3.5	0.5	0.0*	17.8
B105	11.2	35.0	7.0	2.1	2.4	5.2	1.5	0.0*	23.8
B106	9.0	38.0	5.3	1.6	2.4	3.5	1.5	0.0*	29.0
B1	63.0	24.2	30.6	4.0	46.0	11.0	2.0	0.0*	-38.8
B2	44.2	24.6	41.0	1.2	37.8	4.0	1.2	0.0*	-19.6
B3	31.6	27.8	5.6	2.3	23.7	5.4	0.2	0.0*	-3.8
B4	30.3	28.2	18.2	5.0	20.0	5.1	0.2	0.0*	-2.1
B5	20.3	33.8	15.7	0.8	9.8	8.4	1.3	0.0*	13.5
B6	6.9	35.0	--	5.3	0.5	0.3	0.8	0.0*	28.1
B7	6.1	43.6	--	5.0	--	--	1.1	0.0*	37.5

NOTES:

1. ELEVATIONS REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM.
2. -- INDICATES STRATUM NOT ENCOUNTERED WITHIN DEPTH OF BORING.
3. * INDICATES DEPTH OF PENETRATION INTO STRATUM.

HALEY & ALDRICH



SITE COORDINATES: N43°39'41",W70°16'30"

"MAP FROM DELORME'S STREET ATLAS USA, 2000 FREEPORT, MAINE"

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

COMMUNITY EDUCATION FACILITY AND PARKING GARAGE
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

PROJECT LOCUS

APPROX. SCALE: 1:25,000

JULY 2002

FILE NO. 28438-001

FIGURE 1

APPENDIX A

Logs of Recent Borings

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B101

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 3
Start 24 June 2002
Finish 25 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 24.8
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	SS	NX	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	3.0	1.375	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Notes: Drive Casing 55.5 ft.
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					24.6		-ASPHALT PAVEMENT-										
	6 10 12 12	S1 15	0.5 2.5		0.2	SW	Medium dense brown well-graded SAND with silt, dry, mps=1.0 in. -FILL-	5	5	10	30	40	10				
					20.8												
5	5 7 6 5	S2 NR	5.0 7.0		4.0	SP	Medium dense brown poorly-graded SAND with silt, wet, uniform, mps=1 mm -MARINE DEPOSIT-					80	20				
	3 3 2 3	S3 23	7.0 9.0		17.3 7.5	CL	Medium stiff olive-brown lean CLAY, wet, slightly mottled with occasional silt and fine SAND layers -MARINE DEPOSIT-					5	95	N	M	M	H
10	WOR WOR WOR WOR	S4 17	10.0 12.0	NO WELL INSTALLED	15.3 9.5	CL	Very soft to soft olive-gray lean CLAY, wet, slightly mottled with occasional silt and fine SAND layers -MARINE DEPOSIT-						100	N	M	M	H
15	WOR WOR WOH WOH	S5 21	15.0 17.0			CL	Very soft to soft olive-gray lean CLAY, wet, slightly mottled with occasional silt and fine SAND layers -MARINE DEPOSIT-						100	N	M	M	H
20							Washed hole down to 21.0 ft.										
							FV-1, 2 in. x 7 in. vane =10/0 ft./lbs., Su=371 psf										
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/25/02	0730		55.0	55.5	18.7
6/25/02	1000		Open	60.6	12.3

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 55.5
Rock Cored (lin. ft.) 5.1
Samples 12S, 1C

Boring No. B101

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B101
File No. 28438-001
Sheet No. 2 of 3

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	WOR WOR WOR WOR	S6 20	26.0 28.0			CL	FV-2, 2 in. x 7 in. vane =10/0 ft./lbs., Su=371 psf Soft olive-gray lean CLAY with black streaks, wet						100	N	M	M	H
30	WOH WOH WOH 2	S7 24	30.0 32.0			CL	Soft to medium stiff olive-gray lean CLAY with black streaks, wet						100	N	M	M	H
35	1 WOH 1 1	S8 24	35.0 37.0			CL	Soft to medium stiff olive-gray lean CLAY with black streaks, wet						100	N	M	M	H
40	WOH WOH WOH WOH	S9 24	40.0 42.0			CL	FV-3, 2 in. x 7 in. vane =19/5 ft./lbs., Su=705 psf Medium stiff olive gray lean CLAY with black streaks with occasional fine sand and silt layers, wet						100	N	M	M	H
45	WOH 1 7 10	S10 24	45.0 47.0		-21.0 45.8	SM	Medium dense brown silty SAND with occasional clay-silt seams, uniform, wet, mps=1 mm -GLACIAL TILL-				75	25					
50	8 10 35 38	S11 17	50.0 52.0		-26.3 51.1	SM	Dense brown silty SAND with gravel, wet, mps=1.0 in. -GLACIAL TILL-	15	10	10	10	35	20				
55	18 65/0'	S12 5"	55.0 55.5		-30.7 55.5	SM	Dense gray silty SAND with gravel, wet, mps=1.0 in. -GLACIAL TILL DEPOSIT- SPT refusal on BEDROCK See core boring report	15	15	10	15	30	15				

*SPT = Sampler blows per 6 in. **Maximum 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.

HALEY & ALDRICH

CORE BORING REPORT

Boring No. B101
File No. 28438-001
Sheet No. 3 of 3

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
55									
	3	C1	55.6 60.6	54/24	90/40	Fresh	NO WELL INSTALLED	55.5	Moderately hard, fresh gray fine grained SCHIST with calcite vein. Joints spaced close to moderate, moderately dipping primarily along foliation. Joints are planar to undulating, smooth to rough, mostly fresh, few decomposed, tight to open, some silt infilling. -BEDROCK-
	3								
	4								
	5								
60	6							60.6	60.6 ft. end of boring

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B102

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 2
Start 26 June 2002
Finish 26 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 25.3
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	2.5	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Notes: HSA 40.0
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					25.0												
	16 7 8 8	S1 11	0.5 2.5		0.3	SW	-ASPHALT PAVEMENT- Medium dense brown well-graded SAND with gravel, dry-moist, mps=1.25 in. -FILL-	15	15	10	25	30	5				
					21.8												
					3.5												
5	10 14 18 21	S2 24	5.0 7.0			CL	Very stiff to hard olive-brown lean CLAY, moist, mottled -MARINE DEPOSIT-						100	N	M	M	H
10	3 5 6 7	S3 24	10.0 12.0	NO WELL INSTALLED		CL	Stiff olive-brown lean CLAY with occasional gray silt seams, wet, slightly mottled -MARINE DEPOSIT-					5	95	N	M	M	H
					11.3												
					14.0												
15	2 1 2 2	S4 10	15.0 17.0			CL	Medium stiff olive-gray lean CLAY, wet -MARINE DEPOSIT-						100	N	M	M	H
20	WOH WOH WOH 1	S5 24	20.0 22.0			CL	Medium stiff olive-gray lean CLAY with black streaks, wet						100	N	M	M	H
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/26/02	1200		40.0	40.5	31.5
6/26/03	1220	Caved	Open	12.6	Dry

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 40.5
Rock Cored (lin. ft.) -
Samples 9S

Boring No. B102

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B102
File No. 28438-001
Sheet No. 2 of 2

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	WOH WOH WOH 1	S6 24	25.0 27.0			CL	Medium stiff olive-gray lean CLAY with black streaks, wet						100	N	M	M	H
30	1 WOR 1 1	S7 24	30.0 32.0		-7.7	CL	Medium stiff olive-gray lean CLAY with occasional silty fine sand seams with black streaks, wet -MARINE DEPOSIT-					5	95	N	M	M	H
35	3 5 7 6	S8 24	35.0 37.0		33.0 -13.2	SM	Medium dense grayish-brown and reddish-brown silty SAND, wet, uniform, mps=1 mm -GLACIAL TILL-				10	60	30				
40	50	S9 6	40.0 40.5		38.5 -15.2 40.5		Gray highly weathered SCHIST -WEATHERED BEDROCK- 40.5 ft. SPT refusal on -BEDROCK- End of boring										

*SPT = Sampler blows per 6 in. **Maximum 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. B102

TEST BORING REPORT

Boring No. B103

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 3
Start 25 June 2002
Finish 25 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 27.1
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	SS	NX	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	3.0	1.375	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Notes: Drive Casing
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	2 2 3 2	S1 18	0.0 2.0	NO WELL INSTALLED	26.6	SM	Loose brown silty SAND, roots, dry, mps=3 mm			5	10	65	20				
					0.5	SM	-TOPSOIL-										
							Loose grayish brown silty SAND with gravel, wet, mps 0.75 in. -FILL-	5	10	10	10	45	20				
					24.1												
					3.0												
5	4 9 12 15	S2 24	5.0 7.0			CL	Very stiff olive-brown lean CLAY with occasional silty fine sand seams, mottled, moist -MARINE DEPOSIT-					5	95	N	M	M	H
10	3 5 6 6	S3 24	10.0 12.0			CL	Stiff olive-brown lean CLAY with occasional silty fine sand seams, slightly mottled, wet					5	95	N	M	M	H
					12.1												
15	1 1 1 2	S4 24	15.0 17.0		15.0	CL	Medium stiff olive-gray lean CLAY, wet						100	N	M	M	H
					11.1		-MARINE DEPOSIT-										
					16.0	SM	Brown silty SAND layer										
					10.2												
					16.9												
20	1 1 1 1	S5 24	20.0 22.0			CL	Medium stiff olive-gray lean CLAY with black streaks, wet -MARINE DEPOSIT-						10	N	M	M	H
					3.1												
					24.0												
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/25/02	1645		Open	38.0	10.9

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 33.3
Rock Cored (lin. ft.) 4.7
Samples 7S,1C

Boring No. B103

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B103
File No. 28438-001
Sheet No. 2 of 3

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	10 6 14 23	S6 23	25.0 27.0		0.4	SP-SM	Medium dense olive-brown and reddish-brown poorly-graded SAND with silt, wet, uniform, mps=1 mm -GLACIAL TILL-				40	50	10				
					26.7	SM	Medium dense olive-brown silty SAND with gravel, wet, mps=1.2 in. -GLACIAL TILL-	10	15	10	10	35	20				
30	12 12 12 18	S7 16	30.0 32.0		-4.8	SM	Medium dense olive-brown silty SAND with gravel, wet, mottled, mps=1.5 in -GLACIAL TILL-	15	15	10	15	30	15				
					31.9	SM	Gray silty SAND with gravel, wet -GLACIAL TILL-										
					-6.2 33.3		33.3 ft. casing refusal on BEDROCK See core boring report										

*SPT = Sampler blows per 6 in. **Maximum 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.

HALEY & ALDRICH

CORE BORING REPORT

Boring No. B103
File No. 28438-001
Sheet No. 3 of 3

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
	5								
	5	C1	33.4 38.0	55/34	100/62	Fresh	NO WELL INSTALLED	33.5	Moderately hard, fresh, fine grained, gray SCHIST with calcite veins. Joints close to moderate, moderately dipping primarily along foliation. Joints are planar to undulating, smooth to rough, fresh, tight. -BEDROCK-
35	6								
	9								
	7							38.0	38.0 ft. end of boring

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B104

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 1
Start 26 June 2002
Finish 26 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 32.3
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	2.5	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Notes: HSA 14.5
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					32.0		-ASPHALT PAVEMENT-										
	7 11 5 8	S1 24	0.5 2.5		0.3 30.8	SW	Medium dense brown well-graded SAND with silt, dry, mps=0.5 in.		10	20	30	30	10				
					1.5		-FILL-										
5	6 8 11 14	S2 24	5.0 7.0			CL	Very stiff, olive-brown lean CLAY with occasional silty fine sand seams, moist, slightly mottled -MARINE DEPOSIT-					5	95	N	M	M	H
10	6 6 10 10	S3 21	10.0 12.0	NO WELL INSTALLED	21.8 10.5	SM	Medium dense grayish-brown and reddish-brown silty SAND, wet, uniform, mps 1mm				5	65	30				
					19.8 12.5		-GLACIAL TILL-										
					18.3	SW	Dense brown silty SAND with gravel, wet -GLACIAL TILL-										
					14.0		-WEATHERED BEDROCK-										
					17.8 14.5		14.5 ft. auger refusal on BEDROCK End of boring										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/26/02	0730		14.5	14.5	12.1
6/26/02	0745	Caved	Open	11.1	10.9

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14.5
Rock Cored (lin. ft.) -
Samples 3S

Boring No. B104

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B105

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 1
Start 26 June 2002
Finish 26 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 35.0
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	2.5	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Notes: HSA
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED	34.7												
	6 8 6 6	S1 17	0.5 2.5		0.3 32.9	SW	-ASPHALT PAVEMENT- Medium dense brown well-graded SAND with gravel, dry, mps=1.3 in -FILL-	5	10	20	30	30	5				
					2.1 30.5	CL	Stiff olive-brown lean CLAY, moist, slightly mottled -MARINE DEPOSIT-						100	N	M	M	H
5	4 6 5 10	S2 20	5.0 7.0		4.5 28.7	SM	Medium dense reddish-brown well-graded silty SAND, wet, mottled, mps=1 mm, uniform -GLACIAL TILL-				5	65	30				
					6.3 25.3	SM	Medium dense reddish-brown well-graded SAND with gravel and silt, wet, mps=1.0 in. -GLACIAL TILL- Water at 8.0 ft.	10	10	10	30	30	10				
10	6 12 50/0.2'	S3 -	10.0 11.2		9.7 23.8		Medium dense grayish-brown, highly weathered SCHIST -WEATHERED BEDROCK-										
					11.2		11.2 ft. SPT refusal on BEDROCK End of boring										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/26/02	0840		10.0	11.2	8.4
6/26/02	0845		10.0	11.2	7.5
6/26/02	0855	Caved	Open	7.9	7.0

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 11.2
Rock Cored (lin. ft.) -
Samples 3S

Boring No. B105

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

TEST BORING REPORT

Boring No. B106

Project COMMUNITY EDUCATION FACILITY AND PARKING GARAGE , PORTLAND, ME
Client UNIVERSITY OF SOUTHERN MAINE
Contractor MAINE TEST BORINGS, INC.

File No. 28438-001
Sheet No. 1 of 1
Start 26 June 2002
Finish 26 June 2002
Driller M.Coffin
H&A Rep. B.Estes
Elevation 38.0
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile B-53
Inside Diameter (in.)	2.5	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Notes: HSA
				Hoist/Hammer: Winch Safety Hammer

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED	37.8												
	6 7 3 7	S1 18	0.5 2.5		0.2	SW	-ASPHALT PAVEMENT- Medium dense brown well-graded SAND with gravel, dry, mps=1.25 in.	5	10	20	30	30	5				
					36.4 1.6	ML	-FILL- Stiff olive-brown SILT with occasional fine sand seams and layers, moist, mps=1 mm			5	5	15	75				
					34.0		-MARINE DEPOSIT-										
5	6 6 4 7	S2 18	5.0 7.0		4.0	SM	Medium dense grayish-brown and reddish-brown silty SAND, wet, uniform, mps=1 mm				5	65	30				
					31.3		-GLACIAL TILL DEPOSIT-										
					6.7 30.5	SM	Medium dense brown well-graded SAND with gravel and silt, wet, mps=1.25 in	10	10	15	25	30	10				
					7.5 29.0		-GLACIAL TILL DEPOSIT- Grayish-brown, highly weathered SCHIST										
					9.0		-WEATHERED BEDROCK- 9.0 ft. auger refusal on BEDROCK End of boring										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
6/26/02	0930		9.0	9.0	8.8
6/26/02	0935	Caved	Open	5.5	5.3

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 9.0
Rock Cored (lin. ft.) -
Samples 2S

Boring No. B106

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

*SPT = Sampler blows per 6 in **Maximum particle size is determined by direct observation within the limitations of sampler size (in millimeters)

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

APPENDIX B

Logs of Previous Borings

TEST BORING REPORT

Boring No. B1

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes: 2" x 7" FV

File No.	28438-000
Sheet No.	1 of 3
Start	2 January 2002
Finish	2 January 2002
Driller	M.Coffin
H&A Rep.	K.Recker
Elevation	24.2
Datum	NGVD
Location	See Plan

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					23.9												
	52 53 16 10	S1 22	0.5 2.5		0.3	SW	-BITUMINOUS PAVEMENT- Dense, brown well-graded SAND(SW), mps=0.5 in., no odor, dry -FILL-		15	15	20	40	10				
					20.2												
5					4.0												
	5 7 8 7	S2 24	5.0 7.0			SP	Medium dense, gray brown poorly-graded SAND(SP), no odor, wet -MARINE DEPOSIT-					85	15				
10					14.2												
	1 WOH 1 WOH	S3 24	10.0 12.0	NO WELL INSTALLED	10.0	CL	Medium stiff, gray, lean CLAY(CL), no odor, wet					5	95	N	M	M	
15	WOR WOR WOH WOH	S4 24	15.0 17.0			CL	Medium stiff, gray, lean CLAY(CL), no odor, wet FV at 15.0 ft., Su=560 psf						100	N	M	M	
20	WOH WOH WOH 2	S5 24	20.0 22.0			CL	Medium stiff, gray, lean CLAY(CL) with black streaks, no odor, wet						100	N	M	M	
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/2/02	1430		63.0	63.0	30.6

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 63.0
Rock Cored (lin. ft.)
Samples 13S

Boring No. B1

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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TEST BORING REPORT

Boring No. B1
File No. 28438-000
Sheet No. 2 of 3

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	WOH WOH WOH 2	S6 24	25.0 27.0			CL	Medium stiff, gray, lean CLAY(CL) with black streaks, no odor, wet FV at 25.0 ft., Su=740 psf						100	N	M	M	
30	WOH WOH WOH 2	S7 24	30.0 32.0			CL	Medium stiff, gray, lean CLAY(CL) with black streaks, no odor, wet						100	N	M	M	
35	WOH WOH WOH 2	S8 24	35.0 37.0			CL	Stiff, gray, lean CLAY(CL) with black streaks, no odor, wet, fine sand lense, dense FV at 35.0 ft., Su=1,300 psf						100	N	M	M	
40	WOH 1 2 2	S9 24	40.0 42.0			CL	Stiff, gray, lean CLAY(CL) with black streaks, no odor, wet						100	N	M	M	
45	WOH 1 2 3	S10 24	45.0 47.0			CL	Stiff, gray, lean CLAY(CL) with black streaks, fine sand layers, no odor, wet -MARINE DEPOSIT-						100	N	M	M	
50	WOH 5 5 4	S11 24	50.0 52.0		-25.8 50.0	SM	Medium dense, brown silty SAND with gravel(SM), mps=1.2 in., no odor, wet	15	15	5	20	25	20				
55	10 17 13 19	S12 12	55.0 57.0			SM	Dense, gray silty SAND with gravel(SM), mps=1.2 in., no odor, wet -GLACIAL TILL-	20	15	10	20	20	15				
60	14 39 10 85	S13 24	60.0 62.0		-36.8 61.0	SM	Very dense, silty SAND with gravel(SM), mps=3/4", no odor, wet	15	15	10	20	20	20				
							Very dense, gray black decomposed bedrock										

*SPT = Sampler blows per 6 In. **Maximum 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.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. B1
File No. 28438-000
Sheet No. 3 of 3

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
					-38.8												
					63.0		Auger refusal at 63.0 ft Bottom of Exploration										

*SPT = Sampler blows per 6 in. **Maximum 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. B1

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TEST BORING REPORT

Boring No. B2

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes: 2" x 7" FV

File No.	28438-000
Sheet No.	1 of 2
Start	3 January 2002
Finish	3 January 2002
Driller	M.Coffin
H&A Rep.	B.Lawrence
Elevation	24.6
Datum	NGVD
Location	See Plan

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	~~100/.3~~	~~S1~~ 3	~~0.3~~ 0.6		24.3 / 0.3	SW	-BITUMINOUS PAVEMENT- / -FILL-		15	10	30	40	5				
	6 4 5 9	S2 8	2.0 4.0		23.4 / 1.2	ML	Brown, well-graded SAND with gravel(SW), mps=1/2", moist / Stiff, dark brown SILT(ML), moist, occasional shell fragment					5	95	R			
					21.6 / 3.0	SM	Medium dense, brown silty SAND(SM), mps=2 mm, moist					65	35	R			
					21.4 / 3.2	CL	Stiff, brown, poorly-graded SAND(SP), moist					95	5				
5	4 6 10 10	S3 24	5.0 7.0			CL	Very stiff, brown lean CLAY(CL), moist -MARINE DEPOSIT-					5	95	N	M	M	N
10	4 4 6 6	S4 24	10.0 12.0	NO WELL INSTALLED		CL	Stiff, mottled brown gray lean CLAY(CL), moist, frequent find sand partings					5	95	N	M	M	H
15	1 1 1 1	S5 24	15.0 17.0			CL	Medium stiff, gray, lean CLAY(CL), wet, black streaks,Occasional fine sand partings						100	N	M	M	H
20	WOR WOH 1 2	S6 24	20.0 22.0				Medium stiff, gray lean CLAY(CL), wet, black streaks FV1 20 ft., Su=700 psf						100	N	M	M	H
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/3/02	1445		44.2		41.0

Sample Identification

- O Open End Rod
- T Thin Wall Tube
- U Undisturbed Sample
- S Split Spoon
- G Geoprobe

Well Diagram

Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary

Overburden (lin. ft.)	44.2
Rock Cored (lin. ft.)	
Samples	11S

Boring No. B2

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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TEST BORING REPORT

Boring No. B2
File No. 28438-000
Sheet No. 2 of 2

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	WOH 4 1 1	S7 24	25.0 27.0				Medium stiff, gray lean CLAY(CL), wet, black streaks, occasional fine sand partings						100	N	M	M	H
30	WOR WOH 1 3	S8 24	30.0 32.0				Stiff, gray lean CLAY(CL), wet, black streaks, occasional fine sand partings FV2 at 30 ft., Su=1,110 psf						100	N	M	M	H
35	1 2 5 7	S9 24	35.0 37.0		-11.6	CL	Stiff, gray lean CLAY(CL) with black streaks to brown lean CLAY(CL), wet, frequent fine sand partings, trace fine gravel, mps=1					10	90	N	M	M	H
					36.2	ML	"										
					-11.8	SP	Brown and gray layered SILT(ML), wet					5	95	R			
					36.4	ML	Layered brown poorly-graded SAND(SP), mps=2 mm, wet					95	5	R			
							and					25	75				
					-14.4		SILT with SAND(ML), wet										
40	6 6 10 21	S10 16	40.0 42.0		39.0	SM	Medium dense, brown silty SAND with gravel(SM), mps=1", wet	10	15	10	15	30	20				
					-16.9												
					41.5	SW-SM	Dense, brown, well-graded, SAND with silt and gravel(SW-SM), mps=1", wet	10	15	30	20	15	10				
					-18.4		-GLACIAL TILL-										
					43.0		-WEATHERED ROCK-										
					-19.6												
	25/0	S11 1	44.2 44.3		44.2		Bottom of Exploration at 44.2 ft. Auger refusal										

*SPT = Sampler blows per 6 In. **Maximum 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. B2

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TEST BORING REPORT

Boring No. B3(OW)

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

File No. 28438-000
Sheet No. 1 of 2
Start 4 January 2002
Finish 4 January 2002
Driller M.Coffin
H&A Rep. B.Lawrence
Elevation 27.8
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes: 2" x 7" FV

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					27.3		-BITUMINOUS CONCRETE-										
	31 8 7 8	S1 12	0.5 2.5		0.5		Brown, well-graded SAND(SW), mps=3/4", moist (frozen)	5	15	15	25	35	5				
					26.5		Brown gray sandy SILT(ML), mps=0.2 mm, moist					30	70	R			
					1.3		-FILL-										
					25.5		Very stiff, brown gray, lean CLAY(CL), mps=2 mm, moist					10	90	N	M	M	H
					2.3		-MARINE DEPOSIT-										
5	3 6 8 9	S2 16	5.0 7.0		21.8	CL	Stiff, brown lean CLAY(CL), mps=2 mm, moist					10	90	N	M	M	H
					6.0	CL	Very stiff, brown gray lean CLAY(CL), mps=2 mm, moist, frequent fine sand partings					10	90	N	M	M	H
10	4 5 7 9	S3 24	10.0 12.0			CL	Stiff, mottled gray brown lean CLAY(CL), mps=2 mm, moist -MARINE DEPOSIT-					5	95	N	M	M	H
15	3 2 5 4	S4 24	15.0 17.0		11.8	CL	Medium stiff, olive lean CLAY(CL), wet						100	N	M	M	H
					16.0		Medium stiff, gray lean CLAY(CL), wet										
20	WOR WOH 2 2	S5 24	20.0 22.0				Stiff, gray lean CLAY(CL), mps=2 mm, wet, frequent fine sand partings FV1 at 20.0 ft., Su=1,300 psf					10	90	N	M	M	H
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/4/02	1005		30.0	31.6	20.5

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 31.6
Rock Cored (lin. ft.)
Samples 7S

Boring No. B3(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

*SPT = Sampler blows per 6 in. **Maximum 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.

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TEST BORING REPORT

Boring No. B3(OW)
File No. 28438-000
Sheet No. 2 of 2

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	18 13 10 12	S6 24	25.0 27.0		1.8 26.0	SP SM	Medium dense, brown poorly-graded SAND(SP), mps=2 mm, wet Medium dense, brown to gray silty SAND with gravel(SM), mps= 1/2", wet, slightly bonded -GLACIAL TILL-					100 35	15				
30	22 22 35 50/.1	S7 24	30.0 31.3		-3.6 31.4 -3.8 31.6	SM	Very dense, brown silty SAND with gravel(SM), mps= 1.3", wet -WEATHERED ROCK- Bottom of Exploration at 31.6 ft. Spoon refusal	20	20	15	15	15	15				

*SPT = Sampler blows per 6 in. **Maximum 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. B3(OW)

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B4

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes: 2" x 7" FV

File No. 28438-000
Sheet No. 1 of 2
Start 2 January 2002
Finish 3 January 2002
Driller M.Coffin
H&A Rep. B.Lawrence
Elevation 28.2
Datum NGVD
Location See Plan

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					27.9												
	31 19 7 7	S1 24	0.3 2.3		0.3	SW	-BITUMINOUS CONCRETE- Medium dense, brown well-graded SAND(SW), mps= 1/2", moist -FILL-		10	15	30	40	5				
5	5 8 12 16	S2 24	5.0 7.0		23.2 5.0	CL	Very stiff, brown, lean CLAY(CL)						100	N	M	M	H
10	4 5 5 7	S3 24	10.0 12.0	NO WELL INSTALLED			Stiff, mottled gray brown lean CLAY(CL), moist to wet -MARINE DEPOSIT-						100	N	M	M	H
15	2 2 3 2	S4 24	15.0 17.0		13.2 15.0	CL	Medium stiff, olive, lean CLAY(CL), wet						100	N	M	M	H
20	WOH WOH WOH WOH	S5 24	20.0 22.0		8.2 20.0	CL	Medium stiff, gray, lean CLAY(CL), mps=2 mm, wet FV1 at 20.0 ft., Su=820 psf					5	95	N	M	M	H
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/3/02	745		30.0	30.3	2.87
1/3/02	805	0.3		22.7	18.2

Sample Identification

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram

Riser Pipe; Screen; Filter Sand; Cuttings; Grout; Concrete; Bentonite Seal

Summary

Overburden (lin. ft.) 30.3
Rock Cored (lin. ft.)
Samples 7S

Boring No. B4

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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TEST BORING REPORT

Boring No. B4
File No. 28438-000
Sheet No. 2 of 2

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	9 13 16 25	S6 24	25.0 27.0		3.2 25.0	SP- SM	Medium dense, brown poorly-graded SAND with silt, mps=0.4 mm, wet, frequent gray silt and clay seams -GLACIAL TILL-					90	10				
30	50/.3	S7 3	30.0 30.3		-1.9 30.1 -2.1 30.3	SM	Brown silty SAND(SM), mps=1/2", wet, Reddish brown WEATHERED ROCK Note: Hammer bouncing 6" on rock Bottom of Exploration at 30.3 ft. Spoon refusal		10	20	20	35	15				

*SPT = Sampler blows per 6 in. **Maximum 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. B4

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B5

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes:

File No.	28438-000
Sheet No.	1 of 1
Start	3 January 2002
Finish	3 January 2002
Driller	M.Coffin
H&A Rep.	B.Lawrence
Elevation	33.8
Datum	NGVD
Location	See Plan

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	32 5 6 10	S1 12	0.3 2.3	NO WELL INSTALLED	33.5 0.3	SW	-BITUMINOUS CONCRETE-										
					33.0 0.8	ML	Very dense, brown well-graded SAND with gravel(SW), mps=1", moist	10	10	20	25	35					
					31.8 2.0	CL	-FILL-					30	70	R			
							Stiff, gray brown sandy SILT(ML), mps=2 mm, moist					10	90	N	M	M	H
							Very stiff, gray brown lean CLAY(CL), mps=2 mm, moist										
5	6 7 9 12	S2 24	5.0 7.0			CL	Very stiff, mottled, gray brown lean CLAY(CL), moist -MARINE DEPOSIT-					5	95	N	M	M	H
						CL	Alternating layers of										
10	7 10 13 15	S3A&B 24	10.0 12.0		23.2 10.6	SP SM	Stiff, gray lean CLAY(CL), mps=2 mm, wet and Medium dense, brown poorly-graded SAND(SP), mps=2 mm, wet					5 95		N	M	M	H
							Medium dense, mottled, brown gray silty SAND(SM), mps=1/2", wet	10	10	30	35	15					
							-GLACIAL TILL-										
15	9 15 15 22	S4 16	15.0 17.0		17.8 16.0	SM	Medium dense, brown silty SAND(SM), mps=1/2", wet	10	10	15	45	20					
					17.0 16.8		Medium dense, gray silty SAND(SM), mps=1/2", wet, occasional coarse to medium sand seam Augered through boulder	10	10	15	45	20					
					14.8 19.0		-WEATHERED ROCK-										
20	60/.1	S5 1	20.2 20.3		13.5 20.3		Bottom of Exploration at 20.3 ft. Auger Refusal										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/3/02	1105		20.0		19.9
1/3/02	1120			16.4	15.7

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.)	20.3
Rock Cored (lin. ft.)	
Samples	5S

Boring No. B5

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B6

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

File No. 28438-000
Sheet No. 1 of 1
Start 3 January 2002
Finish 4 January 2002
Driller M.Coffin
H&A Rep. B.Lawrence
Elevation 35.0
Datum NGVD
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes:

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					34.5		-BITUMINOUS CONCRETE-										
	14 5 3 7	S1 6	0.5 2.5		0.5	SW	Loose brown, well-graded SAND(SW), mps=3/4", moist -FILL-		10	15	25	45	5				
						CL	Gray brown sandy lean CLAY(CL), mps=2 mm, moist					30	70	N	M	M	H
5	6 13 30	S2 12	5.0 6.2		29.7 5.3	SP	Medium dense, orange poorly-graded SAND(SP), mps=2 mm, moist					95	5				
					29.2	SW-	-MARINE DEPOSIT-										
					5.8 28.9	SM	Dense, brown gray well-graded SAND with silt and gravel(SW-SM), mps=1 ", moist	5	10	15	30	30	10				
					6.1		-GLACIAL TILL-										
					28.1		-WEATHERED ROCK										
					6.9		Auger to 6.9 ft. Bottom of Exploration at 6.9 ft. Auger refusal										

NO WELL INSTALLED

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
1/4/02	715	15	5.0	6.1	Dry

Sample Identification

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram

Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary

Overburden (lin. ft.)	6.9
Rock Cored (lin. ft.)	
Samples	2S

Boring No. B6

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B7

Project	Community Education Facility and Parking Garage, Bedford Street, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS		Rig Make & Model: Mobile B53
Inside Diameter (in.)	2 1/2	1 3/8		Bit Type: Cutting Head
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Hoist/Hammer: Winch/ Safety Hammer
				Notes:

File No.	28438-000
Sheet No.	1 of 1
Start	3 January 2002
Finish	3 January 2002
Driller	M.Coffin
H&A Rep.	B.Lawrence
Elevation	43.6
Datum	NGVD
Location	See Plan

Depth (ft.)	SPT*	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**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					43.3												
	62	S1	0.3		0.3	SW	-BITUMINOUS CONCRETE-										
	65	12	2.3				Very dense, brown well-graded SAND(SW), mps=1/2", moist (frozen)	10	20	30	35	5					
	31						-FILL-										
	22																
							Brown 80% fine sand, 20% coarse to medium sand in auger cuttings										
					39.1												
5					4.5		Gray concrete cuttings, dry										
	90/.2	S2	5.0		38.6		(old foundation)										
		2	5.2		5.0		-WEATHERED ROCK-										
					37.5		Note: Durable angular gravel up to 2" in auger cuttings										
					6.1		Auger refusal at 6.1 ft.										

NO WELL INSTALLED

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram

Riser Pipe; Screen; Filter Sand; Cuttings; Grout; Concrete; Bentonite Seal

Summary

Overburden (lin. ft.)	6.1
Rock Cored (lin. ft.)	
Samples	2S

Boring No. B7

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

*SPT = Sampler blows per 6 in. **Maximum 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.

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CITY OF PORTLAND, MAINE

Department of Building Inspections

4/13 20 04

Received from University of Maine

Location of Work 15 Southeast St.

Cost of Construction $

Permit Fee $ 75.00

Building (IL) 1 Plumbing (I5) ___ Electrical (I2) ___ Site Plan (U2) ___

Other FD 0 $75.00 Permit # 03-0011

CBL: 114 A 004

Check #: 216357 **Total Collected** $ 75.00

THIS IS NOT A PERMIT

No work is to be started until PERMIT CARD is actually posted upon the premises. Acceptance of fee is no guarantee that permit will be granted. PRESERVE THIS RECEIPT. In case permit cannot be granted the amount of the fee will be refunded upon return of the receipt less $10.00 or 10% whichever is greater.

WHITE - Applicant's Copy
YELLOW - Office Copy
PINK - Permit Copy

APPENDIX C

Observation Well Installation and Groundwater Monitoring Report

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Project	Community Education Facility and Parking Garage
City/State	Bedford Street, USM, Portland, Maine
Client	University of Southern Maine
Contractor	Maine Test Borings, Inc.
Foreman	M.Coffin

Observation Well	MW1
Test Boring	B3
Installation Date	4-Jan-02
Location	See Plan
H&A File No.	28438-000
H&A Rep.	B.Lawrence

Ground El. 27.8 ft.

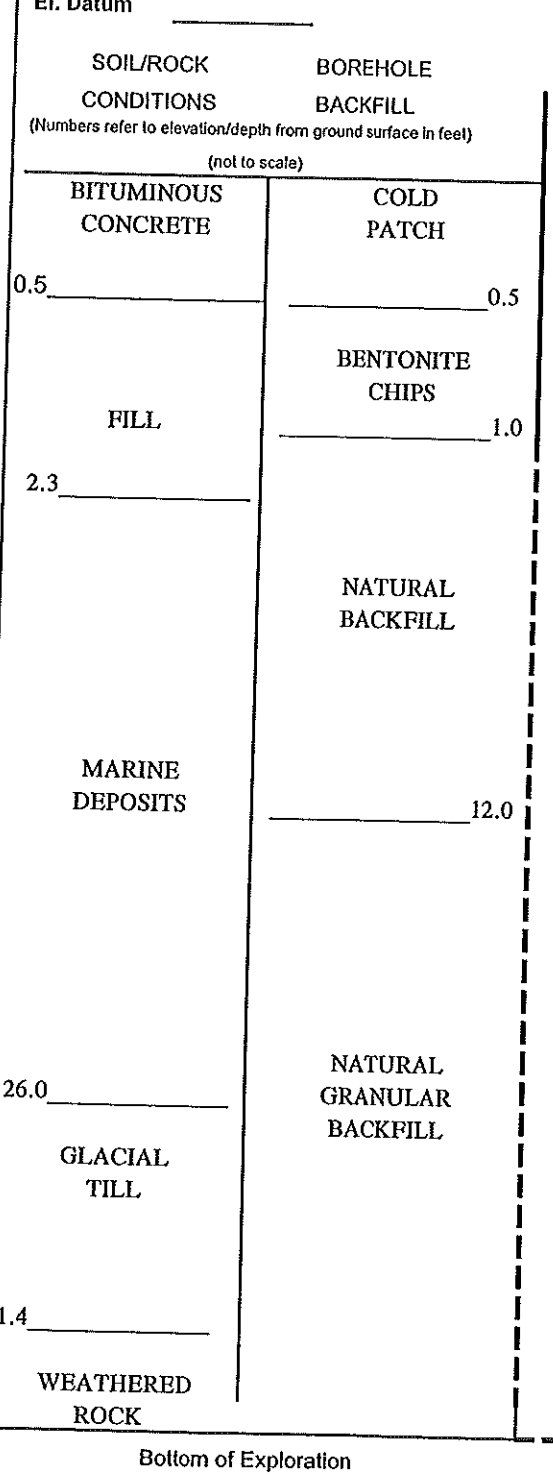
El. Datum

SOIL/ROCK CONDITIONS

BOREHOLE BACKFILL

(Numbers refer to elevation/depth from ground surface in feet)

(not to scale)



Type of protective cover: Hex Nut

Height of top of roadway box above ground surface: 0.0 ft

Depth of top of riser pipe below ground surface: 0.2 ft

Type of protective casing:

Length: 1.0 ft

Inside diameter: 7.0 in

Depth of bottom of roadway box: 1.0 ft

Seals:

Type	Depth to top (ft)	Thickness (ft)
Cold Patch	0.0	0.5
Bentonite Seal	0.5	0.5

Type of riser pipe: Schedule 40 PVC

Inside diameter of riser pipe: 1.0 in

Type of backfill around riser: Natural Backfill

Diameter of borehole: 8.0 in

Depth of top of wellpoint: 10.2 ft

Type of point or manufacturer: Schedule 40 Slotted

Screen gauge or size of openings: 0.010 in

Diameter of wellpoint: 1.0 in

Type of backfill around point: Natural/Sand Backfill

Depth of bottom of wellpoint: 20.2 ft

Silt trap: ft

Depth of bottom of borehole: 31.6 ft

(Depths refer to ground surface)

Remarks:

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HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER **B3**

Page 1 of 1

PROJECT	Community Education Facility and Parking Garage	H&A FILE NO.	28438-000
LOCATION	Bedford Street, Portland Campus, USM	PROJECT MGR.	K. Recker
CLIENT	University of Southern Maine	FIELD REP.	B. Lawrence
CONTRACTOR	Maine Test Borings, Inc.	DATE	1/4/2002
ELEVATION SUBTRAHEND	27.8		

Date	Time	Elapsed Time (days)	Depth of Water from Ground Surface	Elevation of Water	Remarks	Read By
1/4/2002	1535	-	13.1	14.7		BKL
1/7/2002	815	3	5.6	22.2		BKL

Form #3170

APPENDIX C

Observation Well Installation and Groundwater Monitoring Report