GEOTECHNICAL DATA REPORT
PROPOSED BUILDING ADDITION
CBITD FERRY TERMINAL
PORTLAND, MAINE

by

Haley & Aldrich, Inc.
Portland, Maine

for

Scott Simons Architects
Portland, Maine

File No. 39281-000
16 November 2012

HALEY & ALDRICH

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16 November 2012
File No. 39281-000

Scott Simons Architects
75 York Street
Portland, Maine 04101

Attention: Austin K. Smith, AIA, RLA, LEED AP
Senior Associate

Subject: Geotechnical Data Report
Proposed Building Addition
CBITD Ferry Terminal
Portland, Maine

Ladies and Gentlemen:

This report presents the results of the geotechnical field investigations and historic laboratory testing completed in support of the subject project. While design development activities are ongoing, the intent of this report is to convey geotechnical data based on historic and recent subsurface explorations conducted at the site. This work was undertaken at your request in accordance with our proposal dated 10 October 2012 and your subsequent authorization.

ELEVATION DATUM

Elevations referenced herein and shown on the attached figures are in feet and reference Mean Lower Low Water (MLLW). Tidal datum at the site relates to MLLW (in feet) as follows:

El. 0 (MHHW) = El. 9.91
El. 0 (NAVD 88) = El. 5.26
El. 0 (MSL) = El. 4.94

Please note that this tidal information is site specific and is taken from National Oceanic Atmospheric Administration (NOAA) tidal station No. 8418150 located on the Maine State Pier, Portland, Maine. This is the NOAA tidal station closest to the site.

SITE LOCATION, EXISTING CONDITIONS & PREVIOUS USE

The proposed project site is located on Franklin Wharf, west of the Maine State Pier (MSP), at the south end of the existing Casco Bay Island Transit District (CBITD) Ferry Terminal Building (Terminal Building), in Portland, Maine (sees Figure 1, Project Locus).

Historic records suggest that Franklin Wharf was originally constructed in the mid-1800s. An existing dry-laid granite block seawall (seawall) was built and general site fill was placed behind the seawall, over tidal mudflats. Please note that the location of the seawall is not shown on Figure 2. The seawall

runs parallel with the wharf and through the footprint of the existing Terminal Building. The wharf was "reconstructed" in 1923, after the construction of the Maine State Pier, and served as the home to the Boston Shed and Boston Shed Extension until 1984, at which time they were razed to construct the Terminal Building and Parking Garage that currently occupy the site.

PROPOSED SITE DEVELOPMENT

It is our understanding that the principal component of the site development includes the demolition of an approximate 2,900 square foot (sf) portion of the existing Terminal Building and construction of approximately 5,200 sf of new space that will house a patron waiting area including bathrooms, a ticketing office and staff offices. The approximately 65 ft by 80 ft addition is planned to be constructed near the southern end of the Terminal Building. No below-grade space is planned for the new building and the finished ground floor slab level will be constructed at the same level as the existing Terminal Building slab (FFE = El. 12.33).

We also understand that Becker Structural Engineers, Inc. (BSE) has been retained to provide structural engineering services on the project and that they are anticipating that several new columns, located on each side (water and land) of the existing seawall, will be required to support the new structure. Columns located on the water-side of the seawall will be supported by the existing pile caps and grade beams currently supporting the portion of the Terminal Building that will be demolished prior to constructing the new addition. Similarly, we understand that the existing ground floor structural slab will be reused to the extent possible in areas where the proposed addition overlaps portions of the existing Terminal Building to be demolished. The existing pier deck will be used to support the ground floor slab within the addition footprint located on the water side of the seawall and outside the footprint of the current Terminal Building.

Preliminary unfactored column reactions were provided by BSE on 15 October 2012 and are summarized below.

Load	Magnitude (kips)	
	Minimum	Maximum
Axial Compression	8	90
Axial Tension (Uplift)	0	15
Lateral	0	15

Notes:
1. 1 kip = 1,000 lbs.

Please note that lateral and uplift loads do not occur at each proposed column location.

SUBSURFACE EXPLORATIONS

Historically, multiple phases of subsurface explorations have been conducted in and around the project site. The locations of historic and recent test borings applicable to this project are shown on the attached Figure 2, Site and Subsurface Exploration Location Plan. Logs detailing subsurface soil, rock and groundwater conditions have also been included in Appendix A for reference.

Both the historic and recent test borings were drilled by Maine Test Borings of Hermon, Maine. A Haley & Aldrich geologist was present on site to monitor drilling activities and to document soil and bedrock conditions encountered in each of the test borings. In general, soil samples were collected continuously or at standard 5-ft intervals by driving a 24-in. long 1-3/8-in. inside diameter (ID) split-spoon sampler with a 140-lb hammer dropped 30-in. The number of hammer blows required to advance the sampler for each 6-in. interval was recorded and is provided on the test boring logs. The SPT N-value is the total number of hammer blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval and is referred to herein.

Historic Subsurface Explorations

Previous subsurface explorations, consisting of test borings, auger probes, and test pits were conducted at the site by Haley & Aldrich in association with the design and construction of the existing Terminal Building and Parking Garage and the proposed Fireboat Quarters Addition. Each is discussed separately in the following sections of this report.

A. Test Borings

A total of fourteen test borings, designated B-101 through B-114, were drilled during the period 26 September to 17 October 1984 associated with the design and construction of the existing Ferry Terminal and Parking Garage. In addition, one test boring, designated HA08-1, was drilled in 2008 for the design of the proposed Fireboat Quarters Addition. Of these test borings, only B-102, B-103 and B-114 were conducted in the vicinity of the proposed addition. Logs of these test borings are included for reference in Appendix A.

These three test borings were drilled to depths ranging from approximately 32 ft to 55 ft below ground surface (BGS) using 2-3/8-in. inside diameter (ID) steel casing and were terminated in marine clay.

In-situ vane shear tests were conducted within the marine clay deposit in historic test borings B-101, B-109 and HA08-1. Please note that these test borings were not drilled within the limits of the proposed addition footprint and are approximately 100 ft east (towards the Fore River) and 300 ft west (towards Commercial Street) of the proposed addition footprint, respectively. However, it is our opinion that the test results are generally indicative of the undrained shear strength of the marine clay at the proposed building footprint. Results of vane shear testing are summarized in Table I.

B. Auger Probes

Three auger probes, designated P-1 through P-3, were drilled on 17 October 1984 to provide information on the geometry of the land side of the existing seawall. The auger probes were generally located in a line perpendicular and at different distances away from the back of the seawall as shown on Figure 2. Refusal surfaces were encountered in the auger probes at depths ranging from 1.4 to 8 ft BGS. Logs of these auger probes are included for reference in Appendix A.

C. Test Pits

Four test pits, designated TP1 through TP4, were excavated by R.J Grondin & Sons, Inc. of Gorham, Maine on 14 January 1985. Of these test pits, only TP2, TP3 and TP4 were excavated in the vicinity of the proposed addition. Logs of the test pits are included for reference in Appendix A.

In general, these three test pits were excavated to provide information on the following: 1.) geometry of the land side of the existing seawall (TP2), 2.) the type and condition of the near-surface man-placed fill soils (TP2, TP3, and TP4), and 3.) the nature and extent of the foundations supporting the Boston Shed Extension (TP3 and TP4).

The test pits were excavated to depths ranging from approximately 7 to 12 ft BGS using a Ford H158 backhoe.

Recent Subsurface Explorations

The recent subsurface exploration program consisted of two test borings, designated HA12-1 and HA12-2, drilled to depths ranging from 54 to 62 ft BGS using a combination of 2.5-in. ID hollow stem augers and 3.0-in. ID steel casing. The test borings were drilled through man-placed fill and harbor bottom deposit soils and were terminated in the underlying marine clay deposit.

SUBSURFACE CONDITIONS

Soil Conditions

The subsurface soil conditions encountered at the site consist of the following soil units presented in order of increasing depth below ground surface: man-placed fill, harbor bottom soils and marine clay. Additional details are provided on the attached test boring logs. A general description of each soil unit is provided separately, below. Please note that the descriptions provided below are based on the subsurface conditions encountered in the recent test borings.

A. Bituminous Concrete / Man-Placed Fill

A layer of bituminous concrete and man-placed fill was encountered at ground surface in each test boring. The thickness of the layers ranged from approximately 0.5 to 0.7 ft and 32 to 44 ft, respectively. The man-placed fill material varied in composition and generally consisted of the following:

- Sandy SILT (ML) with varying amounts of organic material,
- Silty SAND with varying percentages of gravel (SM),
- Well-graded and poorly-graded SAND with varying percentages of silt, gravel, and coal (SW, SW-SM, SP),
- Well-graded GRAVEL with varying percentages of silt, sand, and brick fragments (GW-GM).

The material was generally heterogeneous in nature and was typically loose to dense with SPT N-values ranging from 5 to 33 blows per foot (bpf).

B. Harbor Bottom Deposit

Harbor bottom soils were encountered directly beneath the man-placed fill material in each test boring with the exception of B-114. Where encountered, the thickness of the layer ranged from 2 to 5.5 ft. The material varied in composition and generally consisted of either sandy SILT (ML) or silty SAND (SM) with varying amounts of organic material and shells. Soil samples typically had an organic odor. The material was typically soft to medium stiff or medium dense with SPT N-values ranging from 4 to 7 bpf.

C. Marine Clay Deposit

Marine clay is the predominant soil unit present at the site. The thickness of marine clay encountered in the two recent test borings ranged from approximately 6 to 25 ft. Please note that the two recent test borings were terminated in the clay layer and did not penetrate the full thickness of the deposit. Historic test borings drilled elsewhere on the site encountered in excess of 100 ft of marine clay. In general, the thickness of the deposit increases from west (Commercial Street) to east (Fore River).

Undrained shear strengths measured during in-situ vane shear testing and laboratory unconfined compressive strength testing suggest that the deposit is soft to stiff. Measured undrained shear strengths range from approximately 400 psf to in excess of 1,200 psf. Refer to Table I for a summary of undrained shear strengths measure in the marine clay.

HISTORIC LABORATORY TESTING

A laboratory testing program was performed on marine clay samples recovered from historic test borings B-101 and B-109. Please note that these test borings were not drilled within the limits of the proposed addition footprint and are approximately 100 ft east (towards the Fore River) and 300 ft west (towards Commercial Street) of the proposed addition footprint, respectively. However, it is our opinion that the laboratory test results from these two test borings are generally indicative of the nature of the marine clay at the proposed building footprint.

The laboratory test program consisted of five one-dimensional consolidation tests and seven unconfined compressive strength tests to assess the compressibility, stress history and strength characteristics of the marine clay deposit. In addition, multiple index tests (Atterberg limits, natural water content, and unit weight) were completed to determine soil classification and assist in developing correlations with engineering properties. All laboratory testing was completed by Haley & Aldrich. Laboratory test results are summarized below and are included in Appendix B.

- Natural Water Content: 22% to 51%
- Atterberg Limits:
  - Liquid Limit (LL): 26% to 46%
  - Plastic Limit (PL): 18% to 26%
  - Plasticity Index (PI): 8% to 20%
- Total Unit Weight: 101 lb/ft^3 to 119 lb/ft^3
- Shear Strength: 766 to 855 psf

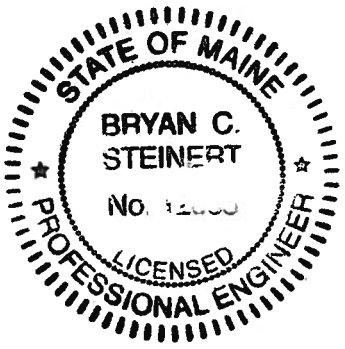
The stress-strain or compressibility characteristics of marine clay deposits are highly dependent upon their stress history. Overconsolidation is a condition that results from the clay deposit having been exposed, at some time in the geologic past, to stresses greater than the present in-place stresses. If the marine clay deposit is stressed within the limits of the maximum previous stress (i.e., maximum past pressure), the magnitude of settlement will be a function of the recompression ratio (RR) of the clay. If the applied stress exceeds the maximum previous stress, the magnitude of settlement will be a function of the virgin compression ratio (CR). Measured values of CR are typically 10 to 25 times greater than RR, and consolidation settlement is directly correlated with the value of CR or RR. Therefore, the estimated settlement for normally consolidated clay would be 10 to 25 times greater than that of overconsolidated clay for the same stress increase. Measured CR values from the clay samples tested ranged from 0.196 to 0.247.

CLOSURE

This report summarizes the geotechnical data, both recent and historic, that will be used by Haley & Aldrich to develop geotechnical design criteria and foundation recommendations for the proposed building addition. We will provide our engineering recommendations under separate cover. We recommend that this geotechnical data report be included in or as a reference document to the Contract Documents for the project so prospective contractors can use the information as the basis for their bids.

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

Sincerely yours,
HALEY & ALDRICH, INC.



Bryan C. Steinert, P.E.
Senior Geotechnical Engineer

Wayne A. Chadbourne, P.E
Lead Geotechnical Engineer/Vice President

Enclosures:

Table I -	Summary of In-Situ Vane Shear Test Results
Figure 1 -	Project Locus
Figure 2 -	Site and Subsurface Exploration Location Plan
Appendix A -	Test Boring Logs
Appendix B -	Historic Laboratory Test Results

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REFERENCES

1. Report entitled, "Geotechnical Data Report, Proposed Casco Bay Ferry Terminal, Portland, Maine," prepared by Haley & Aldrich, Inc., dated 2 November 1984.

2. Report entitled, "Geotechnical Recommendations Report, Proposed Casco Bay Ferry Terminal, Portland, Maine," prepared by Haley & Aldrich, Inc. dated 19 September 1985.

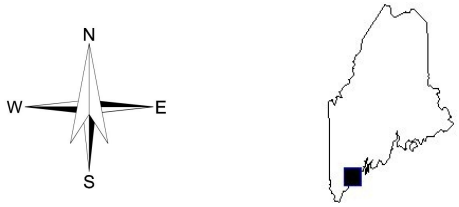
3. Report entitled, "Proposed Fireboat Quarters Addition, Casco Bay Island Transit Terminal Building, Portland, Maine," prepared by Haley & Aldrich, Inc., dated 14 November 2008.

TABLE I
Summary of In-Situ Vane Shear Test Results
Proposed Building Addition
CBITD Ferry Terminal
Portland, Maine

Test Boring No.[2]	Approximate Ground Surface Elevation (ft)[1,3]	Vane Size (in. x in.)	Test No.[4]	Depth below ground surface (ft)	Approximate Elevation (ft)[1,3]	V_{max}[5,7] (ft-lbs)	$V_{remolded}$[5,7] (ft-lbs)	S_u[6,7] (psf)	$S_{u(remolded)}$[6,7] (psf)
B-101	-29.6	3.5 x 7	FV1	22.4	-52.0	65	30	730	340
		3.5 x 7	FV2	23.1	-52.7	60	28	670	310
		3.5 x 7	FV3	32.4	-62.0	65	35	730	390
		3.5 x 7	FV4	33.1	-62.7	65	35	730	390
		3.5 x 7	FV5	42.4	-72.0	85	35	950	390
		3.5 x 7	FV6	43.1	-72.7	70	35	780	390
		3.5 x 7	FV7	52.4	-82.0	75	35	840	390
		3.5 x 7	FV8	53.1	-82.7	100	45	1,120	500
		3.5 x 7	FV9	72.3	-101.9	110	45	1,230	500
		3.5 x 7	FV10	73.1	-102.7	110	50	1,230	560
		2 x 7	FV11	81.9	-111.5	>50	-	>1,860	-
		2 x 7	FV12	82.6	-112.2	>50	-	>1,860	-
		2 x 7	FV13	96.9	-126.5	47	30	1,740	1,110
		2 x 7	FV14	97.6	-127.2	50	30	1,860	1,110
B-109	10.8	3.5 x 7	FV1	42.4	-31.6	70	30	780	340
		3.5 x 7	FV2	43.1	-32.3	80	30	890	340
		3.5 x 7	FV3	52.4	-41.6	50	30	560	340
		3.5 x 7	FV4	53.1	-42.3	70	30	780	340
		3.5 x 7	FV5	62.4	-51.6	90	40	1,000	450
		3.5 x 7	FV6	63.1	-52.3	95	40	1,060	450
HA08-1	12.0	2 x 8.5	FV1	47.7	-35.7	10	-	390	-
		2 x 8.5	FV2	50.7	-38.7	27	15	1,090	600
		2 x 8.5	FV3	60.7	-48.7	26	17	1,040	690
		2 x 8.5	FV4	70.7	-58.7	23	8	910	300
		2 x 8.5	FV5	80.7	-68.7	22	5	870	200
		2 x 8.5	FV6	90.7	-78.7	28	10	1,130	420
		2 x 8.5	FV7	100.7	-88.7	26	9	1,060	370
		2 x 8.5	FV8	110.7	-98.7	27	6	1,090	250

Notes:
1. Estimated ground surface elevations are based on interpretation of the site plans prepared by Woodard & Curran (measured to the nearest 0.5 ft).
2. Test boring locations were determined using GPS equipment and/or by taping and pacing from existing site features.
3. Elevations are measured in feet reference Portland City Datum.
4. Vane test numbers are shown on the test boring logs presented in Appendix A and B.
5. V_{max} and $V_{remolded}$ represent direct peak and remolded vane shear values, respectively, measured in the field.
6. S_u and $S_{u(remolded)}$ represent corrected undrained peak and residual shear strengths, respectively, based on the vane paddle size (rounded to the nearest 10 psf).
7. in-lbs = inch-pounds of torque, psf = pounds per square foot

SITE COORDINATES:43°39'25"N 70°14'54"W



U.S.G.S. QUADRANGLE: PORTLAND EAST, ME

HALEY & ALDRICH

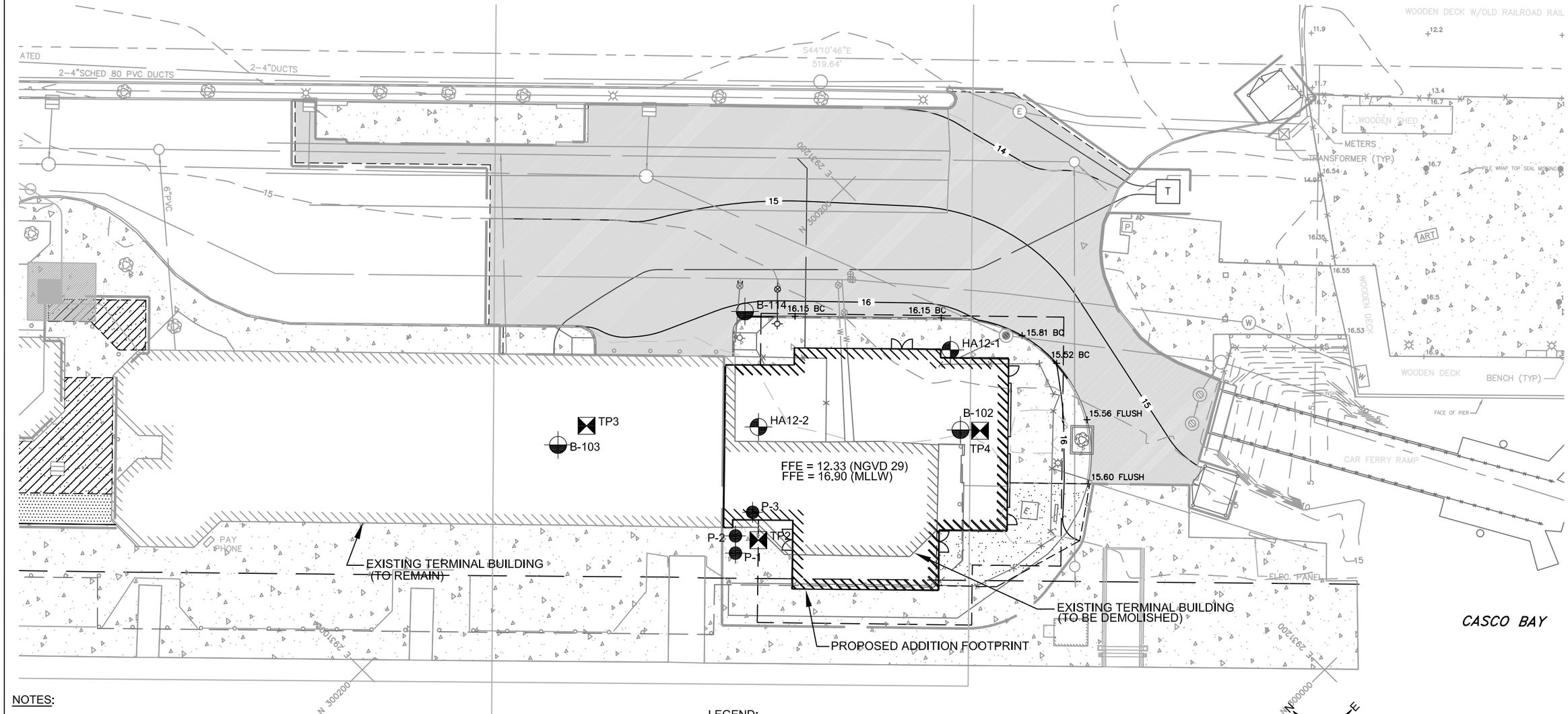
PROPOSED BUILDING ADDITION
CBITD FERRY TERMINAL
PORTLAND, MAINE

PROJECT LOCUS

SCALE: 1:24,000
NOVEMBER 2012

FIGURE 1

39281-000 1.PDF



NOTES:

1. EXISTING SITE CONDITIONS, CONTOURS OF EXISTING GROUND SURFACE ELEVATIONS AND THE LOCATION AND ORIENTATION OF EXISTING SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE ENTITLED "203819-X00C.DWG," PROVIDED BY WOODARD & CURRAN OF PORTLAND, MAINE ON 5 NOVEMBER 2012.
2. PROPOSED SITE CONDITIONS, CONTOURS OF PROPOSED GROUND SURFACE ELEVATIONS AND THE LOCATION AND ORIENTATION OF PROPOSED SITE FEATURES ARE TAKEN FROM THE ELECTRONIC AUTOCAD FILE ENTITLED "203819-X01C.DWG" PROVIDED BY WOODARD & CURRAN OF PORTLAND, MAINE ON 5 NOVEMBER 2012.
3. ELEVATIONS ARE IN FEET AND REFERENCE MEAN LOWER LOW WATER (MLLW) DATUM.
4. THE PLAN LOCATIONS OF RECENT TEST BORINGS (HA12-SERIES) WERE DETERMINED IN THE FIELD BY TAPING/PACING DISTANCES FROM EXISTING SITE FEATURES AND ARE CONSIDERED APPROXIMATE.
5. THE PLAN LOCATIONS OF HISTORIC EXPLORATIONS (TEST BORINGS, TEST PITS, AND AUGER PROBES) WERE DETERMINED BY OVERLAYING THE PROPOSED PLANS AND HISTORIC EXPLORATION LOCATION PLANS AND ARE CONSIDERED APPROXIMATE.
6. SUBSURFACE EXPLORATIONS (HISTORIC AND RECENT) WERE MONITORED IN THE FIELD BY HALEY & ALDRICH, INC. PERSONNEL.
7. REFER TO APPENDIX A FOR LOGS OF EXPLORATIONS (TEST BORINGS, TEST PITS AND AUGER PROBES).

LEGEND:

HA12-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS OF HERMON, MAINE IN OCTOBER 2012
B103	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY MAINE TEST BORINGS, INC. OF BREWER, MAINE IN SEPTEMBER AND OCTOBER 1984
P1	DESIGNATION AND APPROXIMATE LOCATION OF AUGER PROBE DRILLED BY MAINE TEST BORINGS, INC. OF BREWER, MAINE ON 17 OCTOBER 1984
TP2	DESIGNATION AND APPROXIMATE LOCATION OF TEST PIT EXCAVATED BY R.J. GRONDIN AND SONS, INC. OF GORHAM, MAINE ON 14 JANUARY 1985

HALEY & ALDRICH

PROPOSED BUILDING ADDITION
CBITD FERRY TERMINAL
PORTLAND, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
NOVEMBER 2012

FIGURE 2

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APPENDIX A

Subsurface Explorations

Recent Test Boring Logs

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TEST BORING REPORT

Boring No. HA12-1

Project Proposed CBITD Terminal Building Expansion, Portland, Maine
Client Scott Simons Architects
Contractor Maine Test Borings

File No. 39281-000
Sheet No. 1 of 3
Start October 18, 2012
Finish October 18, 2012
Driller M. Porter
H&A Rep. M. Snow
Elevation 15.0 (Approx.)
Datum MLLW
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Mobile Drill B53 Truck
Inside Diameter (in.)	2.5	1.375	--	Bit Type: Cutting Head
Hammer Weight (lb)	--	140	-	Drill Mud: None
Hammer Fall (in.)	--	30	-	Casing: HSA to 28.0'/NW drive 28.0-52.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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						-BITUMINOUS CONCRETE-										
	15 14 12 9	S1 14	1.0 3.0	0.7	SW	Medium dense, brown, well-graded SAND with gravel (SW), mps 1.5 in., no odor, dry, few coal pieces	5	15	15	35	25	5				
						-FILL-										
						Note: Difficulty augering through cobble from approximately 4.0 to 4.6 ft.										
5	9 14 11 13	S2 6	5.0 7.0		SM	Medium dense, brown to black, silty SAND with gravel (SM), mps 2.0 in., no odor, moist	20	5	15	25	20	15				
10	10 4 6 3	S3 20	10.0 12.0		GW-GM	Loose, brown to dark brown, well-graded GRAVEL with silt and sand (GW-GM), mps 2.0 in., no odor, wet	10	40	20	10	10	10				
						-FILL-										
15	1 1 4 5	S4 20	15.0 17.0		SM	Loose, dark brown-gray, silty SAND with gravel (SM), mps 2.0 in., no odor, wet	5	15	10	20	30	20				
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
10/18/12	17:00	0	--	Caved @ 7.7	6.2

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample
C - Rock Core Sample

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

Summary
Overburden (ft) 54.0
Rock Cored (ft) 0.0
Samples 18S

Boring No. HA12-1

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

***Note: 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.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\39281 - CBITD\FIELD PROGRAM\39281-000_TB_HA12-1_HA12-2.GPJ Nov 16, 12

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA12-1
File No. 39281-000
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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
20	1 3 4 6	S5 20	20.0 22.0		ML	Medium stiff, brown-gray, sandy SILT (ML), mps 2.0 in., slight organic odor, wet -FILL-		5		10	30	55				
						Note: Brown to rust-brown, well-graded SAND layer from 21.5 to 21.8 ft.		5	25	40	30					
	7 5 1 3	S6 24	22.0 24.0		ML	Medium stiff, brown-gray, sandy SILT with organics (ML), layered with dark brown to brown, well-graded SAND with silt, gravel, and brick pieces (SW-SM), mps 1.0 in., slight organic odor, wet		20	15	35	20	10				
	2 3 5 7	S7 24	24.0 26.0	24.0	ML	Medium stiff, dark gray to gray, sandy SILT with organics (ML), mps 0.5 in., slight organic odor, wet -FILL-				10	35	55				
25	5 4 4 7	S8 20	26.0 28.0	26.0	SP	Loose, gray, poorly-graded SAND (SP), mps 0.5 in., no odor, wet -FILL-			10	40	50					
	10 11 4	S9 6	28.5 30.0		SW	Medium dense, gray, well-graded SAND with gravel (SW), mps 0.75 in., no odor, wet Note: Removed augers after S9 and advanced NW casing to 30.0 ft.		20	25	25	25	5				
30	5 5 9 10	S10 8	30.0 32.0		SW	Medium dense, brown, well-graded SAND with gravel (SW), mps 2.0 in., no odor, wet -FILL-		20	20	30	25	5				
	9 3 3 4	S11 14	32.0 34.0	33.0		Medium dense, brown, well-graded SAND with gravel (SW), mps 2.0 in., no odor, wet										
					ML	Medium stiff, brown, sandy SILT with organics and shells (ML), mps 0.42 mm, strong organic odor, moist -HARBOR BOTTOM DEPOSIT-				5	35	60				
35	1 2 2 3	S12 24	34.0 36.0		ML/ SM	Soft, brown, sandy SILT to silty SAND with organics and shells (ML/SM), mps 0.42 mm, strong organic odor, moist				5	45	50				
	2 3 3 4	S13 12	36.0 38.0	36.0	CL	Medium stiff, brown-gray, lean CLAY with organics and shells (CL), mps 0.42 mm, organic odor, wet -MARINE DEPOSIT-					10	90				
	1 WOH 2 4	S14 24	38.0 40.0		CL	Soft, brown-gray, lean CLAY with organics and shells (CL), mps 0.42 mm, organic odor, wet					5	95				
40	1 WOH WOH WOH	S15 24	40.0 42.0		CL	Very soft, gray, lean CLAY with organics and shells (CL), mps 0.075 mm, organic odor						100				
				43.5												
45	4 5 19 12	S16 6	45.0 47.0		CL	Hard, gray, lean CLAY (CL) with gray fine sand layers and silt lenses, trace organics and shells, mps 0.42 mm, slight organic odor, wet -MARINE DEPOSIT-					15	85				

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

Boring No. HA12-1

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA12-1
File No. 39281-000
Sheet No. 3 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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
50																
	5 6 10 12	S17 24	50.0 52.0	50.0	CL	Very stiff, mottled gray, lean CLAY (CL), mps 0.075 mm, no odor, moist -MARINE DEPOSIT-						100				
	12 14 13 13	S18 24	52.0 54.0		CL	Very stiff, mottled gray, lean CLAY (CL), mps 0.075 mm, no odor, moist, occasional gray fine sand partings -MARINE DEPOSIT-						100				
				54.0		Bottom of Exploration 54.0 ft										

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

Boring No. HA12-1

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA12-2

Project Proposed CBITD Terminal Building Expansion, Portland, Maine
Client Scott Simons Architects
Contractor Maine Test Borings

File No. 39281-000
Sheet No. 1 of 3
Start October 19, 2012
Finish October 19, 2012
Driller M. Porter
H&A Rep. M. Snow
Elevation 16.0 (Approx.)
Datum MLLW
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	S	--	Rig Make & Model: Mobile Drill B53 Truck
Inside Diameter (in.)	3.0	1.375	--	Bit Type: Cutting Head
Hammer Weight (lb)	--	140	-	Drill Mud: None
Hammer Fall (in.)	--	30	-	Casing: SSA to 5.0'/NW drive to 50.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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				0.5		-BITUMINOUS CONCRETE-										
	12 15 18 20	S1 18	0.7 2.7		SW	Dense, brown, well-graded SAND with gravel (SW), asphalt pieces, mps 1.75 in., no odor, dry -FILL-	5	20	15	35	20	5				
5	10 9 10 13	S2 18	5.0 7.0		SW-SM	Medium dense, brown, well-graded SAND with silt and gravel (SW-SM), coal pieces, glass, mps 2.0 in., no odor, moist	5	10	15	35	25	10				
10	11 7 11 10	S3 16	10.0 12.0		SW-SM	Medium dense, brown, well-graded SAND with silt and gravel (SW-SM), ash, mps 1.5 in., no odor, wet, 4 in. sandy silt layer -FILL-	5	10	15	35	25	10				
15	7 3 4 6	S4 4	15.0 17.0		SW	Loose, brown, well-graded SAND with gravel (SW), mps 1.0 in., no odor, wet		15	20	35	25	5				
	8 8 11 9	S5 8	17.0 19.0		SW-SM	Medium dense, brown, well-graded SAND with silt and gravel (SW-SM), shell piece, mps 1.75 in., no odor, wet	5	10	25	30	20	10				
20	8 8	S6 1	19.0 21.0			Note: Recovered two pieces gravel, approximately 1.5 in. diameter.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
10/19/12	13:45	0	--	Caved @ 12.5	6.1

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample
C - Rock Core Sample

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

Summary
Overburden (ft) 62
Rock Cored (ft) 0.0
Samples 17S

Boring No. HA12-2

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

***Note: 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.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\39281 - CBITD\FIELD PROGRAM\39281-000_TB_HA12-1_HA12-2.GPJ Nov 16, 12

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA12-2
File No. 39281-000
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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
20	8 9															
	11 11 10 14	S7 10	21.0 23.0			Medium dense, brown, well-graded SAND with gravel (SW), mps 2.0 in., no odor, wet -FILL-	5	15	30	30	15	5				
	13 9 7 8	NR	23.0 25.0			No Recovery Note: Sand and gravel observed in wash water.										
25	16 11 10 8	NR	25.0 27.0			No Recovery										
	12 10 10 16	S8 10	27.0 29.0		SW-SM	Medium dense, brown, well-graded SAND with silt and gravel (SW-SM), mps 2.0 in., no odor, wet -FILL-	10	15	25	25	15	10				
30	11 8 12 15	S9 4	29.0 31.0		SW	Medium dense, brown, well-graded SAND with gravel (SW), mps 1.0 in., no odor, wet	5	25	30	25	10	5				
	7 15 10 8	S10 4	31.0 33.0		GW-GM	Medium dense, brown, well-graded GRAVEL with silt and sand (GW-GM), mps 2.0 in., no odor, wet	30	25	20	10	10	10				
	7 5 7 5	S11 6	33.0 35.0		SW	Note: First attempt, no recovery. Medium dense, brown, well-graded SAND with gravel (SW), mps 1.5 in., no odor, wet -FILL-	5	15	25	30	20	5				
35	7 2 2 WOH	S12 20	35.0 37.0	35.0	SM	Medium dense, dark gray to brown, silty SAND with organics (SM), mps			5	40	40	15				
				35.5	ML	0.25 in., slight organic odor, wet Very soft, gray-brown, sandy SILT with gravel (ML), occasional rust mottling, mps 1.0 in., slight organic odor, wet	5	10	10	10	15	50				
				37.0		-HARBOR BOTTOM DEPOSIT- Note: Strata change based on casing blow counts and wash water contents.										
40	8 6 4 9	S13 12	40.0 42.0		SW	Loose, brown, well-graded SAND with gravel (SW), mps 1.0 in., no odor, wet		15	30	30	20	5				
				41.5	ML	Stiff, gray-brown, sandy SILT with gravel (ML), 1.0 in., no odor, wet		15	5	15	15	50				
						-MARINE DEPOSIT-										
45	6 9 20 21	S14 14	45.0 47.0	45.0	SW	Medium dense, brown, well-graded SAND with gravel (SW), mps 1.5 in., no odor, wet	5	15	25	30	20	5				
				49.0		Note: Gray silt observed in wash water at 49.0 ft.										

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

Boring No. HA12-2

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA12-2
File No. 39281-000
Sheet No. 3 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change 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
50	13 16 20 22	S15 10	50.0 52.0		ML	Hard, gray, SILT with sand (ML) and organics, trace shells, mps 0.42 mm, organic odor, wet -MARINE DEPOSIT-					15	85				
	17 18 14 11	S16 24	52.0 54.0	52.0	CL	Hard, gray, lean CLAY (CL) with fine sand seams, mps 0.42 mm, no odor, wet -MARINE DEPOSIT-					5	95				
55																
60	1 WOH WOH 8	S17 24	60.0 62.0		CL	Very soft, gray, lean CLAY (CL), mps 0.075 mm, no odor, wet -MARINE DEPOSIT-						100				
				62.0		Bottom of Exploration 62.0 ft										

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

Boring No. HA12-2

Historic Test Boring Logs

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich

SHEET 1 OF 2
HOLE NO. B-102

DRILLER: Jimmy Goody
M.T.B. JOB NUMBER: 84-174
PROJECT NAME: Casco Ferry
LOCATION: Portland, Maine
LINE & STATION:
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	
SIZE I.D.	2 3/8"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 9-28-84 DATE FIN. 10-2-84
SURFACE ELEV. 10.5
GROUND WATER ELEV. ____

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
Spin										0.7	Tar.
"	1D	2"	12"		2.0	8	9			3.0	Brown silty fine to coarse sand w/fine gravel & wood.
"											
12											
18	2D	2"	24"		5.0	5	10	9	12		Brown clayey silt w/trace of fine gravel & brick.
26										7.0	
28	3D	2"	24"		7.0	6	3	2	3		
42											
44	4D	2"	24"		9.0	14	12	12	14		Brown clayey silt w/fine sand & fine gravel.
2											
3	D	2"	24"	0.0	11.0	8	3	3	4	11.0	
5											
14	5D	2"	24"		13.0	6	3	3	3		Brown silty fine to medium sand w/fine gravel.
12											
12	D	2"	24"	0.0	15.0	9	7	7	4	15.0	
9											
12	6D	2"	24"		17.0	4	4	4	10		Brown fine to coarse sand w/fine to coarse gravel & trace of silt.
10											
11	D	2"	24"	0.0	19.0	4	4	2	2		
6											
15	7D	2"	24"		21.0	3	4	7	6		
9											
9	8D	2"	24"		23.0	6	5	5	6		
11											
15	9D	2"	24"		25.0	9	12	12	9		
14											
12	10D	2"	24"		27.0	8	4	4	3		
10											
12	11D	2"	24"		29.0	12	12	14	15		
31											
19	12D	2"	24"		32.0	14	22	10	7		
18											
17	13D	2"	24"		34.0	3	3	3	4		
21											
31											
5											
12	14D	2"	24"		37.0	5	2	4	8		
16											
16	D	2"	24"	0.0	39.0	11	5	4	4		
22											

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-102

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich

SHEET 2 OF 2
HOLE NO. B-102

DRILLER: Jimmy Goody
PROJECT NAME: Casco Ferry
LINE & STATION:

M.T.B. JOB NUMBER: 84-174
LOCATION: Portland, Maine
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	
SIZE I.D.	2 3/8"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 9-28-84 DATE FIN. 10-2-84
SURFACE ELEV.:
GROUND WATER ELEV.:

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
12											
16											Brown fine to coarse sand w/fine to coarse gravel & trace of silt.
21	15D	2"	24"		43.0	6	4	6	8	43.5	
23											
21											Gray silty clay w/shells.
20	16D	2"	24"		46.0	3	2	3	4	46.0	
24											
24	17D	2"	24"		48.0	8	10	10	13		Gray silty clay w/sea shells w/fine silty sand layers.
28										49.0	
43											
57											Gray silty clay w/fine silty sand layers.
60											
68											
	18D	2"	24"		55.0	2	4	13	11	55.0	
											Bottom of boring @ 55.0'

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-102

3-14

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich

SHEET 1 OF 2
HOLE NO. B-103

DRILLER: Jimmy Goody
M.T.B. JOB NUMBER: 84-174
PROJECT NAME: Casco Ferry
LOCATION: Portland, Maine
LINE & STATION:
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	
SIZE I.D.	2 3/8"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 10-12-84 DATE FIN. 10-15-84
SURFACE ELEV. 10.5
GROUND WATER ELEV. ____

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	BLOWS PER 6" ON SAMPLER 6-12	BLOWS PER 6" ON SAMPLER 12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
											0 to 4.5' from floor to soil.
										4.5	
WOH	1D	2"	24"		6.5	1	4	4	7	6.5	Brown silty fine to medium sand w/fine gravel & clay.
5											
7	2D	2"	24"		8.5	4	2	2	3		Brown silty fine to coarse sand w/fine to medium gravel.
4											
6											
8	3D	2"	24"		11.5	14	7	7	6	11.5	
12											
14	4D	2"	24"		13.5	7	6	8	9	14.0	Brown fine to coarse sand w/fine to medium gravel w/trace of silt.
8											
6											
8	5D	2"	24"		16.0	10	23	28	33		Brown silty fine to coarse sand w/fine to medium gravel.
9											
10	6D	2"	24"		18.0	28	12	14	13		
5											
6	7D	2"	24"		20.0	12	16	12	14		
4											
8	8D	2"	24"		22.0	14	15	14	12		
12											
10											
10											
12	D	2"	18"		26.5	4	4	4			
12											
10											
9											
8											
2	8D	2"	18"		31.8	4	4	3			
6											
6											
6										34.0	
5											
8	9D	2"	18"		36.5	6	3	2			Gray sandy silt w/coarse gravel.
10											
12											
13											
17											

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[x] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-103

TB-14

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich

SHEET 2 OF 2
HOLE NO. B-103

DRILLER: Jimmy Goody
PROJECT NAME: Casco Ferry
LINE & STATION:
M.T.B. JOB NUMBER: 84-174
LOCATION: Portland, Maine
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	
SIZE I.D.	2 3/8"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 10-12-84 DATE FIN. 10-15-84
SURFACE ELEV.
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
26	10D	2"	18"		41.5	5	2	5			
15											
11											
11										44.0	
10											Black silty fine sand w/gray sandy silt.
27	11D	2"	18"		46.5	3	2	3			
22											
25										48.0	
22											
23											
	12D	2"	18"		51.5	Wt.	of 1	Man			
										51.5	Gray silty clay w/fine sand parting.
											Bottom of boring @ 51.5'

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-103

TB-14

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich

SHEET 1 OF 1
HOLE NO. B-114

DRILLER: Jimmy Goody
M.T.B. JOB NUMBER: 84-174
PROJECT NAME: Casco Ferry
LOCATION: Portland, Maine
LINE & STATION:
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	
SIZE I.D.	2 3/8"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 10-17-84 DATE FIN. 10-17-84
SURFACE ELEV. 10.3
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger										~~0.2~~	~~Tar.~~
"	1D	2"	18"		2.0	9	24	22		4.0	Brown silty fine to medium sand w/fine to medium gravel.
"											
"											
"											
6	2D	2"	18"		6.5	6	5	7		8.0	Brown/black silty fine to medium sand w/ some gravel.
14											
16											
12											
9											
4	3D	2"	18"		11.5	4	2	3		14.0	Brown silty fine to medium sand w/coarse gravel.
4											
9											
4											
14											
12	4D	2"	18"		16.5	8	7	11		20.0	Black silty fine to coarse sand w/fine to medium gravel & coal.
24											
17											
21											
23											
11	5D	2"	18"		21.5	11	4	2		22.0	Brown sandy silt to brown silty clay.
7											
9											
10											
11											
21	6D	2"	18"		26.5	WoH	1	1		31.5	Gray silty clay.
16											
18											
20											
22											
	7D	2"	18"		31.5	Wt. of 1		Man			Bottom of boring @ 31.5'

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-114

Historic Test Pit Logs

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST PIT REPORT

TEST PIT NO. 1

PROJECT: CASCO BAY FERRY TERMINAL

CLIENT: STEVENS ASSOCIATES

CONTRACTOR: GRONDIN

EQUIPMENT USED: FORD H158 BACKHOE

FILE NO. 8549
LOCATION: Column 12b
See Diagram
ELEVATION: 11.2±
EXPLORATION DATE: 1/14/85
INSPECTOR: S. Kelley

Scale in Feet	Strata Change	Sample Number	Sample Depth Range	DESCRIPTION OF MATERIALS	REMARKS
	0.2			WOOD Planking	
2				Crawl Space	
4	4.0			Cobbles, bricks, trace silty sand, some boulders - FILL	Appears washed by tide action
6	6.0			Brown-gray silty coarse to fine SAND, some ash, brick, many cobbles - FILL	
8	8.5			Bottom of test pit	Boulder extending beyond concrete grade beam at 5.5 ft. depth prevented further penetration
10					
12					Water in exploration due to tidal action

* Too numerous to count

GROUNDWATER

DATE	TIME*	DEPTH/FT.

NOT ENCOUNTERED ☐ * HRS. AFTER COMPL.

9.0' (L) x 2.0' (W) x 4.5' (D) = 81 Cu. Ft.

BOULDERS

8" to 18" DIAM: No. *TNTC Vol. 20± Cu. Ft.

Over 18" DIAM: No. ____ Vol. ____ Cu. Ft.

SUMMARY

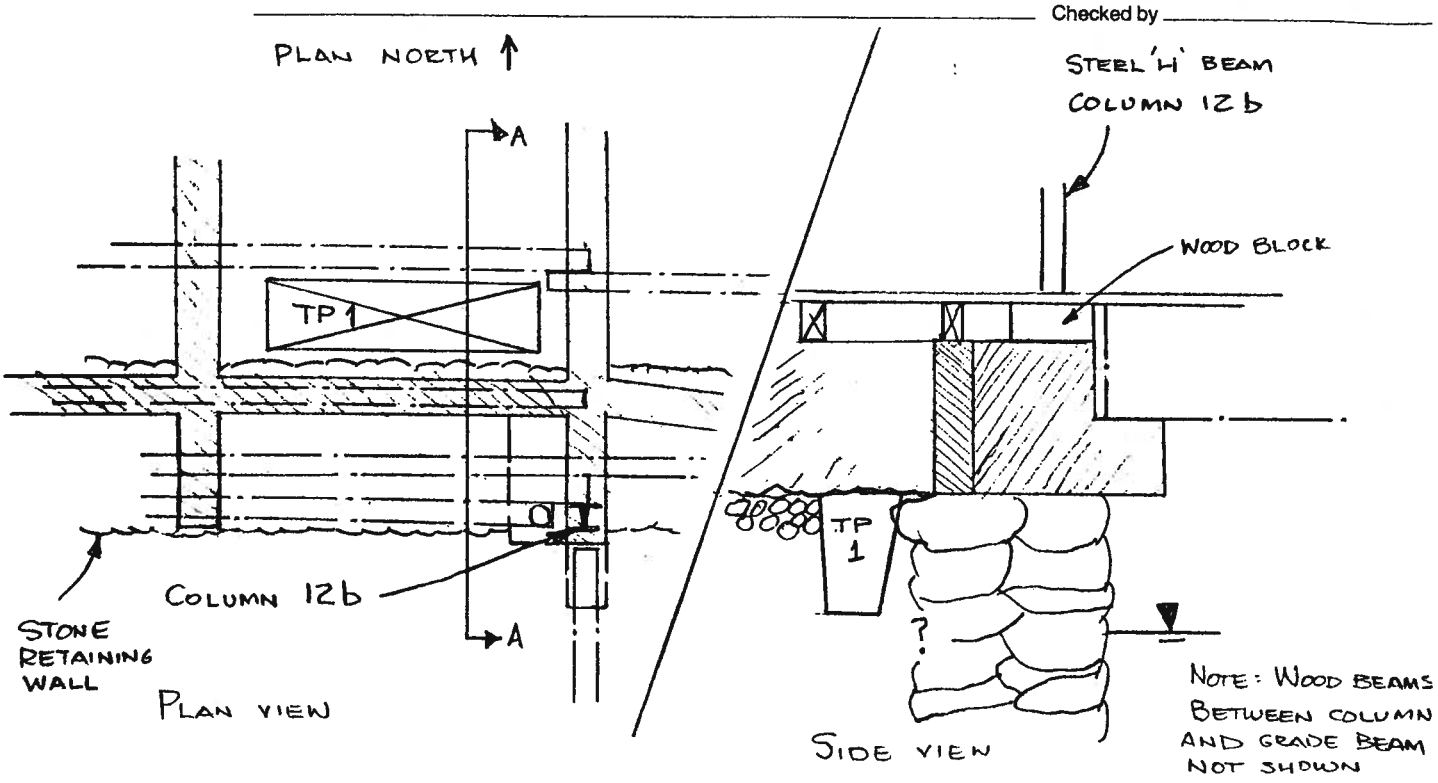
DEPTH 8.5ft.
JAR SAMPLES --
BAGSAMPLES --
GROUNDWATER 7.0(tidal)
TEST PIT NO. 1

H & A FOR NOV. 78 24

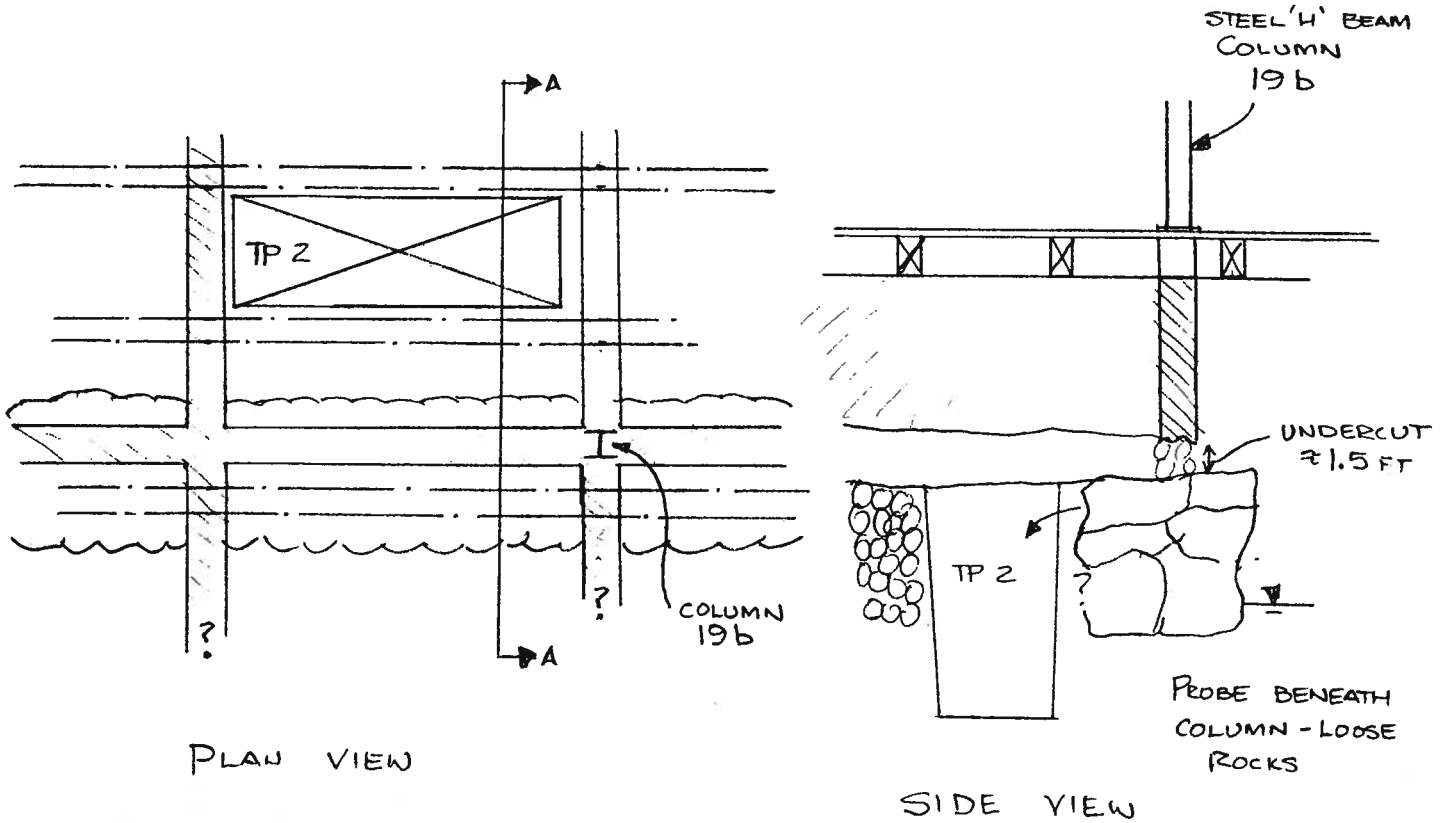
HALEY & ALDRICH, INC.

Client STEVENS ASSOCIATES
Project CASCO BAY FERRY TERMINAL

File Number 8549
Sheet 1 of 2
Date 15 JANUARY 1985
Computed by SJK
Checked by



FOUNDATION AT TP 1 SCALE 1"=5' HORIZ AND VERT



FOUNDATION AT TP 2 SCALE 1"=5' HORIZ AND VERT

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST PIT REPORT

TEST PIT NO. 3

PROJECT: CASCO BAY FERRY TERMINAL

CLIENT: STEVENS ASSOCIATES

CONTRACTOR: GRONDIN

EQUIPMENT USED: FORD H158 BACKHOE

FILE NO. 8549

LOCATION: Column 16c
See Diagram

ELEVATION: 10.5±

EXPLORATION DATE: 1/14/85

INSPECTOR: S. Kelley

Scale in Feet	Strata Change	Sample Number	Sample Depth Range	DESCRIPTION OF MATERIALS	REMARKS
	0.4			CONCRETE Pavement	
				Brown cobbly coarse to fine SAND, some gravel-FILL	Frost to 1.5 ft.
	1.5				
2				Brown gravelly coarse to fine SAND, some cobbles, few boulders-FILL	8" diameter concrete pipe encountered at 3.0 ft., dry, ½ full of sediment
	3.5				
				Cobblestone Pavement	Old dock level?
4	4.0				
				Gray to black medium to fine SAND, some silt, little gravel, trace cobbles wood, ash, pieces of glass and tile pipe, slight organic odor-FILL	
6					
8					
	9.0±				
	9.5			Brown gray silty medium to fine SAND, soft-FILL	
10				Black silty coarse to fine SAND, trace gravel, bricks, ceramics, ash-FILL	Fill is damp below 9.0 ft.
	11.5				
12				Brown coarse to medium SAND, some fine sand, little silt, trace black silty coarse to fine sand with organics-FILL	
	12.7				
				Bottom of test pit	

H & A FOR NOV. '78 24

GROUNDWATER		
DATE	TIME*	DEPTH/FT.
NOT ENCOUNTERED	X	* HRS. AFTER COMPL.

8.0' (L) x 6.0' (W) x 12.7' (D) = 610 Cu. Ft.

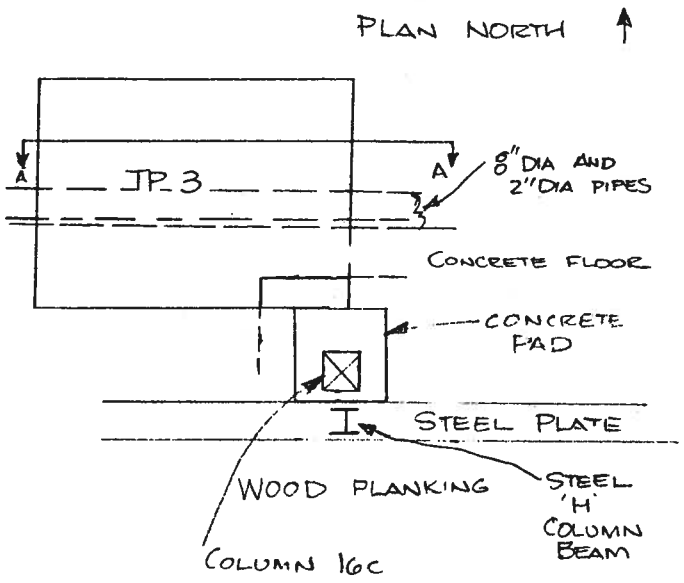
BOULDERS
8" to 18" DIAM: No. 8 Vol. 4 Cu. Ft.
Over 18" DIAM: No. 2 Vol. 2 Cu. Ft.

SUMMARY
DEPTH 12.7 ft.
JAR SAMPLES --
BAG SAMPLES --
GROUNDWATER N/A
TEST PIT NO. 3

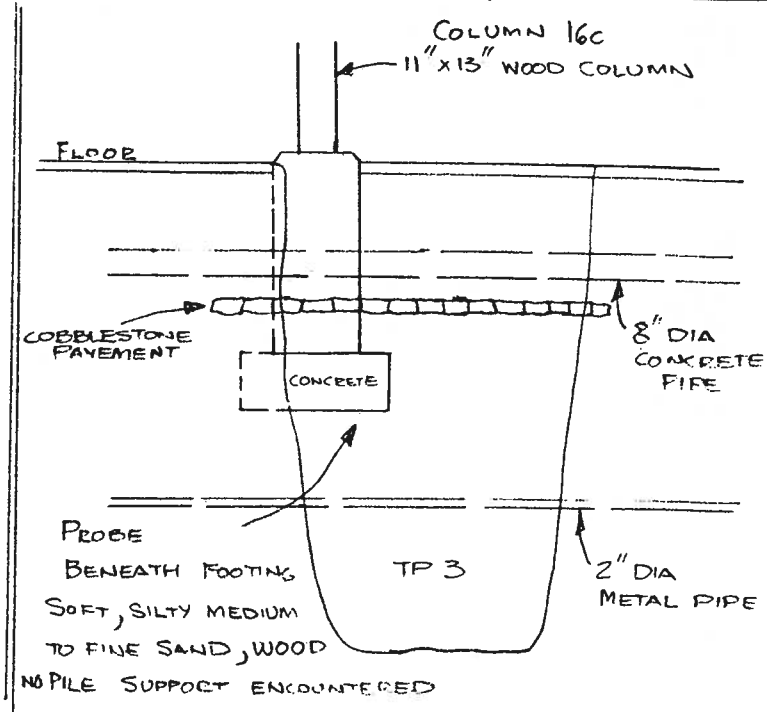
HALEY & ALDRICH, INC.

Client STEVENS ASSOCIATES
Project CASCO BAY FERRY TERMINAL

File Number 8549
Sheet 2 of 2
Date 15 JANUARY 1985
Computed by SJK
Checked by

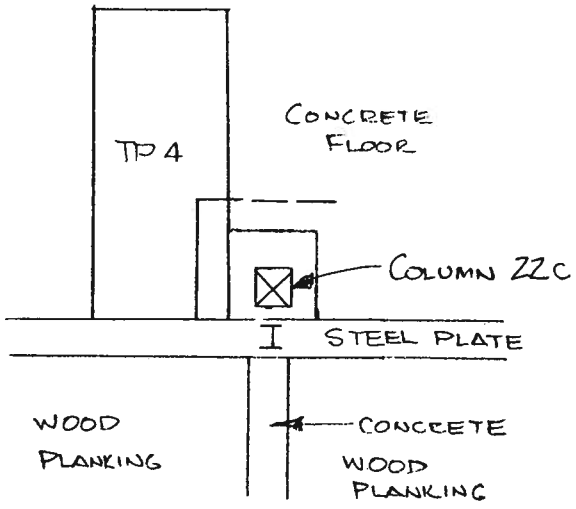


PLAN VIEW

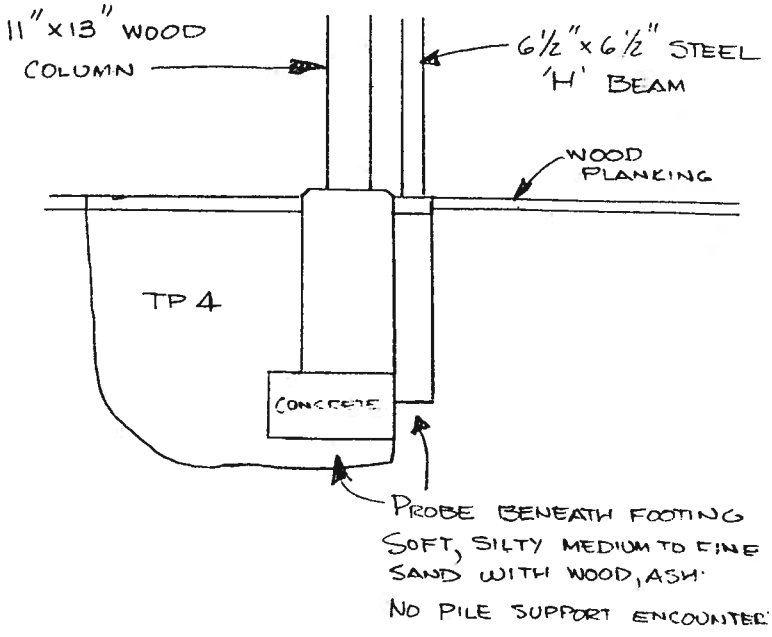


SIDE VIEW

FOUNDATION AT TP 3 SCALE 1" = 5' HORIZ. AND VERT.



PLAN VIEW



SIDE VIEW

FOUNDATION AT TP 4 SCALE 1" = 5' HORIZ AND VERT

Historic Auger Probe Logs

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

"BORING LOG"

PROJ. Casco Ferry

CLIENT Haley & Aldrich

BORING NO. P-1
LINE & STA.
OFFSET
GR. ELEV.
DATE: 10-17-84

A	STRATUM DESCRIPTION	BLOWS PER___	B
0.3	Planking - boards.		
	Air.		
6.6			
8.0	Boulders & rock.		
	Refusal @ 8.0'		
	Driller: Jimmy Goody Job # 84-174		

BORING NO. P-2
LINE & STA.
OFFSET
GR. ELEV.
DATE: 10-17-84

A	STRATUM DESCRIPTION	BLOWS PER___	B
0.3	Wood planking.		
	Air.		
6.0			
	Boulders & sandy material.		
14.0			
	Refusal @ 14.0'		

1. COL. A Depth in feet.
2. COL. B
3. HAMMER = 140#; FALL 30"
4. SAMPLER = ____ O.D. SPLIT SPOON
5. GWT = GROUND WATER

AND - 40 to 50%
SOME - 10 to 40%
TRACE - 0 to 10%

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

"BORING LOG"

PROJ. Casco Ferry

CLIENT Haley & Aldrich

BORING NO. P-3

LINE & STA.

OFFSET

GR. ELEV.

DATE: 10-17-84

A	STRATUM DESCRIPTION	BLOWS PER___	B
0.3	~~Boards & planking.~~		
	Air.		
6.1			
	Rocks & boulders, silty sandy material.		
13.0			
	Refusal @ 13.0'		
	Driller: Jimmy Goody Job # 84-174		

BORING NO.

LINE & STA.

OFFSET

GR. ELEV.

DATE:

A	STRATUM DESCRIPTION	BLOWS PER___	B

1. COL. A Depth in feet.
2. COL. B
3. HAMMER = 140#; FALL 30"
4. SAMPLER = ____O.D. SPLIT SPOON
5. GWT = GROUND WATER

AND - 40 to 50%
SOME - 10 to 40%
TRACE - 0 to 10%

APPENDIX B

Historic Laboratory Test Results

H&A FORM 6 – FEB. 74

HALEY & ALDRICH, INC.

SUMMARY OF LABORATORY SOIL TEST RESULTS

CASCO BAY FERRY TERMINAL, PORTLAND, ME

FILE NO. 8549
SHEET 1 OF 3

BORING & SAMPLE NUMBER	DESCRIPTION	DEPTH (FEET)	TEST NO.	NATURAL WATER CONTENT %	ATTERBERG LIMITS %		UNIT WEIGHT LB/CU.FT.	UNCONFINED TEST		CONSOLIDATION		OTHER TESTS (TSF)
					LL	PL		COMPRESSIVE STRENGTH PSF	STRAIN %	MAX. PAST PRESSURE TON/SQ.FT.	CR	
B101/U-1	Gray silty CLAY with intermittent black laminations	20 - 22										
		20.0-20.11		26.80								
		20.11-20.27	V1	21.78								TV = 0.17
		20.27-20.43	L1	45.71	26.0	18.0						PP = 0.80
		20.43-20.52		39.05								SV = 0.20
		20.52-20.64	C1	32.83			119.2			0.97 (disturbed)	0.102	R = 0.03
		20.64-20.93	UC1	41.14			100.6	943	4.5			
B101/U-2	Gray silty CLAY	30 - 32										
		30.20-30.38	V1	42.86								TV = 0.21
		30.38-30.55	L2	42.00	40.2	24.9						PP = 0.25
		30.55-30.85		48.66								SV = 0.21
												R = 0.05
B101/U-3	Gray silty CLAY	40 - 42										
		40.16-40.34	V3	47.28								TV = 0.30
		40.34-40.50	L3	41.30	44.0	26.3						PP = 0.55
		40.50-40.63	C2	38.02			112.2			1.88	0.247	SV = 0.34
		40.63-40.92	UC2	45.91			110.9	1709	1.8			R = 0.06

SUMMARY OF LABORATORY SOIL TEST RESULTS

CASCO BAY FERRY TERMINAL, PORTLAND, ME

FILE NO. 8549
SHEET 2 OF 3

BORING & SAMPLE NUMBER	DESCRIPTION	DEPTH (FEET)	TEST NO.	NATURAL WATER CONTENT %	ATTERBERG LIMITS % LL	ATTERBERG LIMITS % PL	UNIT WEIGHT LB/CU FT.	UNCONFINED TEST COMPRESSIVE STRENGTH PSF	UNCONFINED TEST STRAIN %	CONSOLIDATION MAX. PAST PRESSURE TON/SQ. FT.	CONSOLIDATION CR	OTHER TESTS (TSF)
B101/U-4	Light gray silty CLAY with intermittent black laminations	50 - 52										
		50.83-50.92		50.77								
		50.92-51.08	V4	47.24								TV = 0.125 PP = 0.20 SV = 0.15 R = 0.08
		51.08-51.24	L4	45.37	38.0	25.5						
		51.24-51.54	UC3	41.08			107.9	324 (Large strain at failure and low strength - disturbed ?)	10.5			
B101/U-5	Gray silty CLAY	70 - 72										
		71.11-71.19		42.52			109.5					
		71.19-71.28	V5	42.13								TV = 0.14 PP = 0.20
		71.19-71.36	L5	40.81	41.6	24.4						
		71.36-71.48	C3							Consolidation test indicates severe disturbance.		
		71.48-71.77	UC4	41.31			109.5	318 (Large strain at failure and low strength - disturbed ?)	11.8			

H&A FORM 6 – FEB. 74

HALEY & ALDRICH, INC.

SUMMARY OF LABORATORY SOIL TEST RESULTS

CASCO BAY FERRY TERMINAL, PORTLAND, ME

FILE NO. 8549
SHEET 3 OF 3

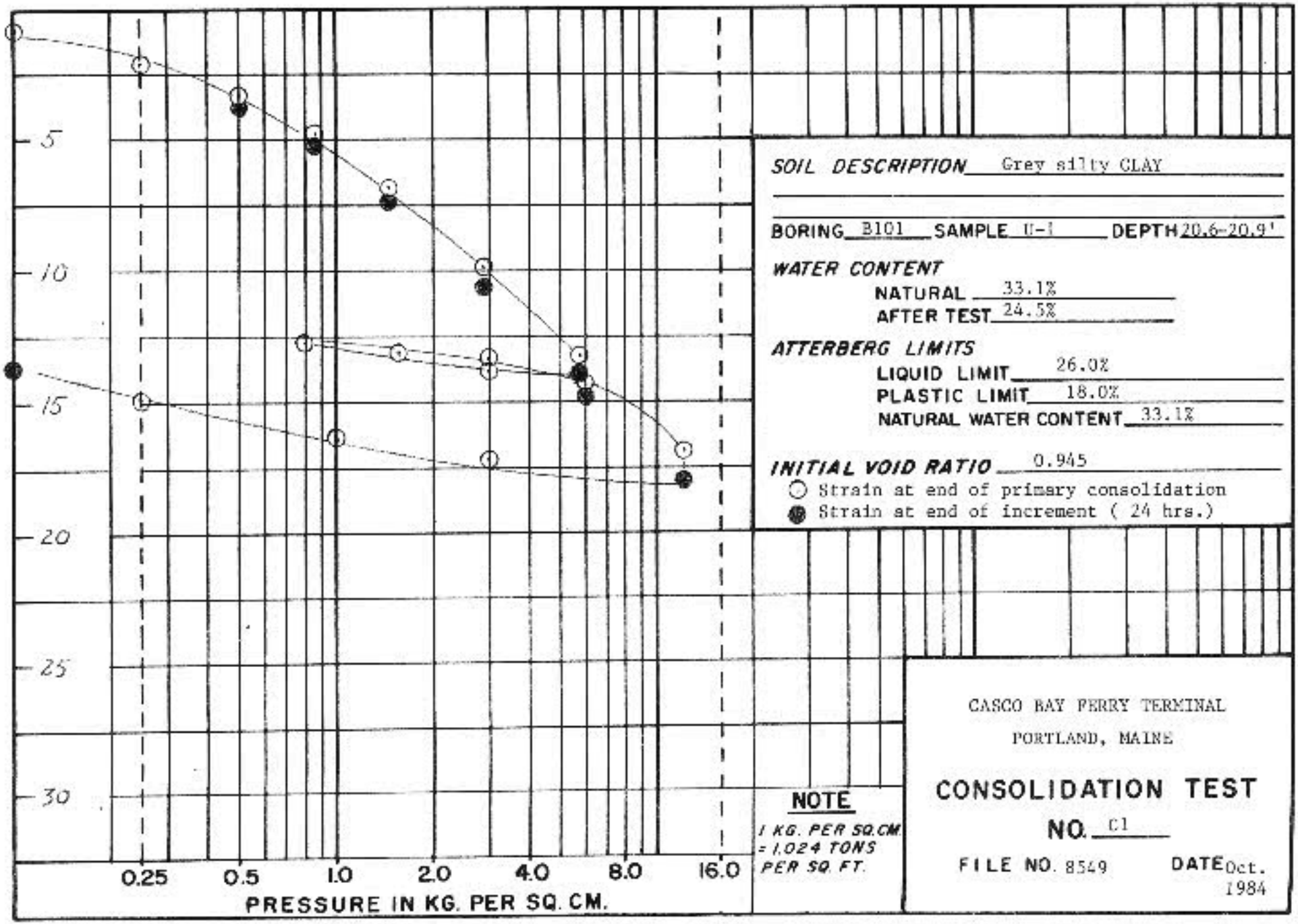
BORING & SAMPLE NUMBER	DESCRIPTION	DEPTH (FEET)	TEST NO.	NATURAL WATER CONTENT %	ATTERBERG LIMITS %		UNIT WEIGHT LB/CU FT	UNCONFINED TEST		CONSOLIDATION		OTHER TESTS (TSF)
					LL	PL		COMPRESSIVE STRENGTH PSF	STRAIN %	MAX. PAST PRESSURE TON/SQ. FT.	CR	
B109/U-1	Gray silty CLAY with intermittent black laminations	40 - 42										
		40.1 – 40.24	V6	43.24								TV = .20 PP = .30 SV = .20 R = .04
		40.33 – 40.50	L6		44.0	21.9						
		40.50 – 40.80	UC5	42.25			112.7	1477	3.0			
		40.80 – 40.94	C4	40.0			115.8			1.64	0.212	
B109/U-2	Gray silty CLAY with intermittent black laminations and trace fine gravel	50 - 52										
		50.16 – 50.40	V7 L7	35.46	40.8	22.9						TV = 0.14 PP = 0.25 SV = 0.20 R = 0.07
		50.40 – 50.60	UC6	40.76			114.3	1532	4.8			
		50.60 – 50.83	C5				111.6			2.28	0.196	
B109/U-3	Gray silty CLAY with intermittent black laminations	60 - 62										
		60.25 – 60.41	V8 L8	40.42 38.62	45.5	25.5						TV = 0.25 PP = 0.70 SV = 0.38 R = 0.10
		60.41 – 60.70	UC7	37.02			114.6	1563	3.8			
		60.70 – 60.83	C6				115.0			2.28	0.21	

NOTES:

TV = Shear strength in TSF as measured by Torvane manufactured by Soiltest.
PP = Compressive strength in TSF as measured by Pocket Penetrometer manufactured by Soiltest.
SV = Shear strength in TSF as measured by Lab Vane manufactured by Geonor.
R = Remolded strength in TSF as measured by Lab Vane manufactured by Geonor.

H&A FORM AUG.'75 50

HALEY & ALDRICH, INC.



SOIL DESCRIPTION Grey silty CLAY

BORING B101 SAMPLE U-1 DEPTH 20.6-20.9'

WATER CONTENT

NATURAL 33.1%

AFTER TEST 24.5%

ATTERBERG LIMITS

LIQUID LIMIT 26.0%

PLASTIC LIMIT 18.0%

NATURAL WATER CONTENT 33.1%

INITIAL VOID RATIO 0.945

○ Strain at end of primary consolidation

● Strain at end of increment (24 hrs.)

NOTE

1 KG. PER SQ.CM. = 1.024 TONS PER SQ. FT.

CASCO BAY FERRY TERMINAL

PORTLAND, MAINE

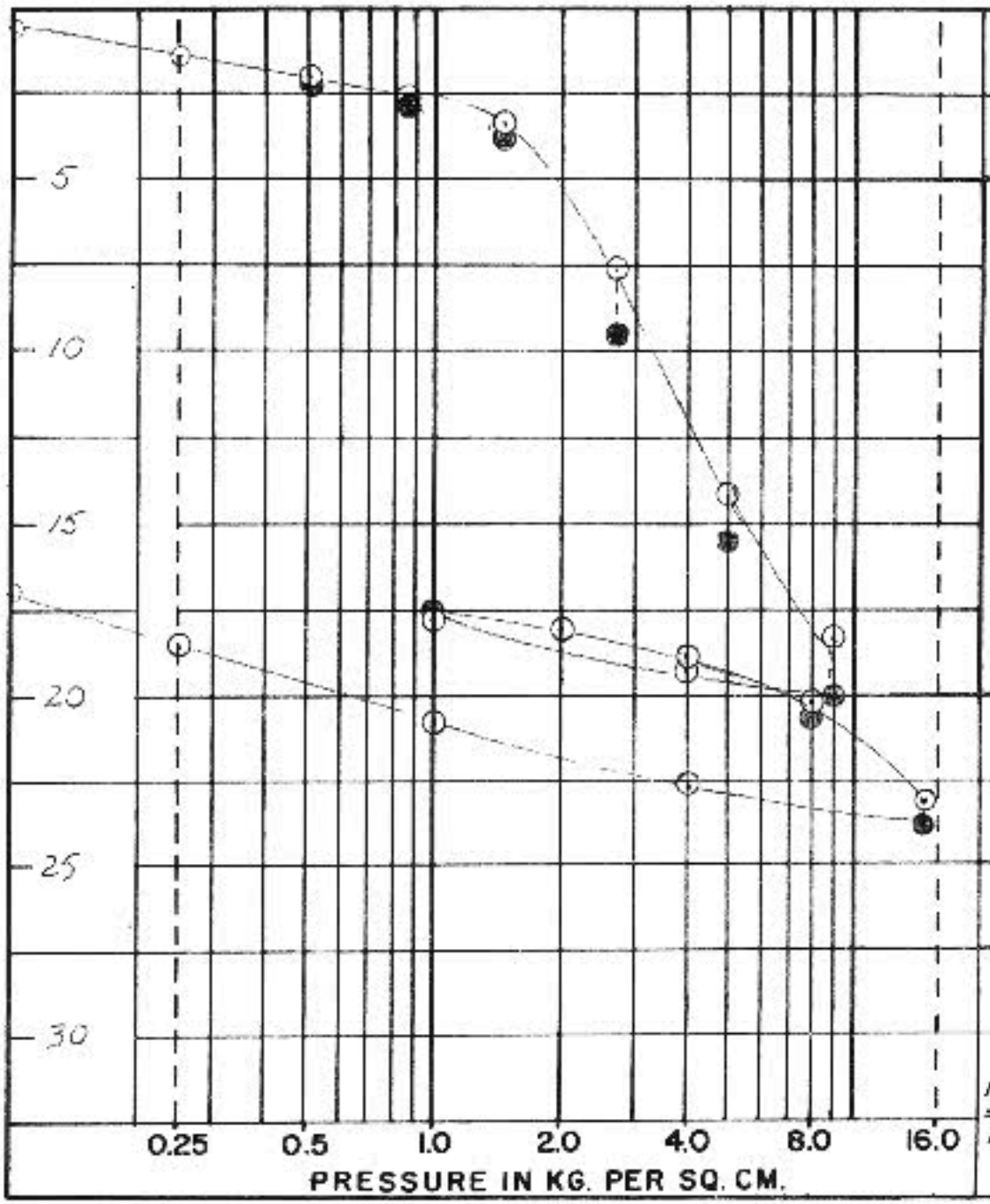
CONSOLIDATION TEST

NO. C1

FILE NO. 8549 DATE Oct. 1984

H&A FORM 50
AUG.'75

HALEY & ALDRICH, INC.



SOIL DESCRIPTION Grey Silty CLAY

BORING B101 SAMPLE U-3 DEPTH 40.5-40.6'

WATER CONTENT
NATURAL 44.6%
AFTER TEST 32.8%

ATTERBERG LIMITS
LIQUID LIMIT 44.0%
PLASTIC LIMIT 26.3%
NATURAL WATER CONTENT 44.6%

INITIAL VOID RATIO 1.25

○ Strain at end of primary consolidation
● Strain at end of increment (24 hrs.)

NOTE
1 KG. PER SQ.CM = 1.024 TONS PER SQ. FT.

CASCO BAY PERRY TERMINAL
PORTLAND, MAINE

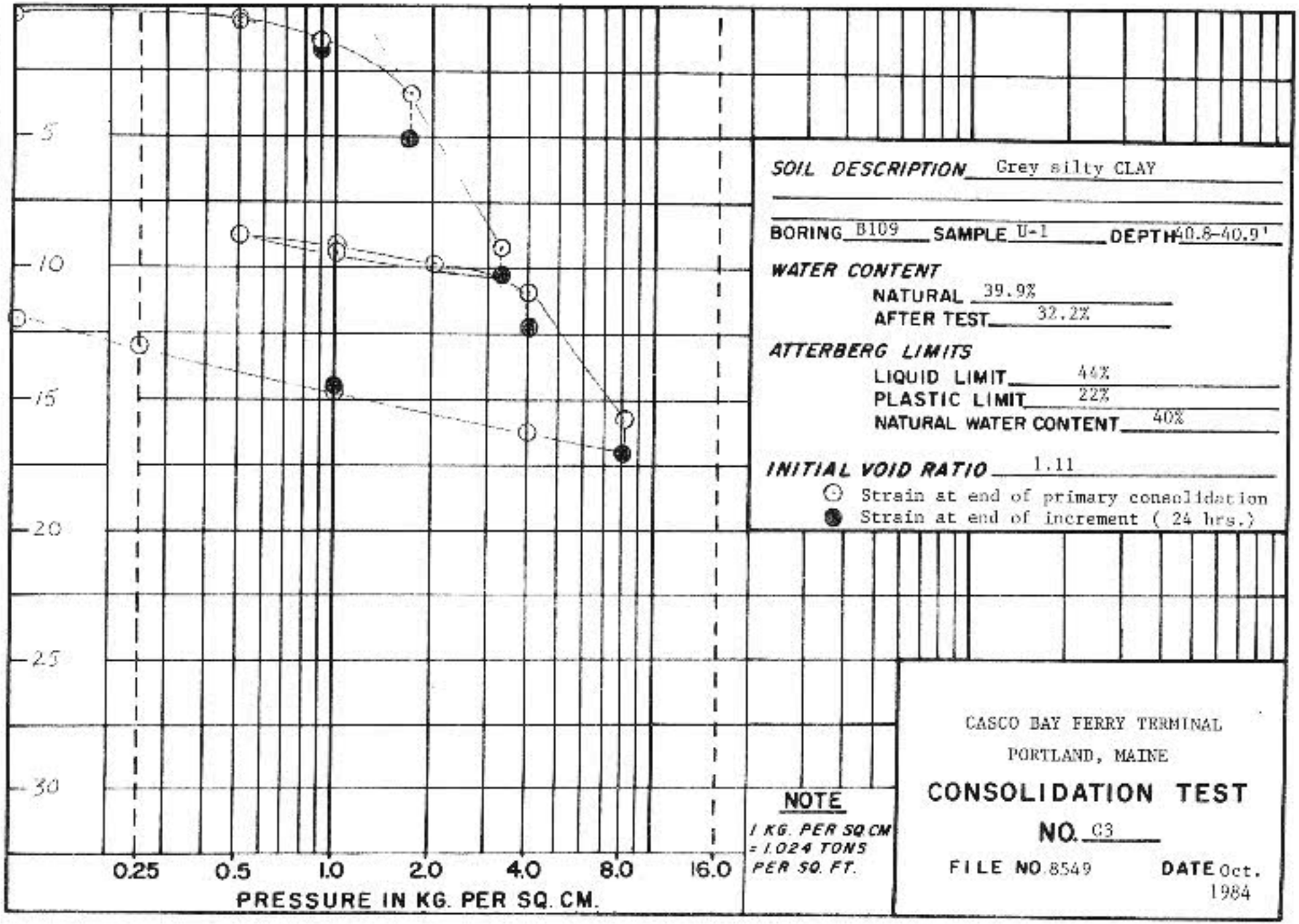
CONSOLIDATION TEST

NO. C2

FILE NO. 8549 DATE Oct. 1984

H&A FORM 50
AUG. '75

HALEY & ALDRICH, INC.



SOIL DESCRIPTION Grey silty CLAY

BORING B109 SAMPLE U-1 DEPTH 40.8-40.9'

WATER CONTENT
NATURAL 39.9%
AFTER TEST 32.2%

ATTERBERG LIMITS
LIQUID LIMIT 44%
PLASTIC LIMIT 22%
NATURAL WATER CONTENT 40%

INITIAL VOID RATIO 1.11

○ Strain at end of primary consolidation
● Strain at end of increment (24 hrs.)

NOTE
1 KG. PER SQ CM = 1.024 TONS PER SQ. FT.

CASCO BAY FERRY TERMINAL
PORTLAND, MAINE

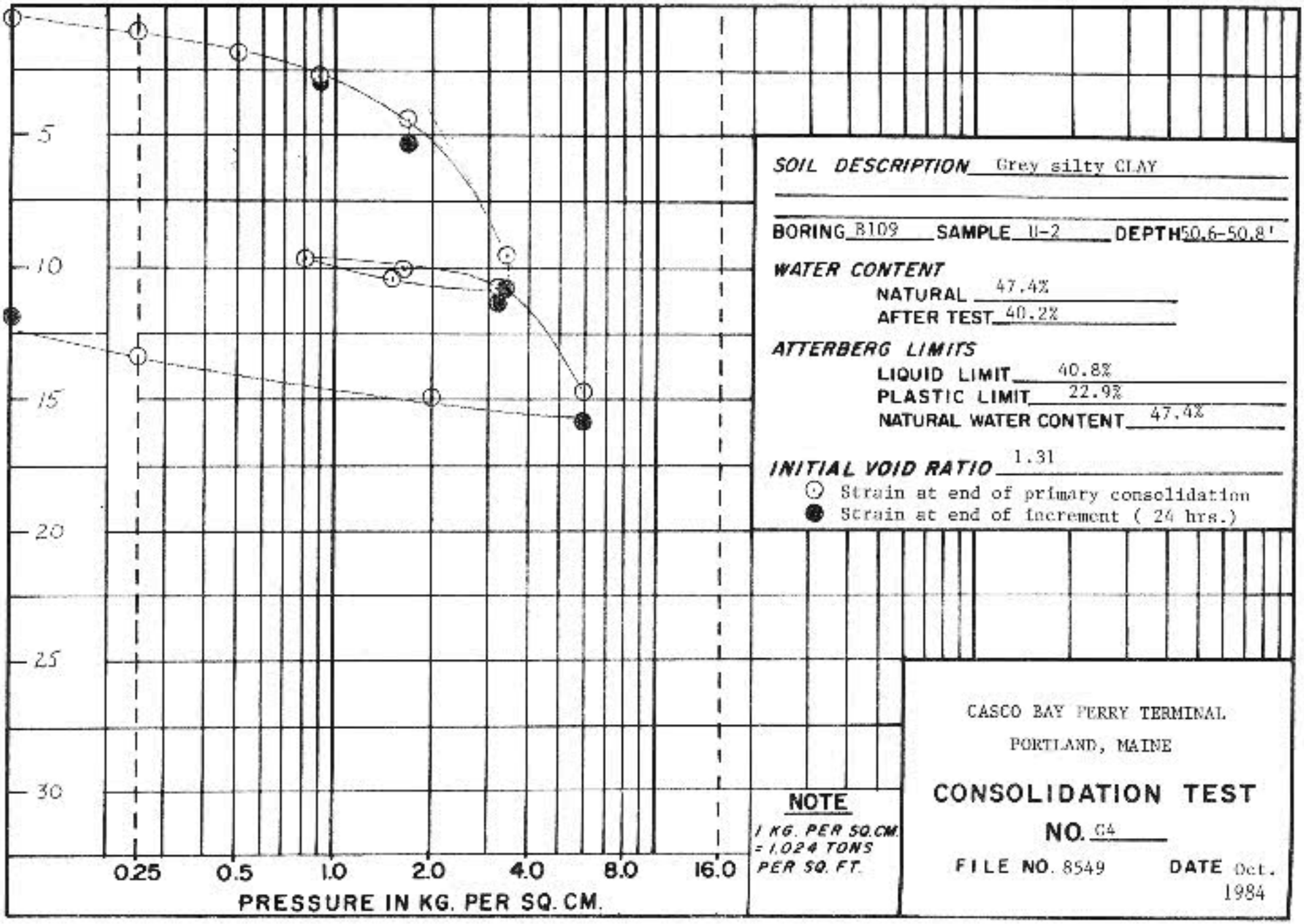
CONSOLIDATION TEST

NO. C3

FILE NO. 8549 DATE Oct. 1984

H&A FORM 50
AUG.'75

HALEY & ALDRICH, INC.



SOIL DESCRIPTION Grey silty CLAY

BORING B109 SAMPLE U-2 DEPTH 50.6-50.8'

WATER CONTENT
NATURAL 47.4%
AFTER TEST 40.2%

ATTERBERG LIMITS
LIQUID LIMIT 40.8%
PLASTIC LIMIT 22.9%
NATURAL WATER CONTENT 47.4%

INITIAL VOID RATIO 1.31

⊙ Strain at end of primary consolidation
● Strain at end of increment (24 hrs.)

NOTE
1 KG. PER SQ.CM. = 1.024 TONS PER SQ. FT.

CASCO BAY FERRY TERMINAL
PORTLAND, MAINE

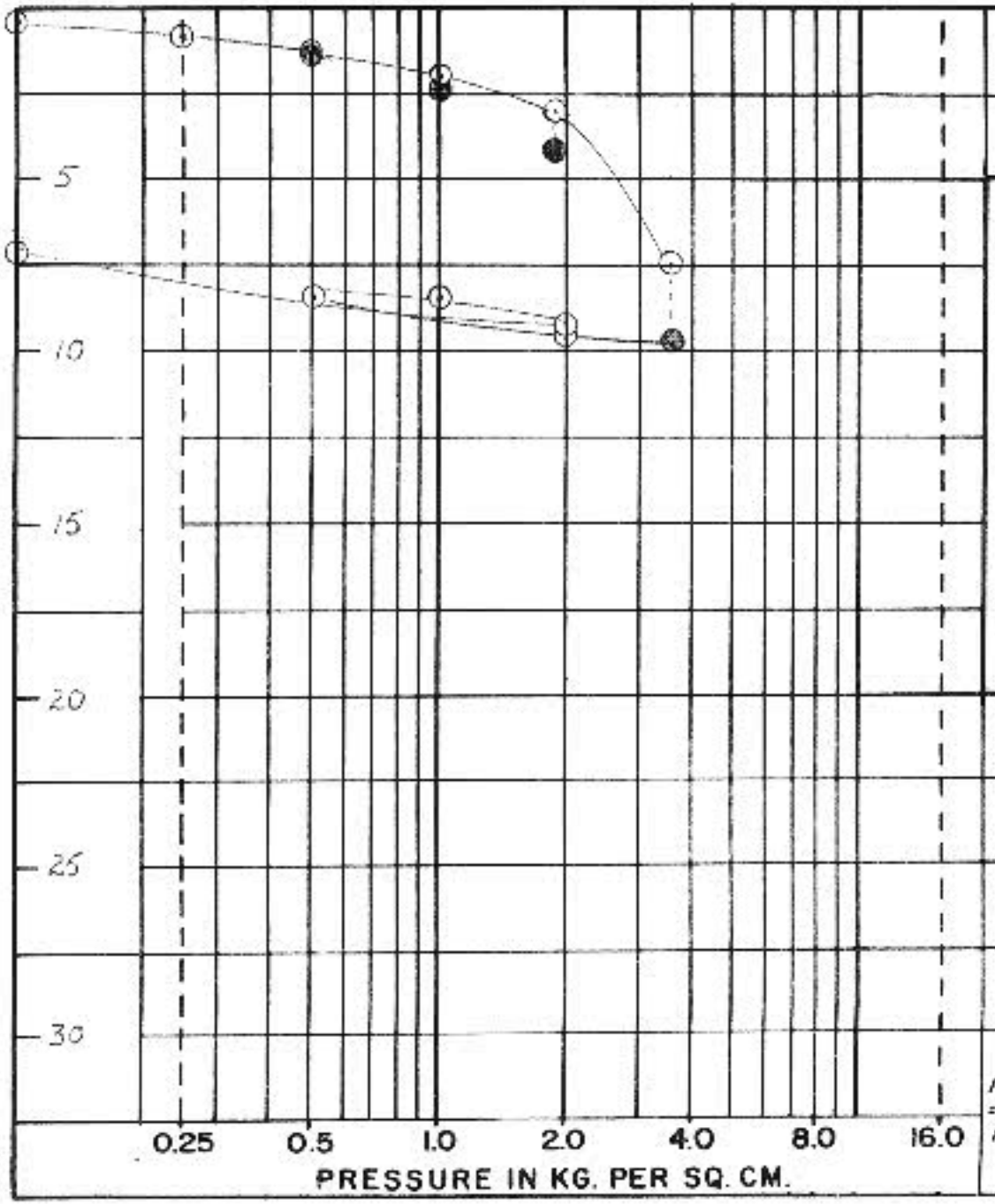
CONSOLIDATION TEST

NO. C4

FILE NO. 8549 DATE Oct. 1984

H&A FORM 50
AUG.'75

HALEY & ALDRICH, INC.



SOIL DESCRIPTION Grey silty CLAY

BORING B109 SAMPLE U-3 DEPTH 60.7-60.8'

WATER CONTENT
NATURAL 41.4%
AFTER TEST 37.8%

ATTERBERG LIMITS
LIQUID LIMIT 45.5%
PLASTIC LIMIT 25.5%
NATURAL WATER CONTENT 41.4%

INITIAL VOID RATIO 1.15

⊙ Strain at end of primary consolidation
● Strain at end of increment (24 Hrs.)

NOTE
1 KG. PER SQ CM = 1.024 TONS PER SQ. FT.

CASCO BAY FERRY TERMINAL
PORTLAND, MAINE

CONSOLIDATION TEST

NO. C5

FILE NO. 8549 DATE Oct. 1984