
● *Geotechnical Engineering* ● *Field & Laboratory Testing* ● *Scientific & Environmental Consulting*

# GEOTECHNICAL ENGINEERING SERVICES
# PROPOSED CANNED MEAT SPREAD EXPANSION
# B&M BAKED BEANS FACILITY
# ONE BEANPOT CIRCLE
# PORTLAND, MAINE

**05-0077 March 15,2005**

**Prepared for:**

Associated Design Partners, Inc.
Attention: Bob Arledge, P.E.
80 Leighton Road
Falmouth, Maine 04105

**Prepared by:**

S.W.COLE ENGINEERING, INC.
286 Portland Road
Gary, Maine 04039

## TABLE OF CONTENTS

05-0077

March 15,2005

Associated Design Partners, Inc.
Attention: Bob Arledge, P.E.
80 Leighton Road
Falmouth, Maine 04105

Subject: Geotechnical Engineering Services
Proposed Canned Meat Spread Expansion
B&M Baked Beans Facility
One Beanpot Circle
Portland, Maine

Dear Mr. Arledge:

In accordance with our Agreement dated February 1,2005, we have made a subsurface investigation at the site of the proposed building additions to the B&M Baked Beans Facility in Portland, Maine. We received verbal authorization to proceed on February 8, 2005. Preliminary subsurface findings and geotechnical recommendations for pile foundations were provided on February 21, 2005. This report summarizes our findings and geotechnical recommendations and its contents are subject to the limitations set forth in Attachment A.

## I.0 INTRODUCTION

### 1.1 Scope of Work

The purpose of our work was to obtain subsurface information in order to develop geotechnical recommendations for foundations associated with the proposed construction. Our scope included six test boring explorations, a geotechnical evaluation of the subsurface findings relative to the proposed construction and preparation of this report.

### I.2 Proposed Construction

Based on our discussions, we understand that the existing building consists of several structures. Portions of the existing building reportedly have spread footing foundations founded on bedrock while other portions are pile-supported. We understand that new

loading docks are proposed on the northeasterly side of the existing building. The proposed loading dock area will be about 24 feet by 53 feet in plan dimensions and will have a finish floor elevation at or near existing grade. We understand that a truckwell is being considered, and a new retaining wall will likely be needed at the edge of the proposed truckwell. Additional site improvements will include construction of an enclosed hallway for fork truck loader traffic and some new interior mechanical equipment in the southeasterly portion of the building. We understand that fills to construct the new additions will be limited to less than I-foot.

## 2.0 EXPLORATION AND TESTING

### 2.1 Exploration

Six test borings (B-1 through B-6) were made at the site on February 16, 2005. The test borings were made by Northern Test Boring of Gorham, Maine. The exploration locations were selected by Associated Design Partners. S. W. COLE ENGINEERING, INC. established the test boring locations in the field based upon existing site features and underground utilities constraints. The approximate exploration locations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of explorations are attached at Sheets 2 through 7. A key to the notes and symbols used on the logs is attached as Sheet 8.

### 2.2 Testing

The test borings were drilled using solid-stem auger drilling techniques. The soils were sampled at 5-foot intervals using a split spoon sampler and Standard Penetration Test (SPT) methods. SPT results are shown on the logs. Soil samples obtained from the test borings were returned to our laboratory for further visual classification.

## 3.0 SITE AND SUBSURFACE CONDITIONS

### 3.1 Site Conditions

The site is relatively flat and level and situated on the existing B&M Baked Beans facility along the shoreline area of Casco Bay and Back Cove in Portland, Maine. The areas of the proposed building additions were covered with asphalt pavement during the test boring work.

**. Subsurface Conditions**

B l a sur layer f asphalt , the test borings encountered a soii ofile ll s tir of 1 ilt ' sand (p l) ing la silt with 1 n, rg , : n slag (fill) ov gray ilty clay ar silty and (g rine ments overlying al ur ces (probable dr Th brov ilt grav id va ra y fo t . 0 to 2 feet thick and ll rozen The b silt fill was generally found to be 6 to 10 feet ick very loose and i deleterious ash and organic materials. The glaciomarine sediments, where nte were gene found to be 8 to 13 feet ick. The glaciomarir silty sar wer in( ) be loose to y loose in relative density d t ine clays were found to be medium in sistency. Each of the test b were terminated on efusal rfaces (probable b ck) encountered at depths g - 4 t 2 t below ie ground e

**3.3 Groundwater**

At the time of drilling, groundwater was observed at depths of **4** to 6 feet below the ground surface. It should be noted that groundwater levels likely fluctuate in response to nearby tidal water levels.

**3.4 Seismic and Frost Conditions**

According to IBC 2000/2003, we interpret the subsurface conditions to correspond to a Seismic Site Class E. The design freezing index for the Portland, Maine area is approximately 1250 Fahrenheit-Degree-Days, which corresponds to a frost penetration on the order of 4.5 feet.

**4.0 EVALUATION AND RECOMMENDATIONS**

**4.1 General**

Based on the findings at the exploration atio nd ur understanding of the ose r it is our opinion the proposed ti appears feasib from a ni standpoint provided the proposed building additions are n on pile-supp rt undations. As discussed the excavation spoils m four f ) are suitable for foundation backfill g ndations exposed to freezing s. As iscussed the fill containing ash may p at regulated facilities ch as a sar landfill or er Systems of bor e

Excavations for pile caps and grade beams will likely encounter groundwater seepage, which will likely require the use of a crushed stone mat to form a working pad to cast foundation concrete. The crushed stone mat will also provide a drainage media from which to sump and pump for temporary dewatering. A layer of geotextile filter fabric should also be needed below the crushed stone to help stabilize the subgrades. Deeper excavations for utilities will likely require braced shoring to support the excavation sidewalls and to help groundwater cutoff. Excavations made adjacent to existing structures must be properly shored or sloped to prevent undermining of the existing buildings.

## 4.2 Pile Foundations

### 4.2.1 Pile Design

Considering the subsurface conditions encountered and our understanding of the proposed construction, we recommend foundation support of the proposed building and floor slabs be derived from steel H-Piles with cast driving tips driven to end-bearing on bedrock. Grade beams, pile caps and foundations exposed to freezing temperatures should extend at least 4.5 feet below exterior finished grade for frost protection or be insulated with foundation insulation to provide adequate frost protection.

Based on our understanding of the project, we offer the following pile sections and allowable axial compressive capacities for design consideration. The allowable axial capacities have been reduced to allow for 1/8-inch corrosion of the pile section.

| H-PILE SECTION ASTM A572 Grade 50 | ALLOWABLE AXIAL COMPRESSIVE PILE CAPACITY (1/8" Corrosion Allowance) |
|---|---|
| HP10 x 42 | 80 kips |
| HP8 x 36 | 75 kips |
| | |

Post-construction settlement of piles driven to practical refusal, on rock should not exceed ½ inch; elastic shortening of the pile should be evaluated on a pile cap by pile cap basis, as deemed necessary by the structural engineer. Considering the depth to bedrock and a

bottom of pile cap elevation of 4.5 feet below exterior grades, we anticipate pile lengths will likely vary from about 4 to 20 feet.

Piles should be spaced a minimum of two pile diameters, center-to-center, but not less than 24 inches. We recommend that pile caps and grade beams be underlain with 8 inches of compacted crushed stone to help provide a stable working surface during construction. Lateral loads can be resisted by passive earth pressures acting on the sides of pile caps and grade beams. For pile caps backfilled with properly compacted Structural Fill (clean, free-draining sand and gravel), we recommend a passive earth pressure of 325 pcf (equivalent fluid) for design consideration. Additional lateral resistance can be provided by tie beams and grade beams between the pile caps, as deemed necessary by the structural engineer.

### 4.2.2 Pile Submittals and Load Testing

The pile-driving contractor should submit information on the pile driving equipment and proposed 'set' or stop driving criteria to S. W. COLE ENGINEERING, INC. prior to the start of pile driving activities. S. W. COLE ENGINEERING, INC. should be on-site during the driving of piles to maintain pile-driving records and to monitor vibrations due to driving.

Vibrations from pile driving activities can adversely affect adjacent structures. We recommend that a pre-driving survey be done on structures adjacent to the proposed project. The pre-driving survey should include photographs and the installation of crack monitors as appropriate to establish a baseline prior to the start of pile driving activities.

The IBC 2000/2003 requires that pile load tests be performed on piles with design capacities over 40 tons (80 kips). Considering the recommended pile capacities are 80 kips or less, pile load testing will is not required. However, based on our experience in the City of Portland, we recommend that a pile driving summary plan and letter, stamped by a Maine Professional Engineer, stating that the piles were installed according to the recommendations in the geotechnical report, be prepared to meet the Special Inspections requirements of the City.

## 4.3 Foundation Drainage

We recommend that a perimeter foundation drainage system be provided near pile cap subgrade around the exterior side of the perimeter grade beam system for the building. The underdrain pipe should be surrounded with 6 inches of crushed stone wrapped in a

non-woven geotextile filter fabric having an apparent opening size of at least 70, such as Mirafi 140N. The underdrain pipe should consist of rigid, 4-inch diameter PVC with perforations of ¼- to ½-inch. The underdrain must have a positive gravity outlet protected from freezing temperatures and backflow.

**4.4 Excavation Work**

An erosion control system should be instituted prior to any construction activity at the site to help protect adjacent drainage ways.

Groundwater and wet soil conditions will likely be encountered in the foundation excavations. In our opinion, ditching with sump and pump dewatering techniques should be adequate to control groundwater in excavations less than about 6 feet deep. We recommend placing at least an 8 inch thick layer of crushed stone at the base of pile cap and grade beam excavations to act as a drainage media from which to sump and pump. A crushed stone working mat will likely also be needed for utility excavations to provide a stable working surface. A geotextile fabric should be used below the crushed stone to help separate the stone and subgrade soils and help stabilize the subgrade.

Deeper excavations, such as for utilities, will likely require braced sheeting for groundwater cutoff and excavation stability. In any case, all excavations must be properly shored and/or sloped in accordance with OSHA trenching regulations to prevent sloughing and caving of the sidewalls during construction. Excavations adjacent to existing buildings must be properly shored to prevent undermining of the existing structures.

**4.5 Backfill and acti**

The existing fill soils are unsuitable for backfill against foundations exposed to freezing or for reuse below paved areas. The existing pavement base gravels may be reused as compacted fills below pile-supported on-grade floor slabs to form a casting bed for construction of the floor slabs. We recommend that foundation exposed to freezing temperatures be backfilled with clean, free-draining, sand and gravel meeting the gradation requirements for Structural Fill, as given below.

A non-woven geotextile (such as Mirafi 140N) should be placed on top of crushed stone working mats prior to placing the Structural Backfill. Crushed stone placed around foundation underdrain pipes and as a working mat below pile caps and grade beams

should be clean, washed ¾-inch minus Crushed Stone Drainage Aggregate meeting the gradation requirements for MDOT 703.23 Underdrain Type C.

| | |
|---|---|
| Sieve Size | Percent Finer by Weight |
| 4 inch | 100 |
| 3 inch | 90 to 100 |
| ¼ inch | 25 to 90 |
| No. 40 | 0 to 30 |
| | |

Fill should be placed in horizontal lifts and be compacted. Lift thickness should be generally limited to between 6 to 12 inches, as appropriate for the compaction equipment being used, such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Foundation backfill and fills placed beneath slabs, paved areas and walkways should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557 (Modified Proctor). Crushed stone below pile-supported foundations should be compacted to provide stable access for foundation construction crews and stable subgrades for concrete placement.

### 4.6 Entrance Slabs

Entrance slabs at door openings should be designed to reduce the effects of differential frost action. We recommend that exterior entrance slabs be underlain with a minimum of 4.5 feet of Structural Fill extending beneath the entire width and length of entrance slab. The thickness of Structural Fill below the entrance slab should transition up to adjacent pavement subbase at a 3H:1V slope or flatter. This is to help avoid abrupt, differential heaving. All adjacent paved and grassed areas should be sloped to promote drainage away from the building periphery.

### 4.7 Weather Considerations

If foundation construction takes place during cold weather, subgrades, foundations, and concrete must be protected during freezing conditions. Concrete must not be placed on frozen soil and once placed, the soil and concrete must be protected from freezing. Further, the on-site fills are moisture sensitive and as such exposed soil surfaces will be susceptible to disturbance during wet conditions. Consequently, sitework and

construction activities should take appropriate measures to protect exposed soils, particularly when wet.

### 4.8 Construction Testing

S. W. COLE ENGINEERING, INC. should be retained to provide testing and observation services during the excavation, pile driving and foundation phases of construction. This is to observe compliance with the design recommendations, drawings and specifications and to allow design changes in the event that subsurface conditions are found to differ from those anticipated prior to the start of construction.

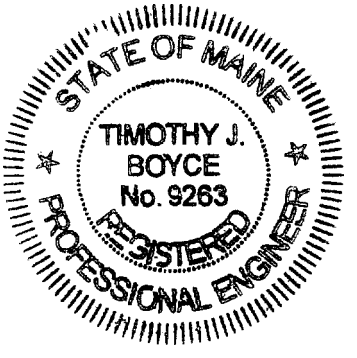
S. W. COLE ENGINEERING, INC. is available to assist in conducting a pre-pile driving survey, provide pile driving vibration monitoring, observe pile installation, and to test soil, concrete, asphalt, steel, spray-applied fireproofing and masonry construction materials.

## 5.0 CLOSURE

S. W. COLE ENGINEERING, INC. should be engaged to review the sitework and foundation design drawings to confirm that our recommendations have been appropriately interpreted and implemented. it has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you as the design progresses and during the construction phase.

Sincerely,

**S.W.COLE ENGINEERING, INC.**




Timothy J. Boyce, P.E.
Senior Geotechnical Engineer

TJB:tjb/pfb

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## Attachment A - Limitations

This report has been prepared for the exclusive use of Associated Design Partners, Inc. for specific application to the proposed Canned Meat Spread Expansion at the B&M Baked Beans Facility located at One Beanpot Circle in Portland, Maine. S. W. COLE ENGINEERING, INC. has endeavored to conduct the work in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S. W. COLE ENGINEERING, INC.'s scope of work has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S. W. COLE ENGINEERING, INC. should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S. W. COLE ENGINEERING, INC.

S.W.COLE ENGINEERING, INC.

# BORING LOG

BORING NO.: **B-1**
SHEET: 1 OF 1
PROJECT NO.: 05-0077

PROJECT/ CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS, INC.
LOCATION: ONE BEANPOT CIRCLE. PORTLAND. MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

DATE START: 2/16/05
DATE FINISH: 2/16/05
ELEVATION: NO SURVEY
SWC REP.: KBG

| | TYPE | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | SSA | 1 3/8" I.D. | 140 lb | 30" |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT 5' +/-

| CASING BLOWS PER FOOT | SAMPLE NO. | PEN. | REC. | DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 | DEPTH | STRATA & TEST DATA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.3' | ASPHALT PAVEMENT |
| | 1D | 24" | 20" | 2.5' | 13 | 8 | 6 | 8 | 0.5'1 | - FROZEN~ BROWN SILTY GRAVELLY SAND (FILL) |
| | | | | | | | | | | BLACK SILT SOME SAND WITH ASH, ORGANICS AND SHELLS (FILL) - VERY LOOSE ~ |
| | 2D | 24" | 5" | 7.0' | 1 / 18" | | | 1 | | |
| | 3D | 1" | 1" | 10.1' | 50/1" | | | | 10.1' | |
| | | | | | | | | | 10.2' | PROBABLE WEATHERED ROCK |
| | | | | | | | | | | REFUSAL AT 10.2' (PROBABLE BEDROCK) |

D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5 SHELBY TUBE

[ ] DRILLER - VISUALLY
[X] SOIL TECH. -VISUALLY
[ ] LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.



BORING NO.: **B-1**

SWCOLE ENGINEERING, LLC

# BORING LOG

BORING NO.: **B-2**
SHEET: 1 OF 1
PROJECT NO.: 05-0077
DATE START: 2/16/05
DATE FINISH: 2/16/05
ELEVATION: NO SURVEY
SWC REP.: KBG

PROJECT / CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS, INC.
LOCATION: ONE BEANPOT CIRCLE, PORTLAND, MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

| | TYPE | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | SSA | 1 3/8" I.D. | 140 lb | 30" |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT 5.5' +/-

| CASING BLOWS PER FOOT | SAMPLE NO. | PEN. | REC. | DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 | DEPTH | STRATA & TEST DATA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.1' | ASPHALT PAVEMENT |
| | 1D | 24" | 6" | 2.5' | 10 | 4 | 3 | 4 | 0.5' | ~ FROZEN ~ BROWN SILTY GRAVELLY SAND (FILL) |
| | 2D | 24" | 12" | 7.0' | 2 | 2 | 8 | 7 | | BLACK SILT SOME SAND<br>WITH ASH, ORGANICS AND SHELLS (FILL)<br>~LOOSE~ |
| | | | | | | | | | 9.8' | |
| | | | | | | | | | 10.0' | PROBABLE WEATHERED ROCK |
| | | | | | | | | | | REFUSAL AT 10.0'<br>(PROBABLE BEDROCK) |

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.



BORING NO.: **B-2**

SWCOLE ENGINEERING, INC.

# BORING LOG

BORING NO. : B-3
SHEET: 1 OF 1
PROJECT NO.: 05-0077
DATE START: 2/16/05
DATE FINISH: 2/16/05
ELEVATION: NO SURVEY
SWC REP.: KBG

PROJECT / CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS, INC.
LOCATION: ONE BEANPOT CIRCLE. PORTLAND. MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

| | TYPE | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | SSA | 1 3/8" I.D. | 140 lb | 30" |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT 6' +/-

| CASING BLOWS PER FOOT | SAMPLE NO. | PEN. | REC. | DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 | DEPTH | STRATA & TEST DATA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.1' | ASPHALT PAVEMENT |
| | 1D | 24" | 16" | 2.5 | 32 | 32 | 28 | 21 | 2.0' | ~ FROZEN ~ BROWN GRAVELLY SAND SOME SILT (FILL) |
| | 2D | 24" | 6" | 7.0' | 3 | 2 | 1 | 1 | a 0' | |
| | | | | | | | | | 8.4' | PROBABLE WEATHERED ROCK |
| | | | | | | | | | | REFUSAL AT 8.4' (PROBABLE BEDROCK) |

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. -VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.



BORING NO.: B-3

S.W.COLE ENGINEERING, INC.

# BORING LOG

BORING NO.: **B-4**
SHEET: 1 OF 1
PROJECT NO.: **05-0077**
DATE START: 2/16/05
DATE FINISH: 2/16/05
ELEVATION: NO SURVEY
SWC REP.: KBG

PROJECT / CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS, INC.
LOCATION: ONE BEANPOT CIRCLE, PORTLAND, MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

| | TYPE | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | SSA | 13/8" I.D. | 140lb | 30" |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT 5' +/-

| CASING BLOWS PER FOOT | SAMPLE NO. | PEN. | REC. | DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 | DEPTH | STRATA & TEST DATA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0 2' | ASPHALT PAVEMENT |
| | 1D | 24" | 24" | 2 5' | 31 | 22 | 17 | 22 | 1.0' | - FROZEN - DARK BROWN SILTY GRAVELLY SAND (FILL) |
| | | | | | | | | | | BLACK SILT SOME SAND<br>WITH SLAG, BRICK, GLASS, ASH, ORGANICS AND SHELLS (FILL) |
| | 2D | 24" | 6" | 7 0' | WOH | 1 | 1/ 12" | | | ~ VERY LOOSE ~ |
| | | | | | | | | | 10 0' | |
| | 3D | 24" | 8" | 12 0' | 1/ 12" | | 1/12" | | | GRAY SILTY SAND<br>LAYERED WITH<br>MEDIUM GRAY SILTY CLAY AND STIFF BLACK SILTY CLAY |
| | | | | | | | | | 15 0' | ~ VERY LOOSE ~ |
| | | | | | | | | | 15 5' | -LOOSE- BROWN FINE SAND TRACE SILT |
| | 4D | 24" | 14" | 17.0' | 2 | 4 | 3 | 4 | 16.5' | ~LOOSE~ BROWN SILTY SAND SOME FINE GRAVEL |
| | | | | | | | | | | GRAY SILTY SAND SOME FINE GRAVEL<br>TRACE CLAY<br>-LOOSE- |
| | 5D | 24" | 17" | 220' | 2 | 1 | 6 | 9 | 23 3' | |
| | | | | | | | | | | REFUSAL AT 23 3' |

SAMPLES: SOIL CLASSIFIED BY:

X

REMARKS:

S.W.COLE ENGINEERING, INC.

# BORING LOG

BORING NO.: B-5
SHEET: 1 OF 1
PROJECT NO.: 05-0077

PROJECT / CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS, INC.
LOCATION: ONE BEANPOT CIRCLE, PORTLAND, MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

DATE START: 2/16/05
DATE FINISH: 2116/05
ELEVATION: NO SURVEY
SWC REP.: KBG

| | N P E | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | SSA | 1 3/8" I.D. | 140lb | 30" |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT *4' +/-*

| CASING BLOWS PER FOOT | SAMPLE NO. | PEN. | REC. | DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 |
|---|---|---|---|---|---|---|---|---|
| | 1D | 24" | 18" | 2.5' | 18 | 15 | 29 | 9 |
| | 2D | 24" | 7" | 6.0' | 1 | 1 / 12" | | 1 |
| | 3D | 24" | 22" | 11.0' | WOH | 4 | 7 | 6 |
| | 4D | 24" | 7" | 16.0' | 9 | 11 | 10 | 6 |

| DEPTH | STRATA & TEST DATA |
|---|---|
| 0.4' | ASPHALT PAVEMENT |
| | - FROZEN - |
| | BLACK SILT SOME SAND |
| | WITH SLAG, BRICK, GLASS, ASH, ORGANICS AND SHELLS (FILL) |
| | -VERY LOOSE- |
| 9.0' | |
| | GRAY SILTY CLAY SOME SAND WITH ORGANICS AND SHELLS |
| 10.5' | - MEDIUM - |
| | GRAY TO GREEN SILTY SAND |
| | TRACE FINE GRAVEL |
| | -LOOSE- |
| | < BLOWCOUNTS OVERSTATED, GRAVEL IN SHOE) |
| 17.5' | |
| | REFUSAL AT 17.5' |
| | (PROBABLE BEDROCK) |

SAMPLES'
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.



BORING NO.: B-5

S.W.COLE ENGINEERING, INC.

# BORING LOG

BORING NO.: B-6
SHEET: 1 OF 1
PROJECT NO.: 05-0077
DATE START: 2/16/05
DATE FINISH: 2/16/05
ELEVATION: NO SURVEY
SWC REP.: KBG

PROJECT / CLIENT: B&M BAKED BEANS PLANT EXPANSION/ ASSOCIATED DESIGN PARTNERS. INC.
LOCATION: ONE BEANPOT CIRCLE, PORTLAND, MAINE
DRILLING CO. : NORTHERN TEST BORING, INC. DRILLER: RICH LEONARD

| | TYPE | SIZE | HAMMER WT. | HAMMER FALL |
|---|---|---|---|---|
| CASING: | SSA | 4 1/2" O.D. | | |
| SAMPLER: | | | | |
| CORE BARREL: | | | | |

WATER LEVEL INFORMATION
WATER AT 5' +/-

| CASING BLOWS PER FOOT | SAMPLE NO. | SAMPLE PEN. | SAMPLE REC. | SAMPLE DEPTH @ BOT | SAMPLER BLOWS PER 6" 0-6 | 6-12 | 12-18 | 18-24 | DEPTH | STRATA & TEST DATA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.2' | ASPHALT PAVEMENT |
| | | | | | | | | | 2.0' | PROBABLE BROWN GRAVELLY SILTY SAND (FILL) |
| | | | | | | | | | | PROBABLE<br>BLACK SILT SOME SAND<br>WITH ASH, ORGANICS AND SHELLS (FILL) |
| | | | | | | | | | | *** AUGER PROBE - NO SAMPLING *** |
| | | | | | | | | | 12.0' | |
| | | | | | | | | | | PROBABLE<br>GRAY SILTY SAND WITH GRAVEL |
| | | | | | | | | | 15.5' | |
| | | | | | | | | | | REFUSAL AT 15.5'<br>(PROBABLE BEDROCK) |

NOTE: NO SPLIT SPOON SAMPLING, AUGER PROBE ONLY, STRAT DESCRIPTIONS ARE BASED ON AUGER CUTTINGS.

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. -VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.



BORING NO.: B-6

## KEY TO THE NOTES & SYMBOLS
### Test Boring and Teat Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**Key to Symbols Used:**

| | | |
|---|---|---|
| w | | water content, percent (dry weight basis) |
| $q_u$ | - | unconfined compressive strength, kipslsq. ft. - based on laboratory unconfined compressive test |
| $S_v$ | - | field vane shear strength, kipslsq. ft. |
| $L_v$ | - | lab vane shear strength, kips/sq. ft. |
| $q_p$ | - | unconfined compressive strength, kipslsq. ft. based on pocket penetrometer test |
| *O* | - | organic content, percent (dry weight basis) |
| $W_L$ | - | liquid limit - Atterberg test |
| $W_P$ | - | plastic limit - Atterberg test |
| WOH | - | advance by weight of hammer |
| WOM | - | advance by weight of man |
| WOR | - | advance by weight of rods |
| HYD | - | advance by force of hydraulic piston on drill |
| RQD | - | Rock Quality Designator - an index *of* the quality of a rock mass. RQD is computed from recovered core samples. |
| $\gamma_T$ | - | total soil weight |
| $\gamma_B$ | - | buoyant soil weight |

**Description of Proportions:**

0 to 5% TRACE
5 to 12% SOME
12 to 35% "Y"
35+% AND

***REFUSAL:*** **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

***REFUSAL:*** **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone *of* the bedrock.