

Geotechnical  
of Massachusetts, Inc.



Consultants  
(617) 685-4800


REPORT  
OF  
SITE ASSESSMENT

FAY STREET PROPERTY  
LOWELL, MA

FOR

MERRIMACK VALLEY HOUSING PARTNERSHIP  
P.O. BOX 2258 HIGHLANDS STATION  
LOWELL, MA

BY:

  
SAMUEL A. FUSCO, P.E.

DATE: 5 February 1988

## INVESTIGATION REPORT FOR

### SITE CERTIFICATION RELATIVE TO HAZARDOUS MATERIALS

#### I. SITE OWNERSHIP AND LOCATION

1. Site Owner: NAME: City of Lowell  
ADDRESS: 375 Merrimac Street  
Lowell, MA  
TEL. NO: 454-8821, City Hall  
DATE OF OWNERSHIP: 1950 TO Present
2. Site Location: ADDRESS: Off Fay Street  
Lowell, MA  
(Lots 95, 86, 10, 60)  
COUNTY: Middlesex  
ASSESSOR'S PLAT: 187 & 207 LOT 95, 86, 10, 60.  
USGS QUADRANGLE: Billerica  
(attach locus plan from USGS map)

#### II. SITE DESCRIPTION AND ENVIRONMENTAL CHARACTERISTICS

1. Brief Description of Subject Site: (Describe site in terms of existing conditions, including topography; grassy or wooded areas; built-up areas; ponds or streams; marshes or swamps; floodplain information; other site-specific features of note).

The site in question is located east of Fay Street in Lowell, MA, and is bounded by open lot and a school to the north, Lunberg Street to the south, B&M tracks to the east and residential homes to the west. Records indicate the site has never been developed. Two (2) paper streets, Fay Street and Florence Lane, pass through the parcel. The western half of the lot is generally flat and at the same grade as land to the west. The topography in the eastern half of the lot slopes downward approximately 10' to the railroad tracks. Presently, the lot consists of woods and open fields. Extensive filling with an ash and cinder fill occurred around the turn of the century. Generally 8-15' of this fill is encountered across the site. The site has no ponds, streams or wetlands and the area is not considered a floodplain.



2. Site Layout Information (see attached site plan prepared from existing maps):

- approximate property boundaries;  
See attached location plan.
- building and parking area location  
None.
- site utilities;  
None. (open lot).
- ponds and floodplains;  
None. (Firm Map 250201-0010-B).
- fencing;  
Chainlink fencing in two locations as shown on attached plan.
- streams;  
None.
- marshes or swamps;  
None.
- wells;  
None.
- easements;  
None.
- power lines; etc.  
Overhead power along Porter Street. No transformers noted.

3. Site-Specific Waste/Wastewater Information (see attached site plan showing known or suspected waste/wastewater conveyance, storage or disposal areas):

- catch basins;  
None.
- septic tanks/leaching fields;  
None.
- sanitary sewers;  
Sanitary sewer for the City of Lowell runs along Porter Street.
- underground oil tanks;  
None.
- lagoons;  
None.
- pits;  
None.
- drainage lines;  
None.







- sumps;  
None.
- ditches;  
None.
- other; This site was apparently used as an ash dump. The fill consists of ash and cinders with traces of glass and metal mixed in. The northeast corner of the property also has railroad ties on the surface placed there by the railroad.

4. Environmental Characteristics Relative to Hazardous Materials (see attached site plan):

- topography and surface water drainage patterns;  
The western half of the property has a slight grade to the northeast. The eastern half rapidly slopes downward to reach a low area along the railroad tracks. Surface water that does not infiltrate runs off in a easterly direction.
- soil types and permeabilities;  
Permeabilities vary across the site depending on the nature of the cinder and ash fill, but generally are moderate.
- surficial and bedrock geology;  
Surficial - Recent fill followed by fine glacial outwash sands and silts.  
Bedrock - Bedrock is found at depth.
- depth to groundwater;  
Variable, 5 to 15' below grade.
- groundwater flow direction;  
Northeasterly.
- ponds, streams, wetlands and floodplains;  
No ponds, streams wetlands or floodplains exist at this site.
- on-site and other drinking water supplies (surface or underground) within 1,000 feet of the site;  
None.  
The City of Lowell draws its water from the Merrimack River.
- condition of vegetation;  
In several locations, the trees on site have been damaged by fire; otherwise no apparent stress is noted.
- other;  
None.

### III. SITE HISTORY AND USE

#### 1. ZONING:

##### Present classification and dates:

\*1966 -- Present TF

Two Family Residential

##### Prior classification and dates:

\*Inception of zoning was in 1966.

#### 2. Current Uses of Sites:

Industrial \_\_\_\_\_

Commercial \_\_\_\_\_

Agricultural \_\_\_\_\_

Residential \_\_\_\_\_

Other   x  

#### 3. Brief Description of Current uses: (describe current use in terms of products made, materials used; wastes generated; etc.):

The lot is open and vacant with various stages of grass, weed and tree growth. There are no products made, materials used or wastes generated. The site does contain various amounts of ash fill and other assorted debris at the surface.

#### 4. Brief Description of Former Uses of Site: (describe prior uses, giving dates of such use and other information relative to waste generation and disposal):

Records indicate that this site has remained undeveloped. The site was used as an ash and cinder dump in the late 1800's or early 1900's. The fill is almost entirely composed of ash and cinders from coal and wood burning with a trace of glass and metal mixed in. The City of Lowell maintains that this area was not the "City Dump" but simply a low area filled with cinder and ash from homes near the site. They mentioned this type of dump is common and many are found throughout Lowell. The northeast corner of the property has railroad ties on the surface.



5. Current and Former Uses of Surrounding Properties:

Current Use:

- To the North - Open land owned by the City of Lowell. Further northward is the Shawnassy School which has (1) one 10,000 gallon underground tank for fuel oil. The fire department did not have any records for this tank. The school was built in 1955.
- To the West - Residential homes along Fay Street
- To the South - Residential homes along Lunberg Street.
- To the East - Boston & Main Railroad. These are heavily used tracks for both freight and commuter trains. B&M Railroad was contacted regarding any spills or derailments in this area. They informed me there has never been any spills or derailments in this area. The Health Department in Lowell was contacted on this matter and they supported B&M's statement. Spot oil and grease staining was noted during inspection along the tracks.

Former Uses:

- To the North - Open land prior to 1955. This area may also have been used as an ash dump in the early 1900's.
- To the South and West - Open land prior to development for housing in the early 1900's.
- To the East - Open land prior to development for the railroad in the late 1800's.

6. List of Environmental Permits Held by Current and Former Site Owners:

None on Record.

7. Summary of Prior Citations or Fines for Violations of Environmental Regulations:

Local residents voiced concern over the possible existence of hazardous materials at this site. No citations or fines issued.

IV. SUMMARY OF SITE INSPECTION AND INVESTIGATIONS

1. Persons Interviewed Relative to Site History and Use:

City of Lowell - Assessor's Office - 454-8821.  
- Engineering Dept. - 454-8821.  
- Water Department - 452-2012.  
- Public Works - 454-8821.  
- Health Department, Mr. Demaris - 454-9159.  
- Fire Dept., Joe Sheehy - 458-4588.  
- Building Department - 454-8821.

William Marotta, MVHP - 459-8490.

Father Finn, MVHP

Shawnassy School, Linda Lee - 832-1657.

B&M Railroad, Dave Pottle (Engineering) - 663-6967.

DEQE, Woburn - 935-2160





2. Surface Soil and Sediment Sampling Locations, Methods and Analytical Results (attach site plan):

- surface soils  
See test pit logs and location plan.
- sediments  
None.
- test pit locations and logs (if any)  
See attached test pit logs and location plan.
- analytical results  
See HNU Results.
- interpretation of results  
See conclusions.

3. Surface Water Sampling Locations and Analytical Results (attach site plan):

- ponds or lagoons  
None.
- streams  
None.
- springs or leachate breakouts on slopes  
None.
- analytical results  
None.
- interpretation or results  
None.

4. Subsurface Soil and Groundwater Sampling, Locations and Analytical Results (attach site plan):

- boring locations and logs  
See attached plan and logs.
- monitoring well locations, elevations and logs  
See attached logs and plan.
- subsurface soil sample depths  
See attached boring logs.
- groundwater flow rates and directions  
Northeasterly, determined through examination of topo sheets.
- analytical results and interpretation  
See HNU results, attached LHB reports and conclusions.



5. Other Sampling Locations and Analytical Results:

- underground tanks  
None.
- discharge lines  
None.
- lagoons and pits  
None.
- analytical results and interpretation  
None.

6. Results of other Geophysical Investigations Conducted (if any):

- magnetometer survey  
None.
- seismic survey  
None.
- electrical resistivity survey  
None.

V. CONCLUSIONS

1. Identification of Persons Conducting the Site Inspection and Investigation:

<u>NAMES</u>	<u>ADDRESS OR AFFILIATION</u>	<u>QUALIFICATIONS</u>
Samuel A. Fusco, P.E	President of Geotechnical Consultants of MA, Inc.	
	BSCE and MSCE specializing in Soils Engineering	
	Registered Professional Engineer - MAPE #24019	



2. Conclusions of the Inspection and Investigation (including any limitations thereto):

Based on the results of our visual reconnaissance, interviews, research, borings, test pits and laboratory testing, we conclude that there is evidence of minor contamination at this site. The testing showed very low levels of petroleum hydrocarbon in the soil and water. Local occurrences of contaminated fill materials with metals or petroleum hydrocarbon may occur and should be monitored if any excavation is planned for the property.

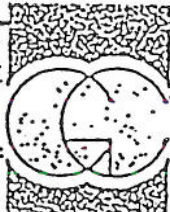
Should subsequent additional information become available, this conclusion may require modification.





# Geotechnical

of Massachusetts, Inc.



# Consultants

(617) 685-4800

PROJECT MVHP 21E, FAY ST., LOWELL  
BY M. Lehtinen

DATE 1-27-88

SHEET 1 OF 2

JOB NO. \_\_\_\_\_

SCALE None

## ORGANIC VAPOR ANALYZER RESULTS

(HNU MODEL #. PI-101 - @.10.2 ev)

DATE COLLECTED: 1/20/88 - 1/21/88 DATE TESTED: 1/25/88 SAMPLE TEMP: 70°F

SAMPLE LOCATION	SAMPLE DEPTH	SAMPLE TYPE	SCALE			COMMENT
			0-20	0-200	0-2000	
MW-1	0'-1'	Soil	ND			
	1'-2'	Soil	ND			
	5'-6'6"	Soil	ND			
	10'-11'6"	Soil	ND			
	15'-16'6"	Soil	1 ppm			
	20'-21'6"	Soil	1 ppm			
MW-2	0-1'	Soil	ND			
	5'-6'6"	Soil	1 ppm			
	10'-11'6"	Soil	1 ppm			
MW-3	0-1"	Soil	ND			
	5'-6'6"	Soil	ND			
	10'-11'6"	Soil	ND			
	15'-16'6"	Soil	ND			
	20'-21'6"	Soil	ND			
MW-4	1-1'	Soil	ND			
	5'-6'6"	Soil	ND			
	10'-11'6"	Soil	2 ppm			
	15'-16'6"	Soil	1 ppm			
	20'-21'6"	Soil	ND			

NOTE: All samples tested in a controlled environment via mason jar sealed with teflon bladder.



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PROJECT MVHP 21E; Fay St., Lowell  
BY M. Lehtinen

DATE 1/27/87

SHEET 2 OF 2

JOB NO.

SCALE None

ORGANIC VAPOR ANALYZER RESULTS

(HNU MODEL # PI-101 - @ 10.2 ev)

DATE COLLECTED: DATE TESTED: SAMPLE TEMP:

SAMPLE LOCATION	SAMPLE DEPTH	SAMPLE TYPE	SCALE			COMMENT
			0-20	0-200	0-2000	
MW-5	0-1'	Soil	ND			
	5'-6'6"	Soil	ND			
	10'-11'6"	Soil	2 ppm			
	15'-16'6"	Soil	ND			
	20'-21'6"	Soil	1 ppm			
MW-6	0-1'	Soil	ND			
	5'-6'6"	Soil	ND			
	10'-11'6"	Soil	ND			
TP-2	2'-3'	Soil	ND			
TP-4	4'	Soil	ND			
TP-5	3'6"	Soil	ND			
TP-7	3'-4'	Soil	ND			

NOTE: All samples tested in a controlled environment via mason jar sealed with teflon bladder.





*The Commonwealth of Massachusetts*  
*Department of Environmental Quality Engineering*  
*Lawrence Experiment Station*

*37 Phalluck Street, Lawrence, Massachusetts 01843*

CERTIFICATION FOR CHEMICAL ANALYSIS OF WATERS

LABORATORY: New England Chroma-Chem Co.  
28 Goodhue Street  
Salem, MA 01970

DATE: 07/01/87

EXPIRATION DATE: 03/15/88

DIRECTOR: Bruce Bornstein

PRIMARY PARAMETERS AND CATEGORIES (DRINKING WATERS)

FULL CERTIFICATION: Trihalomethanes, Volatile Organics

PROVISIONAL CERTIFICATION: Trace Metals

SECONDARY PARAMETERS AND CATEGORIES

FULL CERTIFICATION: Volatile Halocarbons, Volatile Aromatics

PROVISIONAL CERTIFICATION: Metals

Massachusetts Department of Environmental Quality Engineering will accept results from all parameters and categories listed above.

This certificate supercedes all previous certificates issued to this laboratory. Reporting of analyses other than those authorized above shall be cause for revocation of certification.

Original Certificate, not copies, must be displayed in a prominent place at all times. Certification subject to approval by OGC.

*Joseph E. O'Brien*  
Joseph E. O'Brien, Ph.D.  
Director, Laboratory Certification  
For the Commissioner

100<sup>th</sup> Anniversary  
1887 ————— 1987







NEW ENGLAND CHROMACHEM  
28 GOODHUE STREET  
SALEM, MA 01970  
617-744-6600

EPA 624 PURGEABLES  
CLIENT: GEOTECHNICAL CONSULTANTS  
SAMPLE ID: NEC # 801090  
CLIENT ID: # FAY ST. LOWELL MW-1 WATER SAMPLE  
SAMPLE RECEIVED: 01/25/88  
SAMPLE ANALYZED: 01/25/88

PARAMETER	RESULTS (UG/L)
BENZENE	ND
BROMODICHLOROMETHANE	ND
BROMOFORM	ND
BROMOMETHANE	ND
CARBON TETRACHLORIDE	ND
CHLOROBENZENE	ND
CHLORETHANE	ND
2-CHLOROETHYLVINYL ETHER	ND
CHLOROFORM	ND
DIBROMOCHLOROMETHANE	ND
1, 2-DICHLOROBENZENE	ND
1, 3-DICHLOROBENZENE	ND
1, 4-DICHLOROBENZENE	ND
1, 1-DICHLOROETHANE	ND
1, 2-DICHLOROETHANE	ND
1, 1-DICHLOROETHENE	ND
TRANS-1, 2-DICHLORETHENE	ND
1, 2-DICHLOROPROPANE	ND
CIS-1, 3-DICHLOROPROPENE	ND
TRANS-1, 3-DICHLOROPROPENE	ND
ETHYLBENZENE	ND
METHYLENE CHLORIDE	ND
1, 1, 2, 2-TETRACHLOROETHANE	ND
TETRACHLOROETHENE	ND
TOLUENE	ND
1, 1, 1-TRICHLOROETHANE	ND
1, 1, 2-TRICHLOROETHANE	ND
TRICHLOROETHENE	ND
TRICHLOROFLUOROMETHANE	ND
VINYL CHLORIDE	ND
TOTAL XYLENES	ND

RECOVERIES OF INTERNAL STANDARDS	%
BROMOCHLOROMETHANE	105
2-BROMO-1-CHLOROPROPANE	92
1, 4-DICHLOROBUTANE	99

METHOD DETECTION LIMIT = 1 UG/L

01/26/88  
DATE

  
LABORATORY DIRECTOR

NEW ENGLAND CHROMACHEM  
28 GOODHUE STREET  
SALEM, MA 01970  
617-744-6600

EPA 624 PURGEABLES  
CLIENT: GEOTECHNICAL CONSULTANTS  
SAMPLE ID: NEC # 801091  
CLIENT ID: # FAY ST. LOWELL MW-2 WATER SAMPLE  
SAMPLE RECEIVED: 01/25/88  
SAMPLE ANALYZED: 01/25/88

PARAMETER	RESULTS (UG/L)
BENZENE	ND
BROMODICHLOROMETHANE	ND
BROMOFORM	ND
BROMOMETHANE	ND
CARBON TETRACHLORIDE	ND
CHLOROBENZENE	ND
CHLORETHANE	ND
2-CHLOROETHYLVINYL ETHER	ND
CHLOROFORM	ND
DIBROMOCHLOROMETHANE	ND
1, 2-DICHLOROBENZENE	ND
1, 3-DICHLOROBENZENE	ND
1, 4-DICHLOROBENZENE	ND
1, 1-DICHLOROETHANE	ND
1, 2-DICHLOROETHANE	ND
1, 1-DICHLOROETHENE	ND
TRANS-1, 2-DICHLORETHENE	ND
1, 2-DICHLOROPROPANE	ND
CIS-1, 3-DICHLOROPROPENE	ND
TRANS-1, 3-DICHLOROPROPENE	ND
ETHYLBENZENE	ND
METHYLENE CHLORIDE	ND
1, 1, 2, 2-TETRACHLOROETHANE	ND
TETRACHLOROETHENE	ND
TOLUENE	ND
1, 1, 1-TRICHLOROETHANE	ND
1, 1, 2-TRICHLOROETHANE	ND
TRICHLOROETHENE	ND
TRICHLOROFLUOROMETHANE	ND
VINYL CHLORIDE	ND
TOTAL XYLENES	ND

RECOVERIES OF INTERNAL STANDARDS	%
BROMOCHLOROMETHANE	95
2-BROMO-1-CHLOROPROPANE	103
1, 4-DICHLOROBUTANE	106

METHOD DETECTION LIMIT = 1 UG/L

\*THIS SAMPLE SHOWS A SLIGHT PETROLEUM HYDROCARBON CONTAMINATION\*

01/26/88  
DATE

*Bruce A. Bont*  
LABORATORY DIRECTOR

NEW ENGLAND CHROMACHEM  
28 GOODHUE STREET  
SALEM, MA 01970  
617-744-6600

CLIENT: GEOTECHNICAL CONSULTANTS

SAMPLE RECEIVED: 01/25/88

SAMPLE ANALYZED: 01/25/88

NEC  
ID#

CLIENT  
ID

PARAMETER

PET HC (MG/L)

801092

FAY STREET LOWELL MW-3

TRACE

\* THIS IS A WATER SAMPLE

D. L. = 10 MG/L

01/26/88  
DATE

*Bruce A. Bont*  
LABORATORY DIRECTOR

NEW ENGLAND CHROMACHEM  
28 GOODHUE STREET  
SALEM, MA 01970  
617-744-6600

CLIENT: GEOTECHNICAL CONSULTANTS

LABORATORY REPORT  
~~~~~

| PARAMETER        | SAMPLE DESCRIPTION                         |
|------------------|--------------------------------------------|
| RCRA METALS      | 801093<br>FAY ST. LOWELL MW-5 WATER SAMPLE |
| Ag (mg/L)        | < 0.01                                     |
| As (mg/L)        | < 0.01                                     |
| Ba (mg/L)        | < 1.0                                      |
| Cd (mg/L)        | < 0.005                                    |
| Cr-T (mg/L)      | < 0.01                                     |
| Hg (mg/L)        | < 0.002                                    |
| Pb (mg/L)        | < 0.05                                     |
| Se (mg/L)        | < 0.005                                    |
| Sampled by:      | Client                                     |
| Sample R'cd:     | 01/25/88                                   |
| Sample Analyzed: | 01/26/88                                   |

01/26/88  
DATE

*Bar A. Bond*  
LABORATORY DIRECTOR





*The Commonwealth of Massachusetts*  
*Department of Environmental Quality Engineering*  
*Lawrence Experiment Station*

*37 Phalluck Street, Lawrence, Massachusetts 01843*  
CERTIFICATION FOR CHEMICAL ANALYSIS OF WATERS

LABORATORY: Waterworks Lab  
59 Main Street  
Leominster, MA 01453

DATE: 07/01/87

EXPIRATION DATE: 03/15/88

DIRECTOR: Eric Koslowski

PRIMARY PARAMETERS AND CATEGORIES (DRINKING WATERS)

FULL CERTIFICATION: Trace Metals

PROVISIONAL CERTIFICATION: Fluoride

SECONDARY PARAMETERS AND CATEGORIES

FULL CERTIFICATION: Volatile Halocarbons, Volatile Aromatics

PROVISIONAL CERTIFICATION: None at Present

Massachusetts Department of Environmental Quality Engineering will accept results from all parameters and categories listed above.

This certificate supercedes all previous certificates issued to this laboratory. Reporting of analyses other than those authorized above shall be cause for revocation of certification.

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*Joseph E. O'Brien*  
Joseph E. O'Brien, Ph.D.  
Director, Laboratory Certification  
For the Commissioner

100<sup>th</sup> Anniversary  
1887 ————— 1987

## CHAIN OF CUSTODY RECORD

PROJECT NAME MYHP 2IE FAY ST.

Lowell Ma

is 02215

[illegible]

SAMPLED BY (SIGN)

W. Schumacher

|                                                                                              |                                                        |                                                   |                                                     |                                                     |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| RELINQUISHED BY (SIGN)<br>① <u><i>Mr. [Signature]</i></u><br>DATE/TIME ( / / )               | RELINQUISHED BY (SIGN)<br>② _____<br>DATE/TIME ( / / ) | RELINQUISHED BY (SIGN)<br>_____ DATE/TIME ( / / ) | RELINQUISHED BY (SIGN)<br>④ _____ DATE/TIME ( / / ) | RELINQUISHED BY (SIGN)<br>⑤ _____ DATE/TIME ( / / ) |
| RECEIVED BY (SIGN)<br>① <u><i>Diana Fite</i></u><br>DATE/TIME ( / / ) <u><i>1/26/4pm</i></u> | RECEIVED BY (SIGN)<br>② _____ DATE/TIME ( / / )        | RECEIVED BY (SIGN)<br>③ _____ DATE/TIME ( / / )   | RECEIVED BY (SIGN)<br>④ _____ DATE/TIME ( / / )     | RECEIVED BY (SIGN)<br>⑤ _____ DATE/TIME ( / / )     |

METHOD OF SHIPMENT

SHIPPED BY (SIGN)

*M. L. Latham*

RECEIVED FOR LABORATORY BY (SIGN)

Dear Fife

DATE/TIME

1/25, 46

LEGEND: Original: Return to Sample Traffic Control Center  
Copies: Ship with Sample





# The Water Works Laboratories

of MASSACHUSETTS, INC.

59 Main St.

• Leominster, Massachusetts 01453

• (617) 534-1444

• 800-LAB-0094  
(in Mass.)

## EPA Method 625

### Base/Neutral and Acid Extractables

Client Name: Geotechnical Consultants of Mass. - 799 Tnpk. St. N. Andover, Ma.  
Client ID #: Fay St. Lowell, Ma. - MW 5

WWL ID #: 7992

Matrix: Water

Sampled: Same

Received: Jan 28, 1988

Authorized:

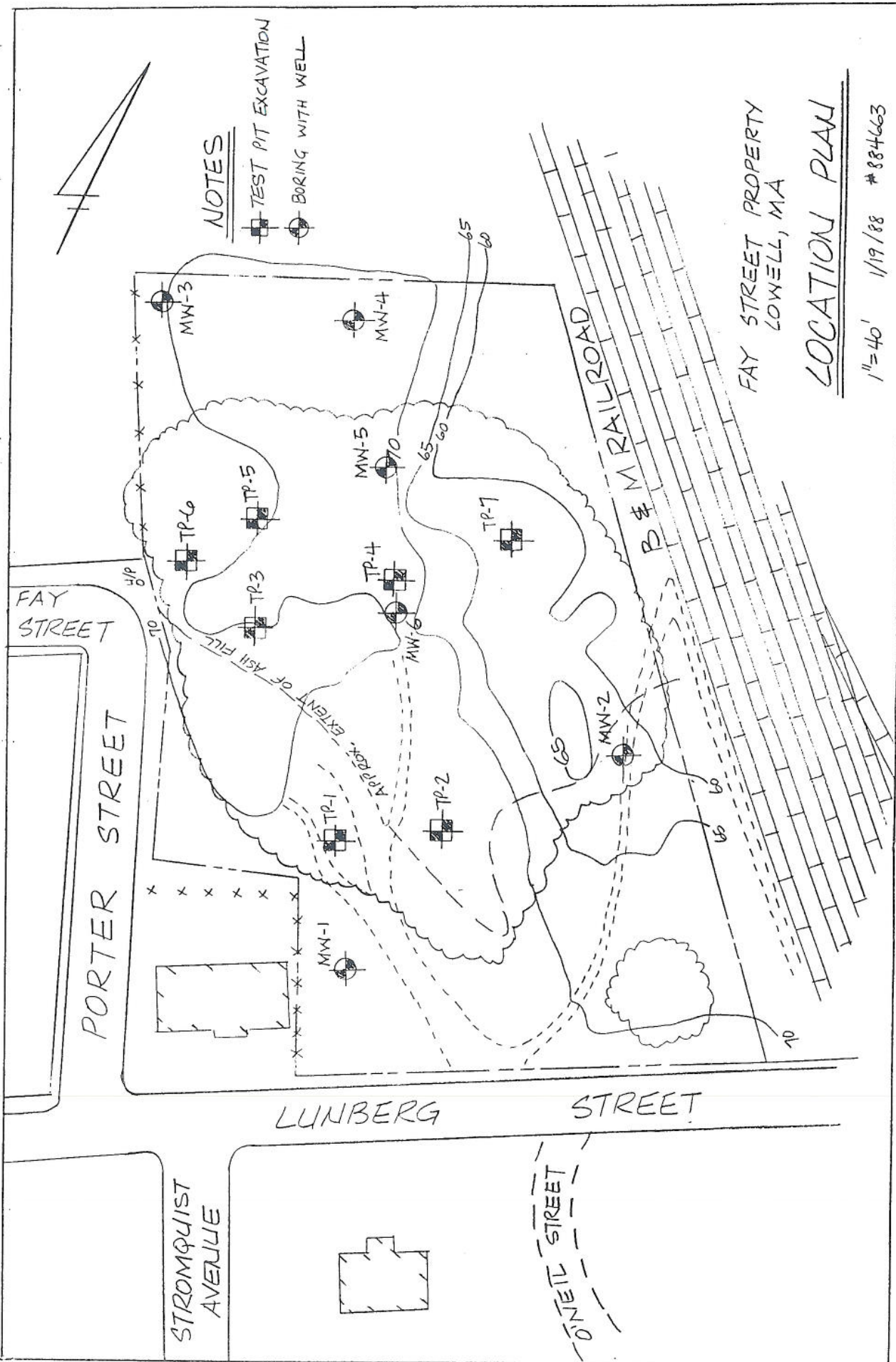
Prepared: Feb 2, 1988

Analyzed: Eric J. Koslowski

| Parameter               | Result | Parameter              | Result |
|-------------------------|--------|------------------------|--------|
| Acenaphthene            | ND     | Acenaphthylene         | ND     |
| Anthracene              | ND     | Benzo(a)fluoranthene   | ND     |
| Benzo(b)fluoranthene    | ND     | Benzo(a)pyrene         | ND     |
| Benzo(ghi)perylene      | ND     | Benzyl butyl phthalate | ND     |
| Bis(2-chloroethyl)ether | ND     | Bis(2-chloroethoxy)    |        |
| Bis(2-ethylhexyl)       |        | methane                | ND     |
| phthalate               | ND     | Bis(2-chloroisopropyl) |        |
|                         |        | ether                  | ND     |
| 4-Bromophenyl phenyl    |        | 2-Chloronaphthalene    | ND     |
| ether                   | ND     | Chrysene               | ND     |
| 1-Chlorophenyl phenyl   |        | Dibenzo [a,h]          |        |
| ether                   | ND     | anthracene             | ND     |
| Di-n-butylphthalate     | ND     | 1,3-Dichlorobenzene    | ND     |
| 1,2-Dichlorobenzene     | ND     | 1,4-Dichlorobenzene    | ND     |
| 3,3'-Dichlorobenzidine  | ND     | Diethyl phthalate      | ND     |
| Dimethyl phthalate      | ND     | 2,4-Dinitrotoluene     | ND     |
| 2,6-Dinitrotoluene      | ND     | Di-n-octylphthalate    | ND     |
| Fluoranthene            | ND     | Fluorene               | ND     |
| Fluorene                | ND     | Hexachlorobenzene      | ND     |
| Hexachlorobutadiene     | ND     | Hexachloroethane       | ND     |
| Indeno[1,2,3-cd]pyrene  | ND     | Isophorone             | ND     |
| Naphthalene             | ND     | Nitrobenzene           | ND     |
| N-Nitrosodi-n-          |        | Phenanthrene           | ND     |
| propylamine             | ND     | Pyrene                 | ND     |
| 1,2,4-Trichlorobenzene  | ND     | 4-Chloro-3-            |        |
| 2-Chlorophenol          | ND     | methylphenol           | ND     |
| 2,4-Dichlorophenol      | ND     | 2,4-Dimethylphenol     | ND     |
| 2,4-Dinitrophenol       | ND     | 2-Methyl-4,6-          |        |
| 2-Nitrophenol           | ND     | dinitrophenol          | ND     |
| 4-Nitrophenol           | ND     | Pentachlorophenol      | ND     |
| Phenol                  | ND     | 2,4,6-Trichlorophenol  | ND     |
| Benzidine               | ND     |                        |        |

Method 625 is performed with a Tracor Model 800 GC/Mass Spectrometer.  
The detection limit is approximately 10 milligrams per liter.





NOTES

- TEST PIT EXCAVATION
- BORING WITH WELL

FAY STREET PROPERTY  
LOWELL, MA

LOCATION PLAN

1" = 40' 1/19/88 #884663







148 Pioneer Dr.  
Leominster, MA 01453  
(617) 840-0391

# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

23 Ingalls St.  
Nashua, NH 03060  
(603) 882-3601

|                                                         |      |              |  |                      |          |                        |          |
|---------------------------------------------------------|------|--------------|--|----------------------|----------|------------------------|----------|
| Client <b>GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS</b> |      |              |  | Date <b>01/22/88</b> |          | Job No. <b>88-049</b>  |          |
| Location <b>FAY STREET, LOWELL, MASSACHUSETTS</b>       |      |              |  |                      |          |                        |          |
| BORING NO.                                              | MW-1 | Ground Elev. |  | Date Start           | 01/20/88 | Date Complete          | 01/20/88 |
|                                                         |      |              |  | Drilling Foreman     | P.N.     | Eng./Hydrol. Geologist | M.L.     |

| DEPTH | Sample Data |               |                          |                | Soil and/or bedrock strata descriptions |                                                                  |
|-------|-------------|---------------|--------------------------|----------------|-----------------------------------------|------------------------------------------------------------------|
|       | Sample      |               | Blows<br>6" Penetration  | Rec.<br>Inches | Casing<br>Blows<br>Per ft.              | Strata<br>Change<br>Depth                                        |
|       | No.         | Depth (ft.)   |                          |                |                                         |                                                                  |
|       | 1           | 0'0" - 1'0"   | sample taken from flight |                |                                         |                                                                  |
|       | 2           | 1'0" - 2'0"   | sample taken from flight |                |                                         | 1'0"                                                             |
|       |             |               |                          |                |                                         | 2'0"                                                             |
| 5     | 3           | 5'0" - 6'6"   | 4-5-5                    |                |                                         | Loose, dry to wet, very fine SAND, trace to some inorganic silt. |
|       |             |               |                          |                |                                         |                                                                  |
| 10    | 4           | 10'0" - 11'6" | 4-6-5                    |                |                                         |                                                                  |
|       |             |               |                          |                |                                         |                                                                  |
| 15    | 5           | 15'0" - 16'6" | 5-5-5                    |                |                                         |                                                                  |
|       |             |               |                          |                |                                         |                                                                  |
| 20    | 6           | 20'0" - 21'6" | 3-3-3                    |                |                                         |                                                                  |
|       |             |               |                          |                |                                         |                                                                  |
| 25    |             |               |                          |                |                                         | 21'6"                                                            |
|       |             |               |                          |                |                                         | End of boring at 21'6"                                           |
|       |             |               |                          |                |                                         | Set well point at 20'0"                                          |
|       |             |               |                          |                |                                         | Water level at 15'0" upon completion                             |
| 30    |             |               |                          |                |                                         | Well Materials;                                                  |
|       |             |               |                          |                |                                         | 1 - 2" PVC end plug                                              |
|       |             |               |                          |                |                                         | 1 - 10' x 2" PVC screen                                          |
|       |             |               |                          |                |                                         | 1 - 10' x 2" PVC riser                                           |
|       |             |               |                          |                |                                         | 1 - buffalo box                                                  |
|       |             |               |                          |                |                                         | 1 bag - sakrete sand                                             |
|       |             |               |                          |                |                                         | 2 bags - silica sand                                             |
| 35    |             |               |                          |                |                                         | 1/2 pail - bentonite pellets                                     |
|       |             |               |                          |                |                                         |                                                                  |
| 40    |             |               |                          |                |                                         |                                                                  |
|       |             |               |                          |                |                                         |                                                                  |

|                |              |                         |        |
|----------------|--------------|-------------------------|--------|
| Type of Boring | Casing Size: | Hollow Stem Auger Size: | 4 1/4" |
|----------------|--------------|-------------------------|--------|

|                                                                                                                                                                          |                                                                                                                                                    |                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proportion Percentages</b><br>Trace 0 to 10%<br>Some 10 to 40%<br>And 40 to 50%                                                                                       | <b>Granular Soils (blows per ft.)</b><br>0 to 4 Very Loose      30 to 50 Dense<br>4 to 10 Loose        Over 50 Very Dense<br>10 to 30 Medium Dense | <b>Cohesive Soils (blows per ft.)</b><br>0 to 2 Very Soft      8 to 15 Stiff<br>2 to 4 Soft            15 to 30 Very Stiff<br>4 to 8 Medium Stiff   Over 30 Hard |
| Standard penetration test (SPT) = 140# hammer falling 30"<br>Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted. |                                                                                                                                                    |                                                                                                                                                                  |

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■



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(617) 840-0391

# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

23 Ingalls St.  
Nashua, NH 03060  
(603) 882-3601

Client **GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS** Date **01/22/88** Job No. **88-049**

Location **FAY STREET, LOWELL, MASSACHUSETTS**

BORING NO. **MW-2** Ground Elev.  Date Start **01/20/88** Date Complete **01/20/88** Drilling Foreman **P.N.** Eng./Hydrol. Geologist **M.L.**

| DEPTH | Sample Data |              |                             |                |                            | Soil and/or bedrock strata descriptions |                                                                                                                                                                                                                                                                       |
|-------|-------------|--------------|-----------------------------|----------------|----------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | Sample      |              | Blows<br>6" Penetration     | Rec.<br>Inches | Casing<br>Blows<br>Per ft. | Strata<br>Change<br>Depth               | Visual Identification of Soil and/or Rock Strata                                                                                                                                                                                                                      |
|       | No.         | Depth (ft.)  |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 5     | 1           | 0'0"- 1'0"   | sample taken<br>from flight |                |                            |                                         | Dry, moist to wet, very fine SAND,<br>some inorganic silt.                                                                                                                                                                                                            |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 10    | 2           | 5'0"- 6'6"   | 4-6-4                       |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 15    | 3           | 10'0"- 11'6" | 4-3-3                       |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 20    |             |              |                             |                |                            | 12'0"                                   | End of boring at 12'0"<br>Set well point at 12'0"<br>Water level at 6'0" upon completion<br><br>Well Materials;<br>1 - 2" PVC end plug<br>1 - 10' x 2" PVC screen<br>1 - 5' x 2" PVC riser<br>1 - buffalo box<br>2 bags - silica sand<br>1/2 pail - bentonite pellets |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 25    |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 30    |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 35    |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
| 40    |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |
|       |             |              |                             |                |                            |                                         |                                                                                                                                                                                                                                                                       |

Type of Boring  Casing Size:  Hollow Stem Auger Size: **4 1/2**

## Proportion Percentages

Trace 0 to 10%  
Some 10 to 40%  
And 40 to 50%

## Granular Soils (blows per ft.)

0 to 4 Very Loose      30 to 50 Dense  
4 to 10 Loose      Over 50 Very Dense  
10 to 30 Medium Dense

## Cohesive Soils (blows per ft.)

0 to 2 Very Soft      8 to 15 Stiff  
2 to 4 Soft      15 to 30 Very Stiff  
4 to 8 Medium Stiff      Over 30 Hard

Standard penetration test (SPT) = 140# hammer falling 30"  
Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■





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|                                                         |  |              |  |                            |  |                                  |  |
|---------------------------------------------------------|--|--------------|--|----------------------------|--|----------------------------------|--|
| Client <b>GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS</b> |  |              |  | Date <b>01/22/88</b>       |  | Job No. <b>88-049</b>            |  |
| Location <b>FAY STREET, LOWELL, MASSACHUSETTS</b>       |  |              |  |                            |  |                                  |  |
| BORING NO. <b>MW-3</b>                                  |  | Ground Elev. |  | Date Start <b>01/20/88</b> |  | Date Complete <b>01/20/88</b>    |  |
|                                                         |  |              |  | Drilling Foreman           |  | P.N. Eng./Hydrol. Geologist M.L. |  |

| DEPTH | Sample Data |                    |                          |             |                      | Soil and/or bedrock strata descriptions |                                                                                          |
|-------|-------------|--------------------|--------------------------|-------------|----------------------|-----------------------------------------|------------------------------------------------------------------------------------------|
|       | No.         | Sample Depth (ft.) | Blows 6" Penetration     | Rec. Inches | Casing Blows Per ft. | Strata Change Depth                     | Visual Identification of Soil and/or Rock Strata                                         |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
| 5     | 1           | 0'0" - 1'0"        | sample taken from flight |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         | Loose, dry to wet, ash, some fine to medium sand, trace organic silt, and glass, (fill). |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
| 10    | 2           | 5'0" - 6'6"        | 2-1-3                    |             |                      |                                         | Medium dense, wet, fine SAND, trace to some inorganic silt.                              |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       | 15          | 3                  | 10'0" - 11'6"            | 1-1-5       |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
| 20    |             | 4                  | 15'0" - 16'6"            | 4-6-6       |                      |                                         | 14'0"                                                                                    |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       | 25          | 5                  | 20'0" - 21'6"            | 5-7-5       |                      |                                         | 21'6"                                                                                    |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
| 30    |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       | 35          |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
| 40    |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |
|       |             |                    |                          |             |                      |                                         |                                                                                          |

|                |              |                         |       |
|----------------|--------------|-------------------------|-------|
| Type of Boring | Casing Size: | Hollow Stem Auger Size: | 4 1/2 |
|----------------|--------------|-------------------------|-------|

|                                                                                                                                                                          |                                                                                                                                                      |                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proportion Percentages</b><br>Trace 0 to 10%<br>Some 10 to 40%<br>And 40 to 50%                                                                                       | <b>Granular Soils (blows per ft.)</b><br>0 to 4 Very Loose      30 to 50 Dense<br>4 to 10 Loose          Over 50 Very Dense<br>10 to 30 Medium Dense | <b>Cohesive Soils (blows per ft.)</b><br>0 to 2 Very Soft      8 to 15 Stiff<br>2 to 4 Soft            15 to 30 Very Stiff<br>4 to 8 Medium Stiff    Over 30 Hard |
| Standard penetration test (SPT) = 140# hammer falling 30"<br>Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted. |                                                                                                                                                      |                                                                                                                                                                   |

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■



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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|------------------|------|------------------------|------|
| Client                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS |                    |                                                                                                                                       |             | Date                 | 01/22/88                                |                                                                                                                                                  | Job No.  | 88-049 |                  |      |                        |      |
| Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FAY STREET, LOWELL, MASSACHUSETTS         |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| BORING NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MW-4                                      | Ground Elev.       |                                                                                                                                       | Date Start  | 01/20/88             |                                         | Date Complete                                                                                                                                    | 01/20/88 |        | Drilling Foreman | P.N. | Eng./Hydrol. Geologist | M.L. |
| DEPTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sample Data                               |                    |                                                                                                                                       |             |                      | Soil and/or bedrock strata descriptions |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No.                                       | Sample Depth (ft.) | Blows 6" Penetration                                                                                                                  | Rec. Inches | Casing Blows Per ft. | Strata Change Depth                     | Visual Identification of Soil and/or Rock Strata                                                                                                 |          |        |                  |      |                        |      |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                         | 0'0"- 1'0"         | sample taken from flight                                                                                                              |             |                      |                                         | Very loose, dry to wet, ash, some fine to medium sand, trace glass, (fill).                                                                      |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2                                         | 5'0"- 6'6"         | 1-1-1                                                                                                                                 |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3                                         | 10'0"- 11'6"       | 2-1-1                                                                                                                                 |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4                                         | 15'0"- 15'6"       | 1-                                                                                                                                    |             |                      | 15'6"                                   | Soft, wet organic SILT, trace fine to medium sand.                                                                                               |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4A                                        | 15'6"- 16'6"       | 2-1                                                                                                                                   |             |                      | 16'6"                                   | Loose, wet, very fine SAND, trace to some inorganic silt.                                                                                        |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         | End of boring at 21'6"<br>Water level at 13'9" upon completion                                                                                   |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5                                         | 20'0"- 21'6"       | 4-4-4                                                                                                                                 |             |                      | 21'6"                                   |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| Type of Boring    Casing Size:    Hollow Stem Auger Size:    4 1/2                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| Proportion Percentages<br>Trace 0 to 10%<br>Some 10 to 40%<br>And 40 to 50%                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |                    | Granular Soils (blows per ft.)<br>0 to 4 Very Loose    30 to 50 Dense<br>4 to 10 Loose    Over 50 Very Dense<br>10 to 30 Medium Dense |             |                      |                                         | Cohesive Soils (blows per ft.)<br>0 to 2 Very Soft    8 to 15 Stiff<br>2 to 4 Soft    15 to 30 Very Stiff<br>4 to 8 Medium Stiff    Over 30 Hard |          |        |                  |      |                        |      |
| Standard penetration test (SPT) = 140# hammer falling 30"<br>Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.                                                                                                                                                                                                                                                                                                                 |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |
| The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■ |                                           |                    |                                                                                                                                       |             |                      |                                         |                                                                                                                                                  |          |        |                  |      |                        |      |





148 Pioneer Dr.  
Leominster, MA 01453  
(617) 840-0391

# SOIL EXPLORATION CORPORATION

Geotechnical Drilling and Groundwater Monitor Wells

23 Ingalls St.  
Nashua, NH 03060  
(603) 882-3601

Client **GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS** Date **01/22/88** Job No. **88-049**  
Location **FAY STREET, LOWELL, MASSACHUSETTS**

BORING NO. **MW-5** Ground Elev.  Date Start **01/21/88** Date Complete **01/21/88** Drilling Foreman **P.N.** Eng./Hydrol. Geologist **M.L.**

| DEPTH | Sample Data |              |                          |             |                      | Soil and/or bedrock strata descriptions |                                                                                                                                                                                              |
|-------|-------------|--------------|--------------------------|-------------|----------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | No.         | Depth (ft.)  | Blows 6" Penetration     | Rec. Inches | Casing Blows Per ft. | Strata Change Depth                     | Visual Identification of Soil and/or Rock Strata                                                                                                                                             |
| 5     | 1           | 0'0"- 1'0"   | sample taken from flight |             |                      |                                         | Loose, dry, moist to wet, ash, some fine to medium sand, trace wood, and glass, (fill).                                                                                                      |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 10    | 2           | 5'0"- 6'6"   | 1-1-1                    |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 15    | 3           | 10'0"- 11'6" | 6-5-5                    |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 20    | 4           | 15'0"- 16'0" | 3-2-                     |             |                      | 15'0"                                   | Medium stiff, wet, organic SILT, some fine sand.                                                                                                                                             |
|       | 4A          | 16'0"- 16'6" | 5                        |             |                      | 16'0"                                   | Medium dense, wet, very fine SAND, trace to some inorganic silt.                                                                                                                             |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 25    | 5           | 20'0"- 21'6" | 4-7-7                    |             |                      | 21'6"                                   | End of boring at 21'6"<br>Set well point at 20'0"<br>Water level at 15'1" upon completion                                                                                                    |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 30    |             |              |                          |             |                      |                                         | Well Materials;<br>1 - 2" PVC end plug<br>1 - 10' x 2" PVC screen<br>1 - 10' x 2" PVC riser<br>1 - buffalo box<br>1 bag - sakrete sand<br>2 bags - silica sand<br>½ pail - bentonite pellets |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 35    |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
| 40    |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |
|       |             |              |                          |             |                      |                                         |                                                                                                                                                                                              |

Type of Boring Casing Size: Hollow Stem Auger Size: 4 1/4

## Proportion Percentages

Trace 0 to 10%  
Some 10 to 40%  
And 40 to 50%

## Granular Soils (blows per ft.)

0 to 4 Very Loose 30 to 50 Dense  
4 to 10 Loose Over 50 Very Dense  
10 to 30 Medium Dense

## Cohesive Soils (blows per ft.)

0 to 2 Very Soft 8 to 15 Stiff  
2 to 4 Soft 15 to 30 Very Stiff  
4 to 8 Medium Stiff Over 30 Hard

Standard penetration test (SPT) = 140# hammer falling 30"

Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■





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# SOIL EXPLORATION CORPORATION

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------|--------------------------------|-------------|----------------------|-----------------------------------------|--------------------------------------------------------------------------|---------|------------------------|------|
| Client                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GEOTECHNICAL CONSULTANTS OF MASSACHUSETTS |              |                                |             | Date                 | 01/22/88                                |                                                                          | Job No. | -88-049                |      |
| Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FAY STREET, LOWELL, MASSACHUSETTS         |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| BORING NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MW-6                                      | Ground Elev. | Date Start                     | 01/21/88    | Date Complete        | 01/21/88                                | Drilling Foreman                                                         | P.N.    | Eng./Hydrol. Geologist | M.L. |
| DEPTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sample Data                               |              |                                |             |                      | Soil and/or bedrock strata descriptions |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No.                                       | Depth (ft.)  | Blows 6" Penetration           | Rec. Inches | Casing Blows Per ft. | Strata Change Depth                     | Visual Identification of Soil and/or Rock Strata                         |         |                        |      |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                         | 0'0"- 1'0"   | sample taken from flight       |             |                      |                                         | Loose, dry to moist, ash, some fine to medium sand, trace glass, (fill). |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2                                         | 5'0"- 6'6"   | 2-1-2                          |             |                      |                                         |                                                                          |         |                        |      |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3                                         | 10'0"- 11'6" | 2-2-4                          |             |                      | 8'0"                                    | Loose, moist, very fine SAND, trace to some inorganic silt.              |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      | 11'6"                                   | End of boring at 11'6"<br>No water encountered upon completion           |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| Type of Boring Casing Size: Hollow Stem Auger Size: 4 1/2                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| Proportion Percentages                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |              | Granular Soils (blows per ft.) |             |                      |                                         | Cohesive Soils (blows per ft.)                                           |         |                        |      |
| Trace 0 to 10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |              | 0 to 4 Very Loose              |             |                      |                                         | 0 to 2 Very Soft                                                         |         |                        |      |
| Some 10 to 40%                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |              | 4 to 10 Loose                  |             |                      |                                         | 8 to 15 Stiff                                                            |         |                        |      |
| And 40 to 50%                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |              | 10 to 30 Medium Dense          |             |                      |                                         | 2 to 4 Soft                                                              |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         | 15 to 30 Very Stiff                                                      |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         | 4 to 8 Medium Stiff                                                      |         |                        |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |              |                                |             |                      |                                         | Over 30 Hard                                                             |         |                        |      |
| Standard penetration test (SPT) = 140# hammer falling 30"                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.                                                                                                                                                                                                                                                                                                                                                                              |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |
| The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■ |                                           |              |                                |             |                      |                                         |                                                                          |         |                        |      |

# REPORT OF TEST PIT TP-1

PROJECT: FAY STREET PROPERTY, LOWELL, MA

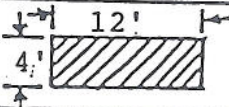
CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                        | REMARKS |
|----------------|--------|-------|----------------|------------------------------------|---------|
|                | NO.    | DEPTH |                |                                    |         |
| 1              |        |       |                | TOPSOIL, sandy loam                |         |
| 2              |        |       | 1.5            | Light brown fine SAND, little silt |         |
| 3              |        |       |                |                                    |         |
| 4              |        |       |                |                                    |         |
| 5              |        |       |                |                                    |         |
| 6              |        |       |                |                                    |         |
| 7              |        |       |                |                                    |         |
| 8              |        |       |                |                                    |         |
| 9              |        |       |                |                                    |         |
| 10             |        |       |                |                                    |         |
| 11             |        |       | 11.0           | BOTTOM OF PIT                      |         |
| 12             |        |       |                |                                    |         |
| 13             |        |       |                |                                    |         |
| 14             |        |       |                |                                    |         |

|             |      |       |                                                                                     |  |                                                           |                               |
|-------------|------|-------|-------------------------------------------------------------------------------------|--|-----------------------------------------------------------|-------------------------------|
| GROUNDWATER |      |       | TEST PIT PLAN                                                                       |  | PROPORTIONS                                               | EXC. EFFORT                   |
| DATE        | TIME | DEPTH |  |  | TRACE 0-10%<br>LITTLE 10-20%<br>SOME 20-35%<br>AND 35-50% | EASY<br>MODERATE<br>DIFFICULT |
| 1/20        |      |       |                                                                                     |  |                                                           |                               |
|             |      |       | ENGINEER: <u>M. Lehtinen</u>                                                        |  | Geotechnical<br>of Massachusetts, Inc.                    | Consultants                   |
|             |      |       | JOB NO. : <u>884663</u>                                                             |  |                                                           |                               |
|             |      |       | SCALE : <u>1"=2 1/2'</u>                                                            |  |                                                           |                               |

NOT ENCOUNTERED



# REPORT OF TEST PIT TP-2



PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                                         | REMARKS |
|----------------|--------|-------|----------------|---------------------------------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                                                     |         |
| 1              | S-1    | 2'-3' |                | FILL: Black to grey/white ash,<br>cinder and trace metal<br>& glass |         |
| 2              |        |       |                |                                                                     |         |
| 3              |        |       |                |                                                                     |         |
| 4              |        |       |                |                                                                     |         |
| 5              |        |       |                |                                                                     |         |
| 6              |        |       | 4.9            | Light brown fine SAND, little<br>silt                               |         |
| 7              |        |       |                |                                                                     |         |
| 8              |        |       | 8.0            | BOTTOM OF PIT                                                       |         |
| 9              |        |       |                |                                                                     |         |
| 10             |        |       |                |                                                                     |         |
| 11             |        |       |                |                                                                     |         |
| 12             |        |       |                |                                                                     |         |
| 13             |        |       |                |                                                                     |         |
| 14             |        |       |                |                                                                     |         |

| GROUNDWATER         |      |       | TEST PIT PLAN                                                                       | PROPORTIONS                                                                           | EXC. EFFORT                   |
|---------------------|------|-------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------|
| DATE                | TIME | DEPTH |                                                                                     | TRACE 0-10%<br>LITTLE 10-20%<br>SOME 20-35%<br>AND 35-50%                             | EASY<br>MODERATE<br>DIFFICULT |
| 1/20                |      |       |  |                                                                                       |                               |
|                     |      |       | ENGINEER: <u>M. Lehtinen</u>                                                        |  | Consultants                   |
|                     |      |       | JOB NO. : <u>884663</u>                                                             |                                                                                       |                               |
|                     |      |       | SCALE : <u>1"=2 1/2'</u>                                                            |                                                                                       |                               |
| NOT ENCOUNTERED 'X' |      |       |                                                                                     |                                                                                       |                               |



# REPORT OF TEST PIT TP- 3

PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                              | REMARKS |
|----------------|--------|-------|----------------|----------------------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                                          |         |
| 1              |        |       |                | FILL: Black to grey/white ash,<br>cinder and trace metal |         |
| 2              |        |       |                |                                                          |         |
| 3              |        |       |                |                                                          |         |
| 4              |        |       | 3.0            | Light brown fine SAND, little<br>silt                    |         |
| 5              |        |       |                |                                                          |         |
| 6              |        |       |                |                                                          |         |
| 7              |        |       |                |                                                          |         |
| 8              |        |       |                |                                                          |         |
| 9              |        |       |                |                                                          |         |
| 10             |        |       |                |                                                          |         |
| 11             |        |       | 10.0           | BOTTOM OF PIT                                            |         |
| 12             |        |       |                |                                                          |         |
| 13             |        |       |                |                                                          |         |
| 14             |        |       |                |                                                          |         |

| GROUNDWATER |      |       | TEST PIT PLAN | PROPORTIONS                                | EXC. EFFORT                   |
|-------------|------|-------|---------------|--------------------------------------------|-------------------------------|
| DATE        | TIME | DEPTH |               | TRACE 0-10%                                | EASY<br>MODERATE<br>DIFFICULT |
| 1/20        |      |       |               | LITTLE 10-20%<br>SOME 20-35%<br>AND 35-50% |                               |
|             |      |       |               |                                            |                               |
|             |      |       |               |                                            |                               |
|             |      |       |               |                                            |                               |

|                                                     |  |                                                                      |
|-----------------------------------------------------|--|----------------------------------------------------------------------|
| ENGINEER: <u>M. Lehtinen</u>                        |  |                                                                      |
| JOB NO. : <u>884663</u>                             |  |                                                                      |
| SCALE : <u>1"=2 1/2'</u>                            |  |                                                                      |
| NOT ENCOUNTERED <input checked="" type="checkbox"/> |  | Geotechnical<br><small>of Massachusetts, Inc.</small><br>Consultants |

# REPORT OF TEST PIT TP- 4

PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                             | REMARKS |
|----------------|--------|-------|----------------|---------------------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                                         |         |
| 1              | S-2    | 4'-5' |                | FILL: Black to grey ash, cinder and trace metal & glass |         |
| 2              |        |       |                |                                                         |         |
| 3              |        |       |                |                                                         |         |
| 4              |        |       |                |                                                         |         |
| 5              |        |       |                |                                                         |         |
| 6              |        |       |                |                                                         |         |
| 7              |        |       |                |                                                         |         |
| 8              |        |       |                |                                                         |         |
| 9              |        |       |                |                                                         |         |
| 10             |        |       |                |                                                         |         |
| 11             |        |       | 10.0           | BOTTOM OF PIT                                           |         |
| 12             |        |       |                |                                                         |         |
| 13             |        |       |                |                                                         |         |
| 14             |        |       |                |                                                         |         |

|                 |      |       |                              |        |             |        |                                                         |  |
|-----------------|------|-------|------------------------------|--------|-------------|--------|---------------------------------------------------------|--|
| GROUNDWATER     |      |       | TEST PIT PLAN                |        | PROPORTIONS |        | EXC. EFFORT                                             |  |
| DATE            | TIME | DEPTH |                              |        | TRACE       | 0-10%  | EASY<br>MODERATE<br>DIFFICULT                           |  |
| 1/20            |      |       |                              |        | LITTLE      | 10-20% |                                                         |  |
|                 |      |       | SOME                         | 20-35% |             |        |                                                         |  |
|                 |      |       | AND                          | 35-50% |             |        |                                                         |  |
|                 |      |       | ENGINEER: <u>M. Lehtinen</u> |        |             |        | Geotechnical<br>of Massachusetts, Inc.      Consultants |  |
|                 |      |       | JOB NO. : <u>884663</u>      |        |             |        |                                                         |  |
|                 |      |       | SCALE : <u>1"=2 1/2'</u>     |        |             |        |                                                         |  |
| NOT ENCOUNTERED |      |       | X                            |        |             |        |                                                         |  |



# REPORT OF TEST PIT TP-5

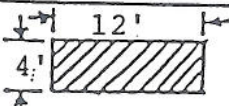

PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                          | REMARKS |
|----------------|--------|-------|----------------|------------------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                                      |         |
| 1              | S-3    | 3'-4' |                | TOPSOIL, sandy loam                                  |         |
| 2              |        |       | 1.5            | FILL: Ash, cinder, trace glass                       |         |
| 3              |        |       | 3.0            | Solid layer of white ash                             |         |
| 4              |        |       | 3.7            | FILL: Black cinder and ash,<br>trace metal and glass |         |
| 5              |        |       |                |                                                      |         |
| 6              |        |       |                |                                                      |         |
| 7              |        |       |                |                                                      |         |
| 8              |        |       |                |                                                      |         |
| 9              |        |       |                |                                                      |         |
| 10             |        |       |                |                                                      |         |
| 11             |        |       |                |                                                      |         |
| 12             |        |       |                |                                                      |         |
| 13             |        |       | 12.0           | BOTTOM OF PIT                                        |         |
| 14             |        |       |                |                                                      |         |

| GROUNDWATER      |      |       | TEST PIT PLAN                                                                             |  | PROPORTIONS                                                                                                                              | EXC. EFFORT                   |
|------------------|------|-------|-------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| DATE             | TIME | DEPTH |  NORTH |  | TRACE 0-10%                                                                                                                              | EASY<br>MODERATE<br>DIFFICULT |
| 1/20             |      |       |                                                                                           |  | LITTLE 10-20%                                                                                                                            |                               |
|                  |      |       |                                                                                           |  | SOME 20-35%                                                                                                                              |                               |
|                  |      |       |                                                                                           |  | AND 35-50%                                                                                                                               |                               |
|                  |      |       | ENGINEER: <u>M. Lehtinen</u>                                                              |  |  Geotechnical Consultants<br>of Massachusetts, Inc. |                               |
|                  |      |       | JOB NO. : <u>884663</u>                                                                   |  |                                                                                                                                          |                               |
|                  |      |       | SCALE : <u>1"=2 1/2'</u>                                                                  |  |                                                                                                                                          |                               |
| NOT ENCOUNTERED. |      | X     | Willows Professional Park • 700 Turnpike Street • North Andover, Mass. 01861              |  |                                                                                                                                          |                               |

Geotechnical  
of Massachusetts, Inc.

Consultants





# REPORT OF TEST PIT TP-6

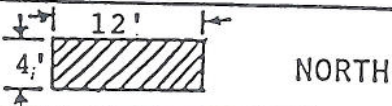

PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                             | REMARKS |
|----------------|--------|-------|----------------|---------------------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                                         |         |
| 1              |        |       | 0.5            | TOPSOIL                                                 |         |
| 2              |        |       |                | FILL: Black to grey cinder and ash, trace metal & glass |         |
| 3              |        |       |                |                                                         |         |
| 4              |        |       |                |                                                         |         |
| 5              |        |       |                |                                                         |         |
| 6              |        |       |                |                                                         |         |
| 7              |        |       | 6.0            | Light brown fine SAND, little silt                      |         |
| 8              |        |       |                |                                                         |         |
| 9              |        |       |                |                                                         |         |
| 10             |        |       |                |                                                         |         |
| 11             |        |       |                |                                                         |         |
| 12             |        |       | 11.0           | BOTTOM OF PIT                                           |         |
| 13             |        |       |                |                                                         |         |
| 14             |        |       |                |                                                         |         |

|                 |      |       |                                                                                     |  |                                                           |  |                                                                                                   |  |
|-----------------|------|-------|-------------------------------------------------------------------------------------|--|-----------------------------------------------------------|--|---------------------------------------------------------------------------------------------------|--|
| GROUNDWATER     |      |       | TEST PIT PLAN                                                                       |  | PROPORTIONS                                               |  | EXC. EFFORT                                                                                       |  |
| DATE            | TIME | DEPTH |  |  | TRACE 0-10%<br>LITTLE 10-20%<br>SOME 20-35%<br>AND 35-50% |  | EASY<br>MODERATE<br>DIFFICULT                                                                     |  |
| 1/20            |      |       |                                                                                     |  |                                                           |  |                                                                                                   |  |
|                 |      |       | ENGINEER: <u>M. Lehtinen</u><br>JOB NO. : <u>884663</u><br>SCALE : <u>1"=2 1/2'</u> |  | Geotechnical<br>of Massachusetts, Inc.                    |  |  Consultants |  |
|                 |      |       |                                                                                     |  |                                                           |  |                                                                                                   |  |
| NOT ENCOUNTERED |      |       |                                                                                     |  |                                                           |  |                                                                                                   |  |

# REPORT OF TEST PIT TP-7

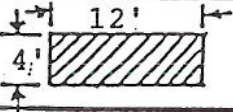

PROJECT: FAY STREET PROPERTY, LOWELL, MA

CLIENT: MERRIMACK VALLEY HOUSING PARTNERSHIP DATE: 1/20/88

CONTRACTOR/EQUIPMENT: J.H.BONFANTI CO./CASE 580E BACKHOE

ELEVATION/DATUM: \_\_\_\_\_ SHEET 1 OF 1

| DEPTH<br>(FT.) | SAMPLE |       | STRATA<br>PLOT | DESCRIPTION                                | REMARKS |
|----------------|--------|-------|----------------|--------------------------------------------|---------|
|                | NO.    | DEPTH |                |                                            |         |
| 1              |        |       |                | FILL: Black cinder and ash,<br>trace glass |         |
| 2              |        |       |                |                                            |         |
| 3              |        |       |                |                                            |         |
| 4              |        |       |                |                                            |         |
| 5              |        |       |                |                                            |         |
| 6              |        |       |                |                                            |         |
| 7              |        |       |                |                                            |         |
| 8              |        |       | 7.0            | Black Organic SILT & PEAT                  |         |
| 9              |        |       | 8.0            | Light brown fine SAND, little<br>silt      |         |
| 10             |        |       |                |                                            |         |
| 11             |        |       | 10.0           | BOTTOM OF PIT                              |         |
| 12             |        |       |                |                                            |         |
| 13             |        |       |                |                                            |         |
| 14             |        |       |                |                                            |         |

| GROUNDWATER     |      |       | TEST PIT PLAN                                                                       |  | PROPORTIONS                                                                                                                  | EXC. EFFORT                   |
|-----------------|------|-------|-------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| DATE            | TIME | DEPTH |  |  | TRACE 0-10%<br>LITTLE 10-20%<br>SOME 20-35%<br>AND 35-50%                                                                    | EASY<br>MODERATE<br>DIFFICULT |
| 1/20            |      |       |                                                                                     |  |                                                                                                                              |                               |
|                 |      |       |                                                                                     |  |                                                                                                                              |                               |
|                 |      |       |                                                                                     |  |                                                                                                                              |                               |
| NOT ENCOUNTERED |      |       | X                                                                                   |  |                                                                                                                              |                               |
|                 |      |       | ENGINEER: <u>M. Lehtinen</u><br>JOB NO. : <u>884663</u><br>SCALE : <u>1"=2 1/2'</u> |  | Geotechnical<br>of Massachusetts, Inc.  |                               |
|                 |      |       |                                                                                     |  | Consultants                                                                                                                  |                               |
|                 |      |       |                                                                                     |  | Willows Professional Park • 799 Turnpike Street • North Andover, Mass. 01845                                                 |                               |



MERRIMACK VALLEY HOUSING PARTNERSHIP

P.O.BOX 2258 HIGHLAND STATION

LOWELL, MA 01851 459-8490

James J. Campbell,  
City Manager  
Lowell City Hall  
Lowell, MA 01852

February 29, 1988

Dear Mr. Campbell:

The Merrimack Valley Housing Partnership is ready to take title to City owned land on Ware Street and to the land on Fay Street.

The City Council voted on December 16, 1987 to convey to the Merrimack Valley Housing Partnership, certain City owned land located on the easterly side of Ware Street in Lowell. MVHP is now prepared to take title to the Ware Street parcel and asks that the deed be conveyed to MVHP.

The Partnership proposes to construct six units in a garden style building on this site. Parking for twelve cars is provided for. The proposed development is consistent with zoning requirements of the City of Lowell. The units are projected to sell at \$70,000 - 75,000.

The Partnership is also prepared to take title to City owned property on Fay Street. The Council asked the Law Department to prepare a vote to sell City owned land off Fay Street to MVHP for \$1.00. MVHP previously asked that this conveyance not occur until a 21E study was initiated to determine if the site contained any harmful or hazardous material. The study has been completed and the results indicate that housing can be constructed on the Fay Street parcels. For your information, I have enclosed, copies of the site assessments for both Fay and Ware Streets.



The Fay Street land consists of three parcels of City owned land and two "paper streets" (see map). MVHP requires the entire site including the "paper streets" to construct affordable housing. MVHP would like these streets abandoned and conveyed to MVHP along with the three parcels of City owned land at Fay and Florence Streets.

MVHP proposes to construct twenty four three-bedroom townhouse condominiums on this site. These will be affordable homes for first time homebuyers and will cost between \$70,000 - \$75,000.

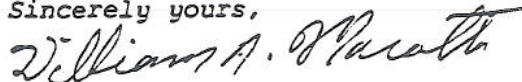
MVHP has been meeting with residents of the Fay Street neighborhood. They are supportive of the development of affordable housing on this site. Enclosed is a preliminary site plan which is acceptable to this group.

MVHP ask that the City Council be asked to vote to convey the City owned land at Fay and Florence Street to MVHP. We also ask that the paper Streets be abandoned and conveyed to MVHP.

In addition MVHP has asked the Planning and Development Department to submit an application on behalf of MVHP, for inclusion of this development in the Massachusetts Housing Partnership Homeowners Opportunity Program. As you know, this program makes low interest mortgages available, through the Massachusetts Housing Finance Agency, to eligible purchasers of affordable homes. Applications are due on March 15, 1988.

Thank you for your assistance and cooperation. If you have any further questions or require additional information please contact me at 459-8490.

Sincerely yours,



William A. Marotta

Executive Director.

Enc.

c.c. J. Cook

E.L. Morris



