OCT 29 1990

Mobil Oil Corporation

WESTFORD TECHNOLOGY PARK
1 TECHNOLOGY PARK DRIVE
WESTFORD, MASSACHUSETTS 01886

October 26, 1990

Department of Environmental Conservation
Agency of Natural Resources
103 South Main Street
Waterbury, VT 05676

Mr. Richard Spiese

Former Mobil SS# 08-PN8
Wilmington, VT

Attached for your review is an expanded environmental investigation performed by Empire Soils Investigations, Inc. As you can see, all three off site wells showed no dissolved BTEX. B-1 (on site) showed 3,124 ppb BTEX. B-2 showed no BTEX.

As a result of this study, we propose to monitor the wells quarterly via EPA 602 analysis and use the data to determine the next course of action, if any.

If you have any questions, please call me at (508) 392-3035.

Sincerely,

A.E. Valenti
Project Engineer

Enclosure

cc: J. Loyka -- 1W
A.G. Swenson
Kirk Moline -- Empire Soils

EMPIRE
SOILS INVESTIGATIONS INC.

EXPANDED HYDROGEOLOGIC INVESTIGATION
EAST MAIN STREET MOBIL SS# 08PN8
WILMINGTON, VERMONT

Prepared For:

Mobil Oil Corporation
Westford, MA

Prepared By:

Empire Soils Investigations, Inc.
Malta, NY

E.S.I. Project No.: ATA-90-105
October, 1990

P.O. BOX 2199, 5 KNABNER ROAD, BALLSTON SPA, NY 12020, 518-899-7491, TELEFAX 518-899-7496

EXPANDED HYDROGEOLOGIC INVESTIGATION
EAST MAIN STREET MOBIL
WILMINGTON, VERMONT

I. INTRODUCTION

As requested, Empire Soils Investigations, Inc. has completed an expanded hydrogeologic investigation at Mobil Service Station No. 08-PN8 located on East Main Street in Wilmington, Vermont. The investigation was authorized by A.E. Valenti of Mobil Oil Corporation under Purchase Order No. 980XEW-01.

Prior to this investigation a total of four monitoring wells had been installed within the project site by Empire Soils Investigations, Inc. in September of 1989. Laboratory results of groundwater samples obtained from the wells on September 17, 1989 indicated the presence of soil and groundwater contamination in the area of the underground petroleum storage tanks. In January of 1990 all of the underground storage tanks were removed from the site. Inspection of the tank removal operation by Empire Soils Investigations, Inc. indicated that contaminated soils were present beneath the tanks. Site inspection by Mr. Patrick Coyne of the Vermont DEP determined that soil removal was not warranted, however, Mr. Coyne had concern over the potential for petroleum contaminated groundwater migration beyond the property boundaries. The Vermont

DEP, in part, requested additional monitoring wells to be installed to define the extent and severity of soil and groundwater contamination. The locations of the additional wells were established at downgradient points south of the station by Kirk Moline of Empire Soils, and Mr. Coyne in the Spring of 1990. During the Spring of 1990, Mobil Oil Corporation vacated the premises, with Sandri Oil Corporation (Sunoco) acquiring the site and constructing a new facility for petroleum sales.

II. METHOD OF INVESTIGATION

A. Monitoring Well Installation

On September 10 and 11, 1990 three (3), two inch diameter PVC monitoring wells were installed on the neighboring property owned by the Deerfield Valley Farmers Day Association, located downgradient and south of the Mobil Station. Refer to Drawing No. 2 in Appendix A. The wells were constructed by Empire Soils Investigation personnel and equipment under the full time supervision of an environmental geologist from Empire Soils Investigations.

The locations of the monitoring wells were selected on the basis of groundwater flow direction as established in the previous phase of investigation, and to intercept potential petroleum contaminants from the area of the preexisting tanks. The Vermont DEP and representatives of

the Deerfield Valley Farmers Day Association agreed to the locations of the wells and the type of surface installation to be used.

The monitoring wells were constructed in borings advanced with a CME-55 drilling rig employing 4 1/4 inch, inner diameter, hollow stem augers. The wells were constructed with two inch diameter, schedule 40, flush joint PVC well screen and riser. The screened intervals of each well were selected to intercept the water table. A filter pack consisting of #1 Whitehead silica sand was placed from the bottom of the boring to approximately 1/2 foot above the top of the screen section. A pelletized bentonite seal, hydrated with potable water, was placed immediately above the filter pack sand. The remaining annular space was filled with native soil cuttings. A protective curb box was installed over each well, flush with the existing grades. Refer to the Monitoring Well Diagrams in Appendix B for the construction details of each well.

B. Soil Sampling

During the drilling program, soil samples were recovered using a two inch split-spoon sampler in general accordance with ASTM Designation D-1584. The soil samples were obtained continuously in the first boring (B-5) in order to locate any stratigraphic changes within the

soils. In the remaining two borings (B-6 and B-7) soil samples were collected continuously to the approximate water table and at nominal five foot intervals thereafter. The soil samples were visually classified by the on-site geologist and recorded on Subsurface Logs. The Subsurface Logs are presented in Appendix B along with a sheet entitled "Key to Subsurface Logs" which explains the terms and symbols used in their preparation.

At the time each samples was recovered, a portion of each was immediately placed in a clean glass jar, covered with aluminum foil and sealed with its lid. The samples were then allowed to rise to the ambient air temperature and analyzed in the field with an H-Nu Systems photo ionization detector (PID) for the presence of volatile organic compounds. The PID can detect, if present, the aggregate concentration of several of the common chemical constituents of petroleum fuels, namely benzene, toluene and xylenes. The instrument has a detection limit of 1 to 2 parts per million. The PID screening results are presented on the individual Subsurface Logs in Appendix B.

C. Decontamination

Decontaminated drilling equipment was used to begin drilling at the site. All drilling equipment, (i.e. augers, cutterhead and drill rods) were decontaminated at the site between borings. Decontamination involved steam

cleaning with a high pressure, high temperature, portable steam cleaner utilizing potable water from our base in Malta, New York.

D. Site Survey

On September 11, 1990 a survey was completed by Empire Soils Investigations personnel to determine the locations and elevations of the monitoring wells relative to the existing monitoring wells within the service station, and to extend the scaled site plan onto the neighboring property on which the new monitoring wells are located. An assumed elevation of 100.00 feet (NE corner, garage finished floor) was used as the project bench mark as it was in the previous site work.

The locations of monitoring wells and pertinent site features not previously located were established using taped measurements from previously surveyed site features and differential levelling techniques. The new site plan is presented in Appendix A as Drawing 2 and is used as a base plan for the remaining drawings within this report.

E. Well Development

On September 11, the three monitoring wells were developed by surging and bailing techniques with weighted PVC bailers. Well development was performed in order to restore the natural hydraulic conductivity of the soils surrounding the well screens and allow fresh formation wa-

ter to enter the wells. The water extracted from the wells through development was discarded adjacent to each well as no petroleum odors were noted during drilling or development.

F. Ground Water Levels and Sampling

On September 17, 1990, ground water levels in all accessible monitoring wells were recorded and the wells were purged and sampled by Empire Soil Investigations personnel using dedicated PVC bailers. The groundwater samples obtained were sent via next day transport to Huntingdon Analytical Services of Middleport, New York, a NYSDOH and NYSDEC approved environmental testing laboratory. All samples were analyzed by EPA Method 602, "Purgeable Aromatics". The laboratory results are presented in Appendix C.

III. FINDINGS OF THE INVESTIGATION

A. Site Description

The project site is located on the South side of East Main Street in the Town of Wilmington, Windham County, Vermont. Topography of the site is variable; being nearly level in the northern section where the service station is located, but dropping steeply by approximately 30 feet in elevation between the top of the slope adjacent to the

southern property line of the station and the newly installed monitoring wells located some 150 feet to the south. The slope is covered by native grasses near the top and is heavily wooded near the bottom. From the break in slope just north of the new monitoring wells, the land slopes gently to the southwest toward a small stream which flows from northeast to southwest. This portion of the site is grass covered and fenced in, and where draft horses are shown by the Deerfield Valley Farmers Day Association.

The east side of the project site is bounded by a dirt road. To the west, the site is bounded by the Wilmington High School buildings and grounds and athletic fields to the southwest.

At the time of this investigation the service station had been converted to a Sunoco Service Station. Two of the monitoring wells installed by Empire Soils Investigations in 1989, prior to the site being renovated by Sunoco, (B-3 and B-4) were covered by asphalt pavement and, as such, were inaccessible for obtaining water levels and groundwater samples.

B. Subsurface Conditions

The subsurface soils encountered during the drilling of the well borings were found to consist of fine SAND and SILT overlying gravelly fine to coarse SAND at depths of six to fifteen feet below existing grade. In boring B-6, hard, dark brown SILT was found to underlie the fine to coarse SAND at a depth of fourteen feet. In boring B-7 wood fragments were recovered in several samples, indicating the presence of naturally deposited vegetative material within the fluvial (stream) deposits. Refer to the individual Subsurface Logs in Appendix B for a more detailed description of the soils encountered.

The recovered soil samples were analyzed in the field for volatile organic compounds with the PID. No detectable quantities were observed in any of the soil samples and no petroleum hydrocarbon odors were noted by the on-site geologist. The results of the PID monitoring of recovered samples are presented on the Subsurface Logs in Appendix B.

C. Groundwater

Groundwater was encountered at each monitoring well location at depths of approximately three to four feet below existing grades. There were no confining strata above the depths at which groundwater was first encountered in-

dicating that the aquifer beneath the site is an unconfined or water table aquifer. As such, groundwater flow is expected to reflect the topography of the project area.

Water levels in the wells were recorded in September 17, 1990 were converted to elevations and used to contour the groundwater table beneath the site. As shown in Drawing No. 3, groundwater flow is generally from north to south essentially mirroring the site topography.

D. Laboratory Analysis

One suite of groundwater samples were obtained on September 17, 1990 by Empire Soils Investigation personnel. The samples were analyzed by EPA Method 602, "Purgeable Aromatics". The results of the testing indicate that petroleum contaminated groundwater has not migrated off-site to the area of monitoring wells B-5, B-6 and B-7. The results do indicate petroleum contaminated groundwater at monitoring well location B-1 as previously determined to exist at this location. The laboratory test results are presented in Appendix C.

IV. CONCLUSIONS

From the investigation the following summary is presented:

- The soils encountered in the area of the three new monitoring wells consist of very Silty fine SAND overlying fine to coarse SAND which may be interbedded with SILT layers and miscellaneous vegetative matter.
- The depth of the water table is approximately 3 to 4 feet below existing grades at the new well locations. Depth to the water table within the station is approximately 18 to 25 feet below grade.
- The direction of groundwater flow is interpreted to be from North to South generally reflecting the topography of the area.
- Petroleum hydrocarbon odors were not noted in the soil samples obtained during the drilling of the new well borings and no detectable concentrations of volatile organic compounds (VOC's) were recorded utilizing an H-Nu Systems, photo ionizing detector (PID).
- Testing by EPA Method 602 "Purgeable Aromatic" of groundwater samples obtained from the monitoring wells on September 17, 1990 indicate that petroleum contaminated groundwater exists at monitoring well location B-1, however, has not migrated to the area of monitoring wells B-5, B-6 and B-7.

V. CLOSURE

This investigation was performed following generally accepted hydrogeological practices and in accordance with Mobil Oil Corporations requirements for site investigations. This report has been prepared on the basis of the data collected during this and previous investigations by Empire Soils, and by the methods described herein. This report presents the conditions believed to be present at

EMPIRE
SOILS INVESTIGATIONS INC.

the time of our investigation. No other warranties, expressed or implied are made.

Empire Soils Investigations, Inc. is pleased to have been of assistance on this project. If you have any questions or comments please contact this office at your convenience.

Respectfully submitted,

EMPIRE SOILS INVESTIGATIONS, INC.

John Sutphin
Environmental Geologist

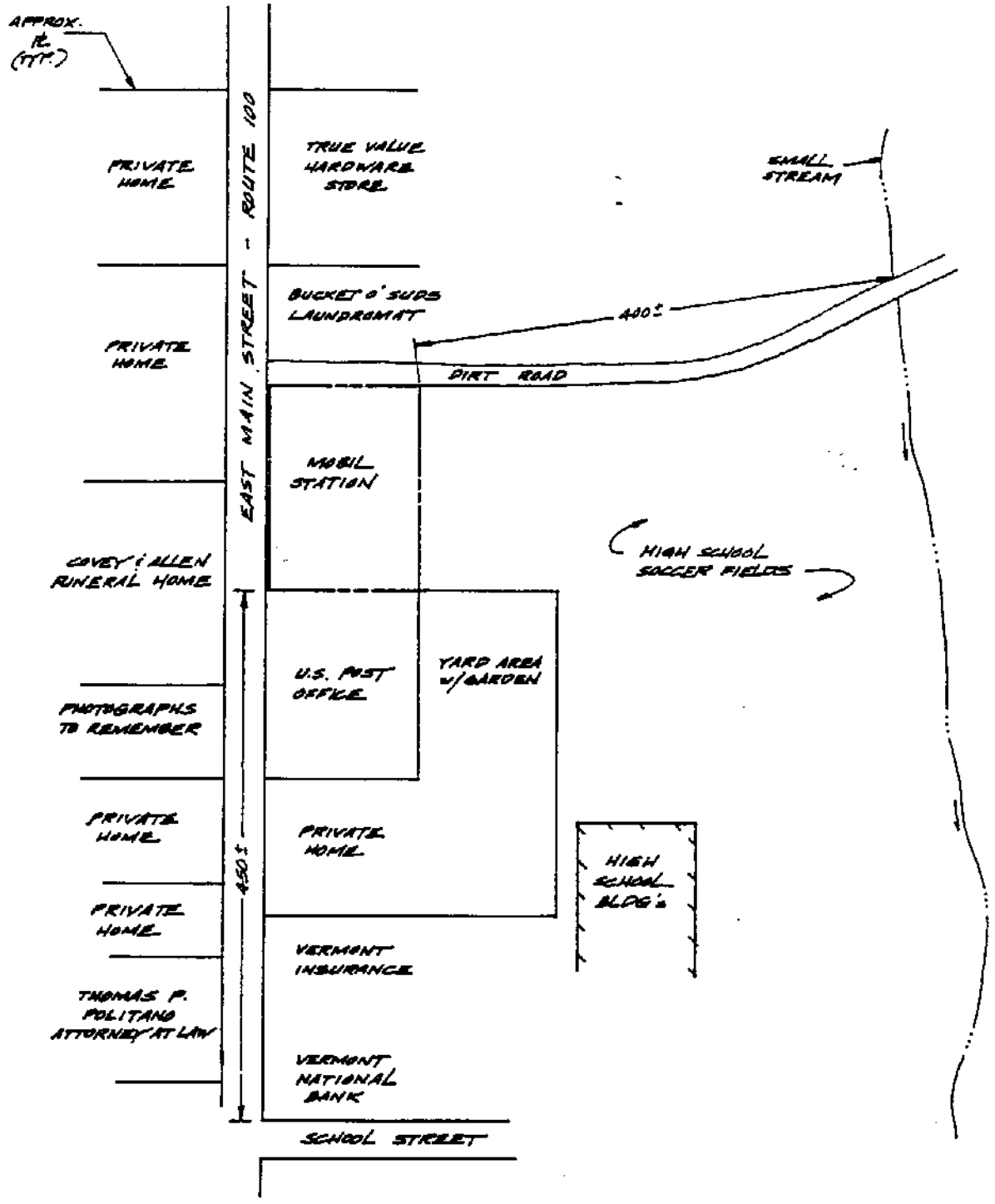
Kirk Moline
Environmental Group Manager

JS:KM:ks

1003wilm

DRAWINGS

APPENDIX A

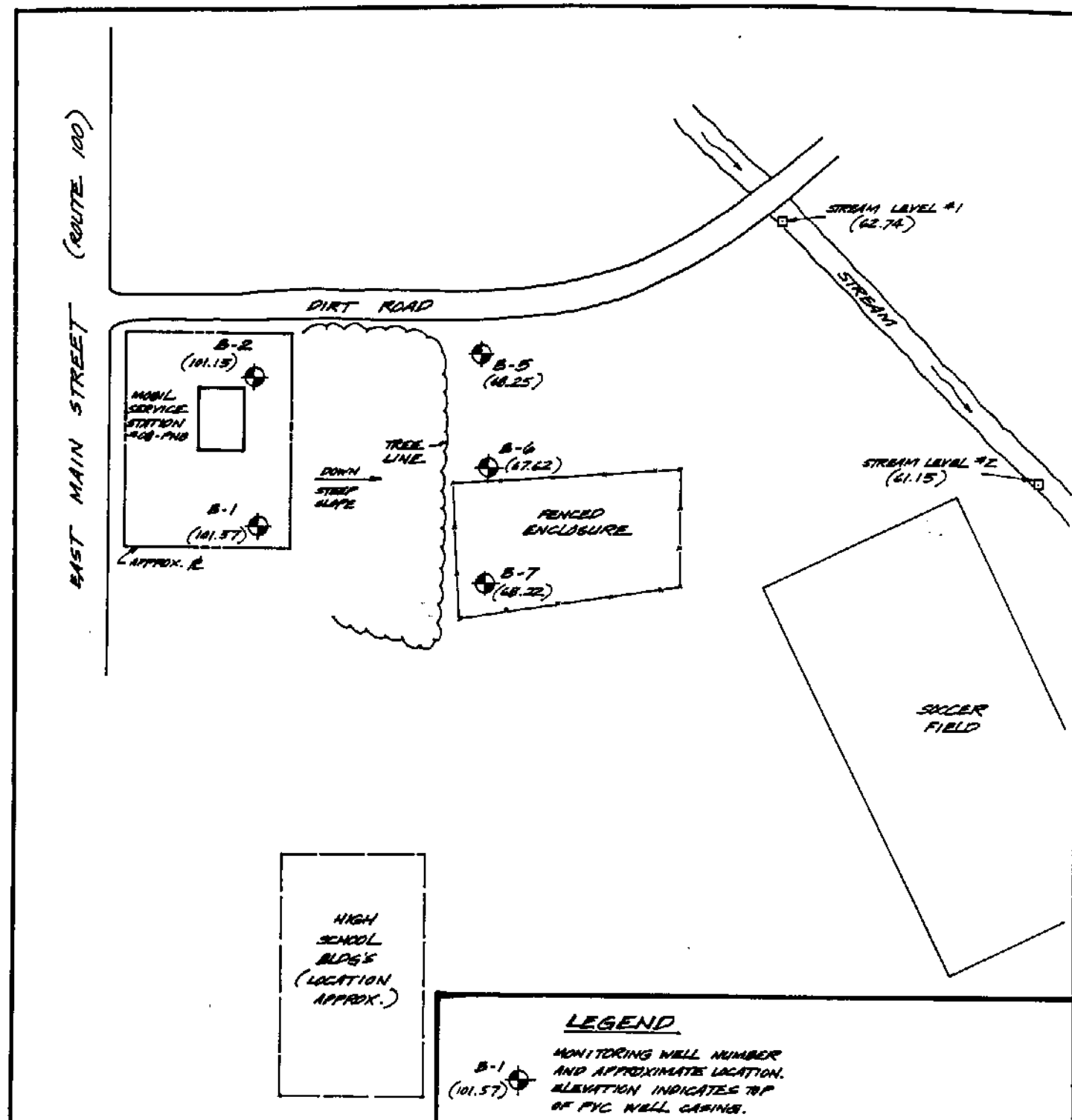


EMPIRE

AREA SITE PLAN

MOBIL SERVICE STATION
EAST MAIN STREET
WILMINGTON, VERMONT

DR. BY JH	SCALE NOT TO SCALE	PROJ NO ATA-89-335
CK'D BY	DATE 10/89	DRWG NO 1



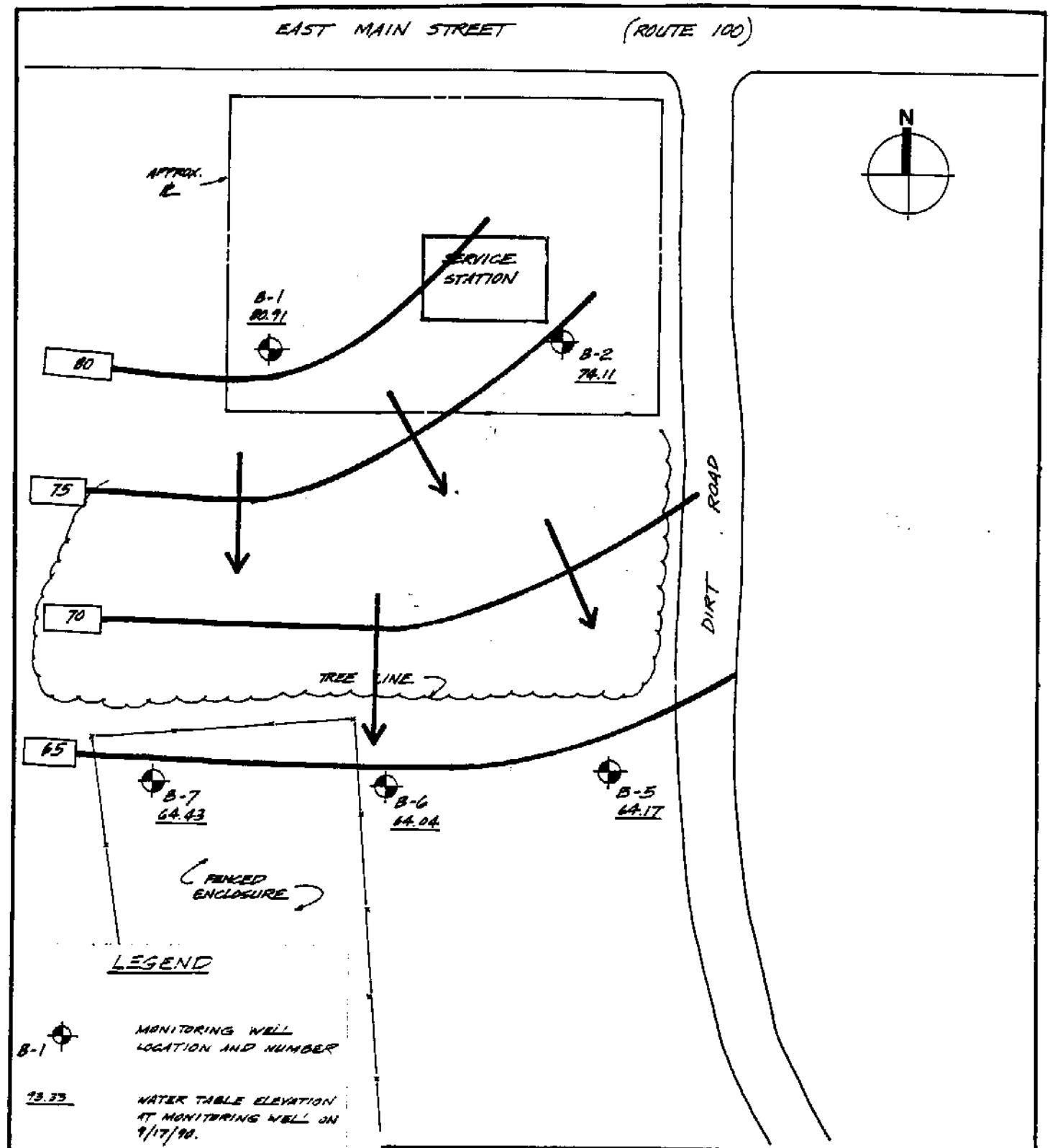
BENCHMARK: FINISH FLOOR ELEVATION OF SERVICE STATION GARAGE. ASSUMED ELEVATION 100.00 FEET.

EMPIRE SOIL INVESTIGATIONS, INC.

SUBSURFACE INVESTIGATION PLAN

EXPANDED HYDROGEOLOGIC STUDY
MOBIL SERVICE STATION #08-PN8
EAST MAIN STREET, WILMINGTON, VERMONT

DR BY JDS/JH	SCALE 1" = 100'	PROJ NO ATH-89-335
CK'D BY	DATE 9/90	DRWG NO 2



BENCHMARK: FINISH FLOOR ELEVATION OF SERVICE STATION GARAGE. ASSUMED ELEVATION 100.00 FEET.

EMPIRE SOILS INVESTIGATIONS, INC.

WATER TABLE CONTOURS
9/17/90

EXPANDED HYDROGEOLOGIC STUDY
MOBIL SERVICE STATION #08-PN8
EAST MAIN STREET, WILMINGTON, VERMONT

DR. BY JDS/JH	SCALE 1" = 50'	PROJ NO ATA-89-335
CK'D BY	DATE 9/90	DRWG NO 3

SUBSURFACE LOGS

AND

MONITORING WELL DETAILS

APPENDIX B

DATE
STARTED 9-13-89
FINISHED 9-13-89
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. 99.60'
G. W. DEPTH See Note #1

PROJECT Mobil Station

LOCATION East Main Street
Wilmington, VT

DEPTH-Ft	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION
0		1	3	6		13		Brown fine Sand, trace coarse sand and fine gravel, trace silt
			7	5				
5		2	32	50		84		-grades to Some fine Gravel, becomes moist, orangish-brown fine to medium SAND at tip of sample
			34	10				(Moist-Firm to Very Compact)
10		3	11	9		21		Light Brown fine SAND, faint petroleum odor noted
			12	14				
15		4	8	6		13		-grades to fine to medium SAND, strong petroleum odor noted
			7	7				
20		5	8	8		17		-Sample wet, petroleum odor noted
			9	9				(Moist to Wet-Firm)
25		6	18	20		54		Fine to coarse SAND, Some Rock fragments at tip of sample
			34	24				
30		7	30	18		36		Brown fine to medium SAND, little coarse sand and gravel (Wet-Very Compact to Compact)
			18	25				
35								END OF BORING @ 32.0'

NOTES

Note #1:
Groundwater was measured at 25.0' below ground surface with augers in place at 30.0'. Groundwater measured at 18.4' below ground surface within well on 9/16/89.

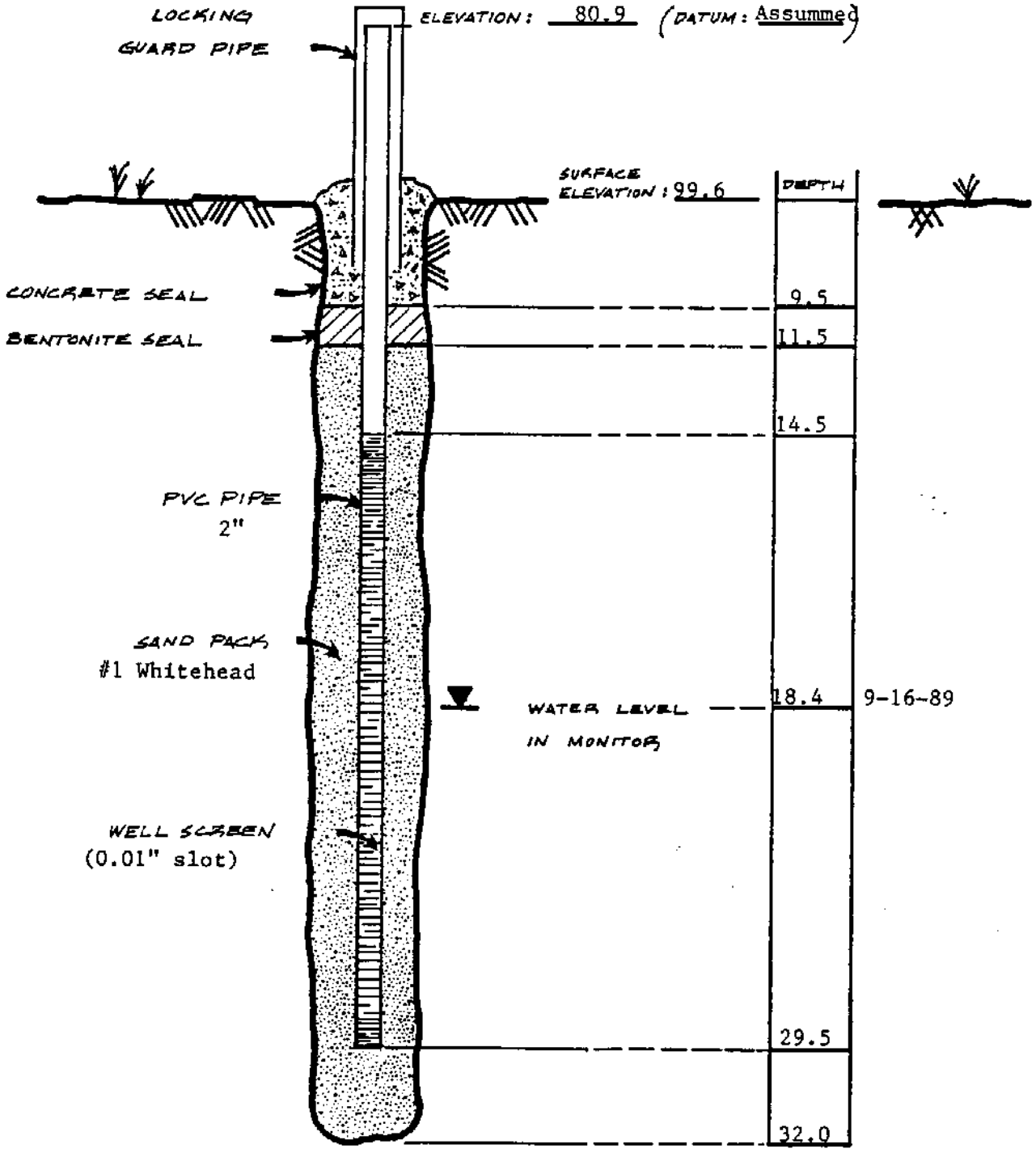
Note #2:
2" diameter PVC monitoring well installed per attached details.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No. blows to drive ___ " casing ___ " with ___ lb. weight falling ___ "per blow

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 4¼" I.D. Hollow Stem Augers



WELL No

B-1

EMPIRE SOIL INVESTIGATION INC

MONITORING WELL DETAILS

SUBSURFACE EVALUATION
MOBIL SERVICE STATION
EAST MAIN STREET, WILMINGTON, VT

DR BY KM	SCALE N.T.S.	PROJ NO. ATA-89-234
CK'D BY	DATE 10/89	DRWG NO.

DATE
STARTED 9-13-89
FINISHED 9-14-89
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV. 99.03'
G. W. DEPTH See Note #1

PROJECT Mobil Station

LOCATION East Main Street
Wilmington, VT

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION
0		1	2	3		10		Poor Sample Recovery - Brown fine SAND, trace silt, trace organics
			7	8				
5		2	8	7		13		Brown fine SAND, Some coarse Sand and fine Gravel
			6	3				
								(Moist-Loose to Firm)
10		3	9	9		15		Brown fine SAND, Some Silt, becomes light brown fine to medium SAND
			6	5				
15		4	7	8		16		Poor Sample Recovery (Gravel in Shoe) - Light Brown fine to coarse SAND, little fine gravel
			8	8				
20		5	24	16		28		(Moist-Firm)
			12	7				Brown fine SAND, Some Silt, Sample wet at Tip
								(Wet-Firm)
25		6	24	25		51		Brown fine to medium SAND, Some coarse Sand and fine Gravel, trace silt
			26	38				
30		7	100/.3			-		
35		8	31	100/.3		-		(Wet-Very Compact)
								END OF BORING @ 24.8'

NOTES

Note #1: Groundwater at 24.0' within augers on 9/14/89 with augers in place at 25.0' Groundwater at 24.6' below ground surface within well on 9/16/89.

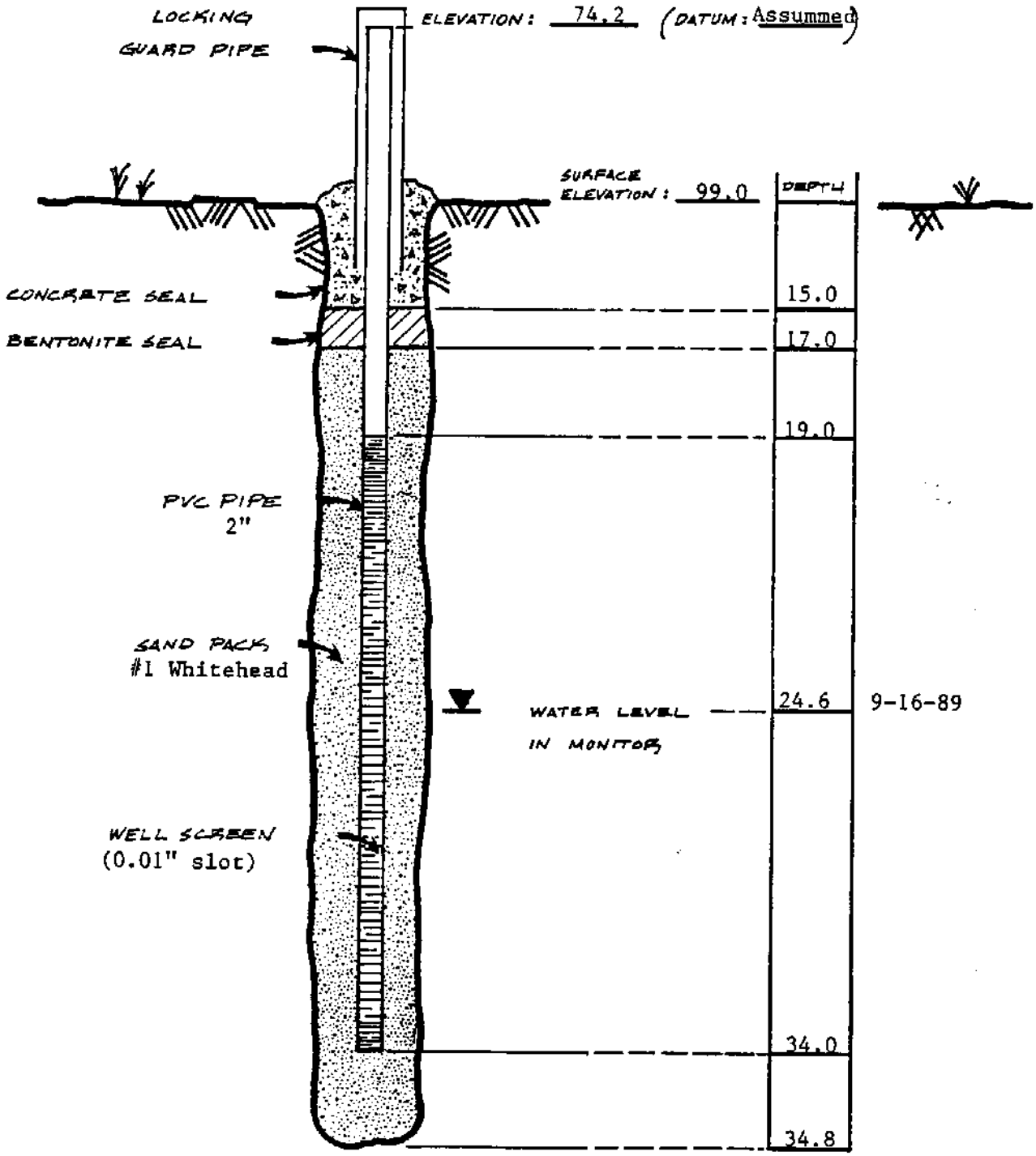
Note #2: 2" diameter PVC monitoring well installed per attached details.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geotechnical Engineer

METHOD OF INVESTIGATION 4¼" I.D. Hollow Stem Augers



WELL No

B-2

EMPIRE

MONITORING WELL DETAILS

SUBSURFACE EVALUATION
MOBIL SERVICE STATION
EAST MAIN STREET, WILMINGTON, VT

DR BY KM	SCALE N.T.S.	PROJ NO ATA-89-234
CK'D BY	DATE 10/89	DRWG NO

DATE
STARTED 9/10/90
FINISHED 9/10/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV.
G. W. DEPTH See Note #1 and #3

PROJECT Expanded Hydrogeologic Study
Mobil Service Station

LOCATION East Main Street
Wilmington, VT

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID (ppm)	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	1	2		5	< 1	Brown fine SAND and SILT	Note #1: Groundwater noted @ 7.85' upon completion of drilling
			3	4					
		2	2	3		5	< 1	-grades fine to medium SAND, Some Silt	
			2	2					
		3	2	1		3	< 1	Dark brown fine SAND, Some Silt (Moist to Wet-Loose)	
			2	3					
		4	9	20		41	< 1		Note #2: 2" PVC monitoring well installed with screen @ 2.6" - 12.6'. See Well Diagram for details.
			21	13					
		5	6	7		22	< 1	Brown fine to coarse SAND, little silt, little gravel.	
10			15	21				(Wet-Firm to Compact)	
								End of Boring @ 13.4' Auger Refusal	Note #3: W.L. @ 4.02 below top of pvc well casing on 9/11/90
20									

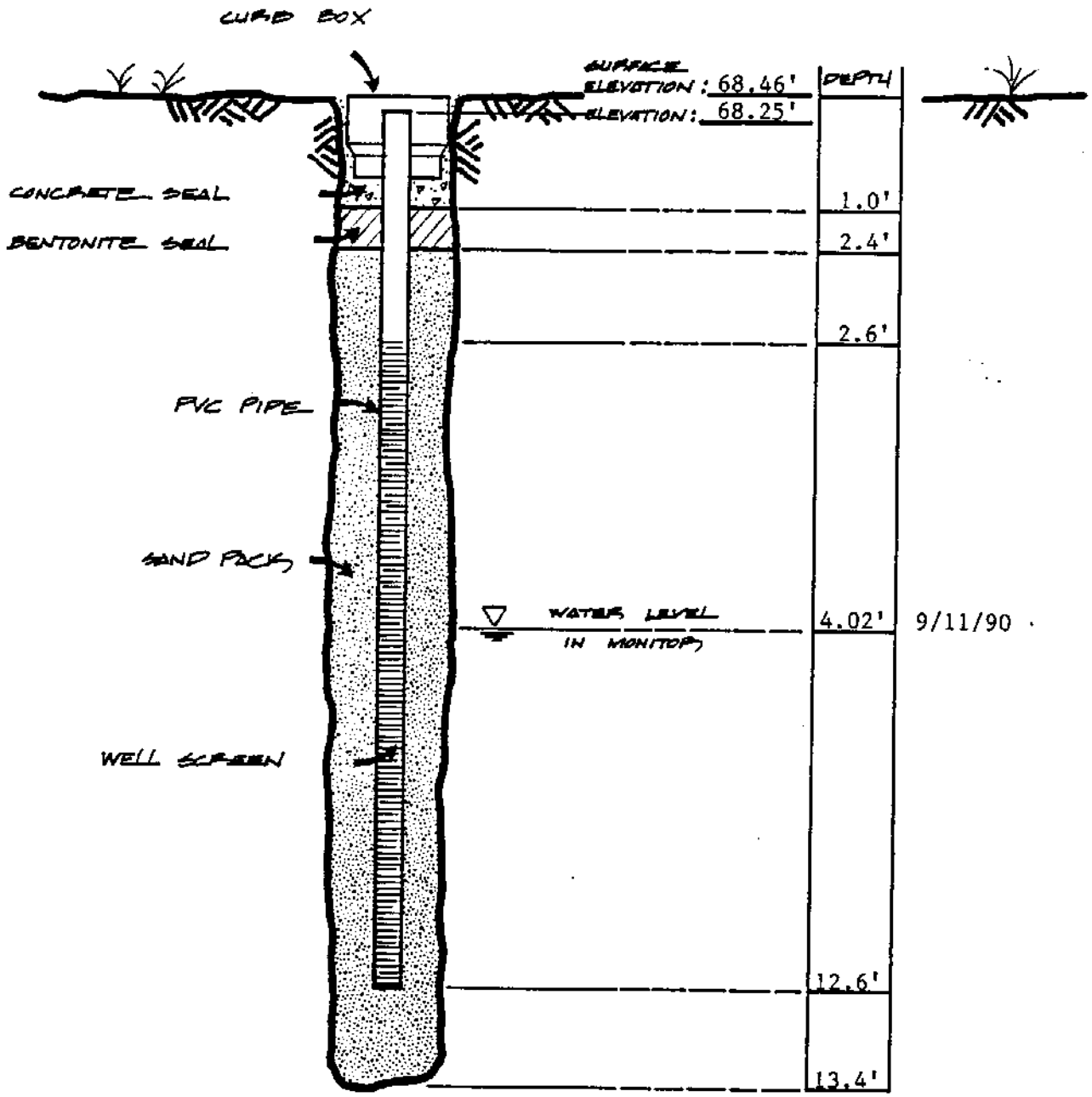
N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION 4¼" I.D. Hollow Stem Augers

DATUM: Project



WELL N2

B-5

EMPIRE SOIL INVESTIGATIONS, INC.

MONITORING WELL DETAILS

EXPANDED HYDROGEOLOGIC STUDY
MOBIL SERVICE STATION
EAST MAIN STREET, WILLMINGTON, VT

DR.BY:	JDS	SCALE:	N.T.S.	PROJ. NO.	ATA-89-335
CK'D BY:		DATE:	9/12/90	DRWG.NO.	

DATE
STARTED 9/10/90
FINISHED 9/11/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV.
G. W. DEPTH See Note #1 #3

PROJECT Expanded Hydrogeologic Study
Mobil Service Station

LOCATION East Main Street
Willmington, VT

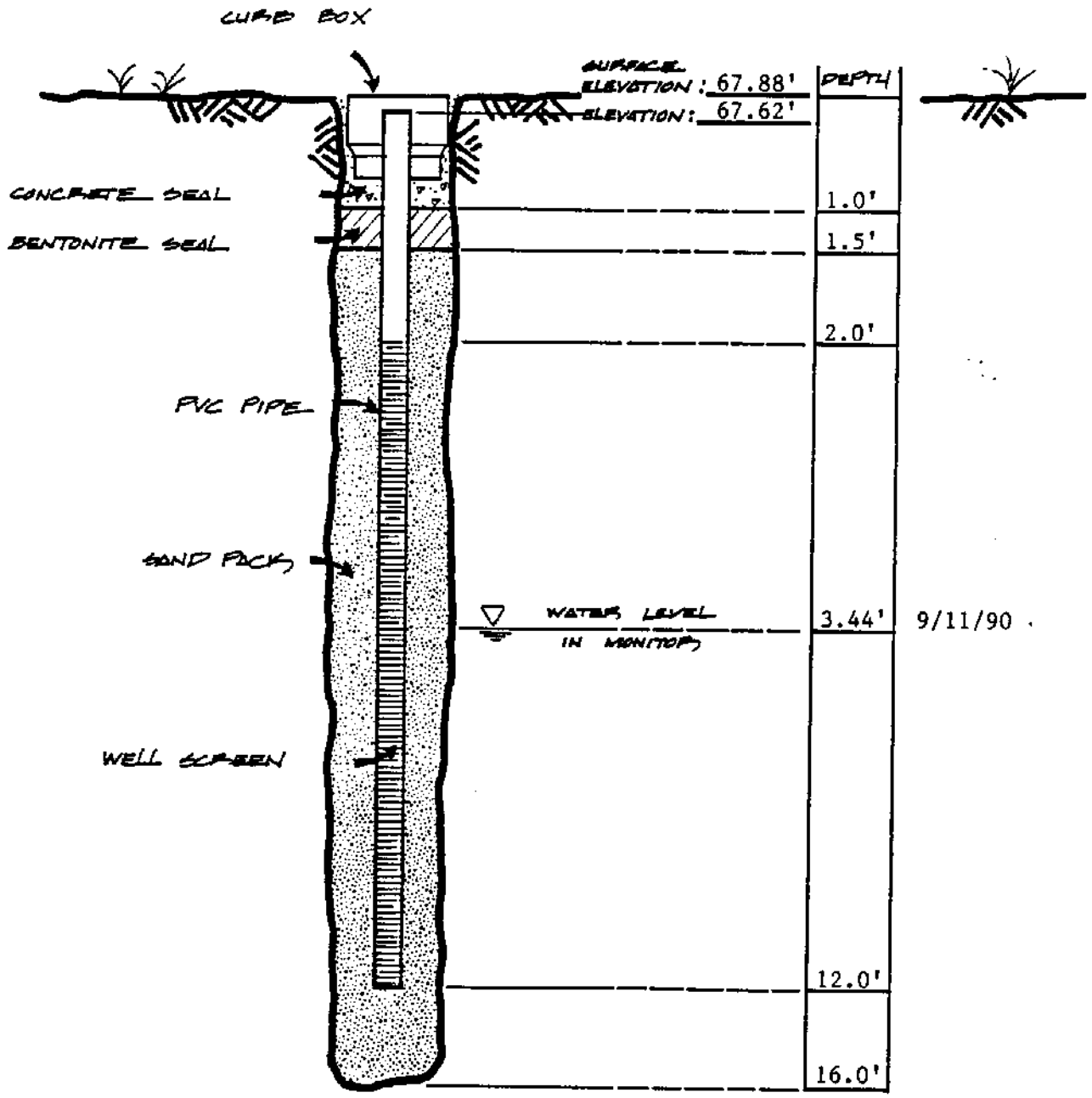
DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID (ppm)	SOIL OR ROCK CLASSIFICATION	NOTES
0									Note #1: Groundwater noted @ 3.79' below existing grade on 9/11/90 before placing well.
		1	2	2		16	< 1	Brown fine SAND and SILT -cobble encountered	
			14	11					
		2	8	4		11	< 1		
			7	6					
		3	17	2		4	< 1		
			2	2				-grades fine SAND, Some Silt	
		4	2	3		11	< 1	-grades fine SAND, little silt, little gravel to coarse sand	
			8	5					
10									Note #2: 2" PVC monitoring well installed with screen @ 2.0'-12.0'. See Well Diagram for details.
		5	2	0		3	< 1	(Moist to Wet-Loose)	
			3	5				Light brown fine to coarse SAND	
								(Wet-Loose)	
		6	28	23		46	< 1		
			23	28				Dark brown SILT, trace organics	
								(Moist-Hard)	
								End of Boring @ 16.0	Note #3: W.L. @ 3.44' below top of pvc well casing on 9/11/90
20									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION 4¼" I.D. Hollow Stem Augers

DATUM: Project



WELL No

B-6

EMPIRE SOILS & GROUNDWATER INVESTIGATIONS, INC.

MONITORING WELL DETAILS

EXPANDED HYDROGEOLOGIC STUDY
MOBIL SERVICE STATION
EAST MAIN STREET, WILMINGTON, VT

DR.BY: JDS	SCALE: N.T.S.	PROJ. NO. ATA-89-335
CK'D BY	DATE: 9/12/90	DRWG.NO.

DATE
STARTED 9/11/90
FINISHED 9/11/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV.
G. W. DEPTH See Note #1

PROJECT Expanded Hydrogeologic Study
Mobil Service Station

LOCATION East Main Street
Wilmington, Vt

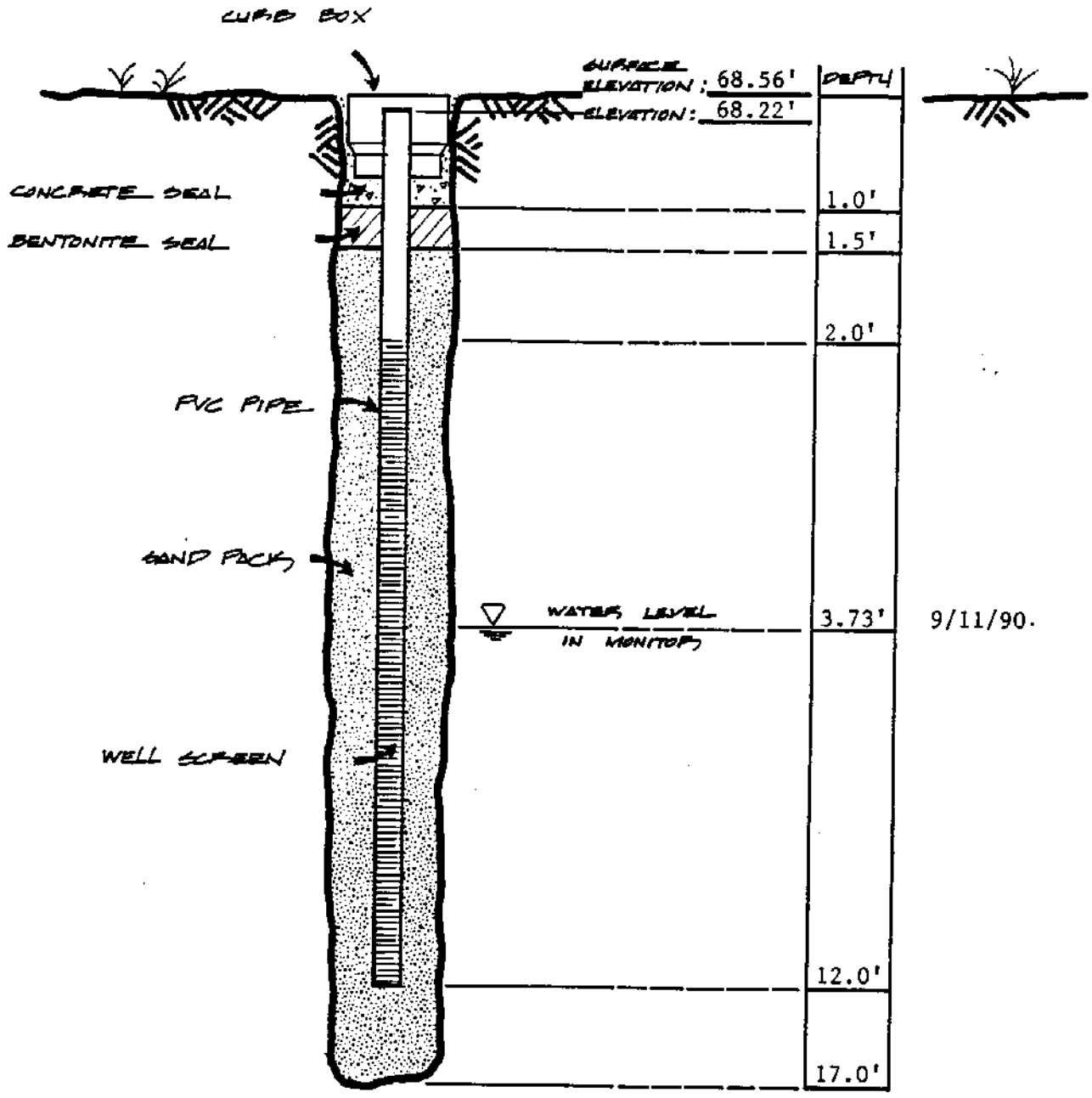
DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID (ppm)	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	3	4		8	<1	Brown SILT, Some fine Sand	Note #1: Groundwater noted @ 3.73' below top of PVC Well Casing approx. 1 hr. after well installed.
			4	4					
		2	4	6		14	<1	-becomes light grayish brown fine SAND and SILT	
			8	12					
		3	9	5		27	<1	-grades Some Silt, traces wood and gravel.	Note #2: 2" PVC Monitoring Well Installed with screen @ 2.0'-12.0'. See Well Diagram for details.
			22	10					
10		4	11	9		19	<1	-low recovery: wood, fine SAND, Some Silt	
			10	17					
		5	23	30		68	<1	-gravelly seam noted (Moist to Wet-Firm to Compact)	
			38	40					
20								End of Boring @ 17.0'	

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION 4¼" I.D. Hollow Stem Augers

DATUM: Project



WELL No

B-7

EMPIRE SOIL INVESTIGATION, INC.

MONITORING WELL DETAILS

EXPANDED HYDROGEOLOGIC STUDY
MOBIL SERVICE STATION
EAST MAIN STREET, WILMINGTON, VT

DR BY: JDS	SCALE: N.T.S.	PROJ. NO. ATA-89-335
CK'D BY:	DATE: 9/12/90	DRWG NO.

DATE
STARTED 5-1-86
FINISHED 5-1-86
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-175
SURF. ELEV. 325.6
G. W. DEPTH See Note #1

Project _____ LOCATION _____

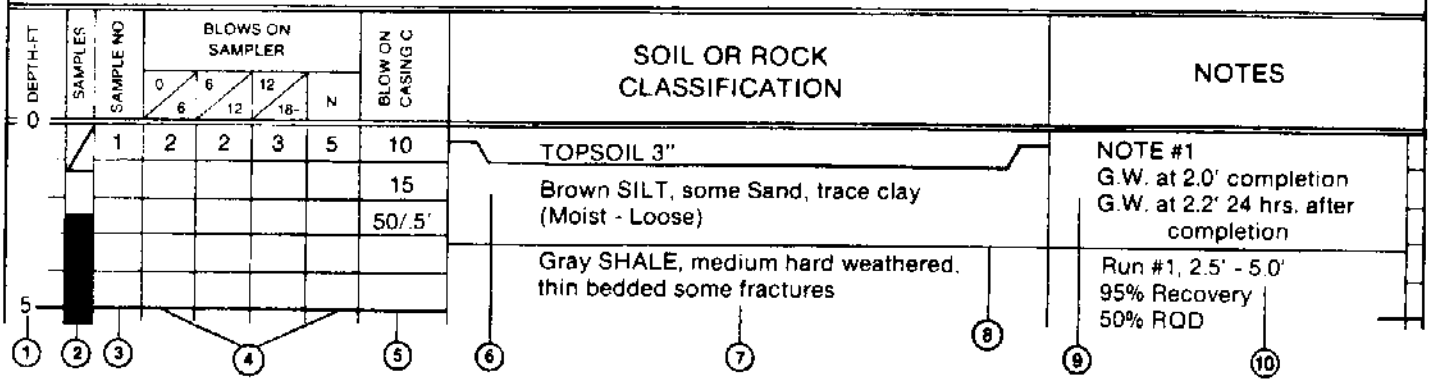


TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Auger or Test Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	> 12"	Coarse Grained (Granular)
Cobble	3" - 12"	
Gravel - Coarse	3" - ¾"	
- Fine	¾" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt-Non Plastic (Granular) Clay-Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 - 50
"some"	20 - 35
"little"	10 - 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accord with the following terms.

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	< 11	Very Soft	< 3
Firm	11 - 30	Soft	3 - 5
Compact	31 - 50	Medium	6 - 15
Very Compact	> 51	Stiff	16 - 25
		Hard	> 26

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test.)

TABLE V

Varved	- Horizontal uniform layers or seams of soil(s).
Layer	- Soil deposit more than 6" thick
Seam	- Soil deposit less than 6" thick
Parting	- Soil deposit less than ⅛" thick
Laminated	- Irregular, horizontal and angled seams and partings of soil(s)

TABLE VI

Rock Classification Terms Term		Meaning
Hardness	Soft	Scratched by fingernail
	Medium Hard	Scratched easily by penknife
	Hard	Scratched with difficulty by penknife
	Very Hard	Cannot be scratched by penknife
Weathering	Very Weathered	Judged from the relative amounts of disintegration iron staining, core recovery, clay seams, etc.
	Weathered	
	Sound	
Bedding	Laminated	Natural breaks in Rock Layers (<1")
	Thin bedded	(1" - 4")
	Bedded	(4" - 12")
	Thick bedded	(12" - 36")
	Massive	(>36")

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers.)

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller at the site, supplemented by classification of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the project. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing or sampling procedures to more accurately evaluate the subsurface conditions. Any evaluation of the contents of this report and the recovered samples must be performed by Professionals. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

1. The figures in the Depth column defines the scale of the Subsurface Log.

2. The sample column shows, graphically, the depth range from which a sample was recovered. See Table 1 for a description of the symbols used to signify the various types of samples.

3. The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

4. Blows on Sampler — shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required for each six inches of penetration is recorded. The first 6 inches of penetration is considered to be a seating drive. The number of blows required for the second and third 6 inches of penetration is termed the penetration resistance, N. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

5. Blows on Casing — shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under the Method of Investigation at the bottom of the Subsurface Log.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician, geologist or geotechnical engineer, unless note otherwise. The visual descriptions are made on the basis of a combination of the driller's field descriptions and observations and the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classification (ASTM D 2487-83) with regard to the particle size and plasticity. (See Table No. II) Additionally, the relative portion, by weight, of two or more soil types is described for granular soils in accordance with "Suggested Methods of Test for Identification of Soils" by D. M. Burmister, ASTM Special Technical Publication 479, June 1970. (See Table No. III) The description of the relative soil density or consistency is based upon the penetration records as defined on Table No. IV. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is described as dry, moist, wet and saturated. Water introduced in the boring either naturally or during drilling may have affected the moisture condition of the recovered sample. Special terms are used as required to describe materials in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and samplers blows or through the "action" of the drill rig as reported by the driller.

7. The description of the rock shown is based on the recovered rock core and the driller's observations. The terms frequently used in the description are included in Table VI.

8. The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Solid stratification lines are based on the driller's field observations.

9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to realize the reliability of the water level observations depends upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the boring may have influenced the observations. The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation wells.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run. The RQD (Rock Quality Designation) is the total pieces of NX core exceeding 4 inches in length divided by the core run. The size core barrel used is also noted.

LABORATORY RESULTS

APPENDIX C

HUNTINGDON ANALYTICAL SERVICES
Division of EMPIRE SOILS INVESTIGATIONS INC.
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - BALLSTON SPA

Project Name: Mobil - Wilmington

HAS Ref. #90-1274

September 26, 1990

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #90-1274

September 26, 1990

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods," Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

<DL - Less than detection limit
ND - Not detected
NA - Not applicable
INP - Information not provided
MB - Method Blank

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 602
PURGEABLE AROMATICS

SAMPLE IDENTIFICATION :	B-1	B-2	B-5	B-6	B-7	TRIP BLANK	METHOD BLANK
HAS SAMPLE #90-1274-	001	002	003	004	005	006	----
DATE ANALYZED:	9/21/90	9/21/90	9/21/90	9/21/90	9/21/90	9/21/90	9/21/90
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l
BENZENE ----------	830	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TOLUENE ----------	1200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ETHYL BENZENE ----------	94	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TOTAL XYLENES ----------	1000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CHLOROBENZENE ----------	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-DICHLOROBENZENE -----	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-DICHLOROBENZENE -----	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-DICHLOROBENZENE -----	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM   10/10   Page 1 of 1

Client Name: Empire Soils, 5 Kushaqua Rd   Client Contact: Steve Lawrence   HAS Quote #:

Address: Malta, NY   Phone: (518) 899 7491   P.O. #:

Project No.: ATA 89 234   Project/Site Name: Mobil - Wilmington

Samplers (Signature): Steve Lawrence   HAS Ref. #90-1274

Container Size & Type: 40ml VOA

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Rec. #	MATRIX	# of Containers	40ml VOA						Analysis Requested/ Remarks
B-1	9/17/90	12:10		X		001	H2O	2							602
B-2	↓	12:40		X		002		2							↓
B-5	↓	12:55		X		003		2							↓
B-6	↓	1:15		X		004		2							↓
B-7	↓	1:30		X		005		2							↓
Trans Blank		—		—		006		1							↓
						MKB									

Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received By:
Steve Lawrence		Tiffany M. Hudson			
Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received By:
Relinquished by:	Date/ Time:	Received for Lab by:	Date/ Time:	Remarks:	

PID SCREENING RESULTS

APPENDIX D

PHOTO-IONIZATION DETECTOR SCREENING RESULTS
MOBIL SERVICE STATION
EAST MAIN STREET
WILMINGTON, VERMONT

SAMPLE NO.	BORING NOMENCLATURE AND PID RESULTS*		
	B-5	B-6	B-7
1	<1	<1	<1
2	<1	<1	<1
3	1	<1	<1
4	<1	<1	<1
5	<1	<1	<1
6		<1	

*Note: All results presented in parts per million