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INTERIM MANAGEMENT OF MIGRATION WORK PLAN

**GROUND WATER MONITORING PROGRAM
SAMPLING AND ANALYSIS PLAN**

**VOLUME I OF II
FIELD SAMPLING PLAN**

Tinkham Garage Site
Londonderry, New Hampshire

Submitted by
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**TABLE OF CONTENTS
VOLUME I**

**TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES
LIST OF APPENDICES**

	Page No.
1. INTRODUCTION	1
1.1 The MOM Ground Water Monitoring Program SAP	1
2. SITE BACKGROUND	3
2.1 Site Location and History	3
2.2 Selected Remedy for the Site	3
2.3 Monitoring Well Network Summary	4
2.3.1 Existing Site Monitoring Wells	4
2.3.2 Wetland Areas Observation Wells	6
2.3.3 Observation Wells for Evaluation of On-Site Ground Water Discharge	6
2.4 Ground Water Characteristics	6
2.4.1 Shallow Overburden Aquifer	6
2.4.2 Deep Bedrock Aquifer	8
2.5 Management of Migration Remediation Monitoring	8
2.5.1 Remediation Goals	8
2.5.2 Remediation Monitoring Requirements	9
2.5.3 Performance Evaluation Criteria	10
2.5.4 Implementation Schedule	11
3. SAMPLING AND DATA QUALITY OBJECTIVES	12
4. HEALTH AND SAFETY	13
5. CURRENT WELL STATUS SURVEY	14
5.1 Introduction	14
5.2 Monthly Water Level Monitoring Program	14
5.3 Current Well Status for Water Quality Sampling	14
6. REMEDIAL ACTION MONITORING PROGRAM	16
6.1 General	16
6.2 Monitoring of Discharges to the POTW	16
6.3 Monitoring of Site Ground Water Quality	18

6.3.1	The Water Quality Monitoring Analytical Program	19
6.3.1.1	Water Quality QA/QC Samples	20
6.3.1.2	Water Quality VOA Preservative	20
6.3.2	Water Quality Sample Designation	21
6.4	Monitoring of Site Ground Water Elevations	22
6.4.1	Wetland Ground Water Elevation Observation Wells	22
6.4.1.1	Indicators of RAs Impacting Site Wetlands	22
6.4.2	The Ground Water Elevation Database	23
6.5	Data Reporting	23
7.	SAMPLING EQUIPMENT AND PROCEDURES	25
7.1	General	25
7.2	POTW Discharge Monitoring	25
7.3	Ground Water Sampling	26
7.3.1	Well Access and Measurements	26
7.3.2	Well Development and Sampling	27
7.4	Decontamination Procedures	31
8.	SAMPLE HANDLING AND ANALYSIS	32
8.1	General	32
8.2	Sample Labeling and Documentation	32
8.3	Chain-of-Custody/Sample Assignment	32
8.4	Sample Shipments	33

TABLES**FIGURES****APPENDICES**

LIST OF TABLES

- 1 - Summary of Monitoring Well Construction and Sampling Information
- 2 - Water Level Monitoring Program April 1994 to February 1995
- 3 - Water Quality Monitoring Program Wells
- 4- Monitoring Wells Sampled During Quarter 3 and 4, November 1994 and February 1995
- 5- Equipment Requirements

LIST OF FIGURES

- 1 - Site Location Map
- 2 - Site Plan
- 3 - Project Schedule

LIST OF APPENDICES

- A - Available Boring Logs and Monitoring Well Installation Diagrams
- B - Health and Safety Plan
- C - Industrial Waste Water Discharge Permit
Discharge Permit Request Approval and
Discharge Permit Revisions
Table C.1 - Summary of POTW Discharge Limits

1. INTRODUCTION

The Management of Migration (MOM) Work Plan for the Tinkham Garage site (site) in Londonderry, New Hampshire consists of a series of interim plans developed for specific aspects of the MOM remedy. As approved, each interim MOM document will be appended or otherwise incorporated into the parent document; the MOM Work Plan. The purpose for having interim documents developed and submitted is to maintain progress toward the overall project remedy.

The MOM Work Plan comprises the following documents:

- the MOM Ground Water Monitoring Program (GWMP) Sampling and Analysis Plan (SAP);
- the Design Plans and Specifications for the MOM Bedrock Pumping System and the on-site conveyance to the Town of Derry Publicly Owned Treatment Works (POTW) which were submitted by Hoyle Tanner & Associates (HTA) and approved by New Hampshire Department of Environmental Services (NHDES) on June 10, 1994; and
- the Operation and Maintenance Plan for the MOM Bedrock Pumping System to be submitted under separate cover.

1.1 The MOM Ground Water Monitoring Program SAP

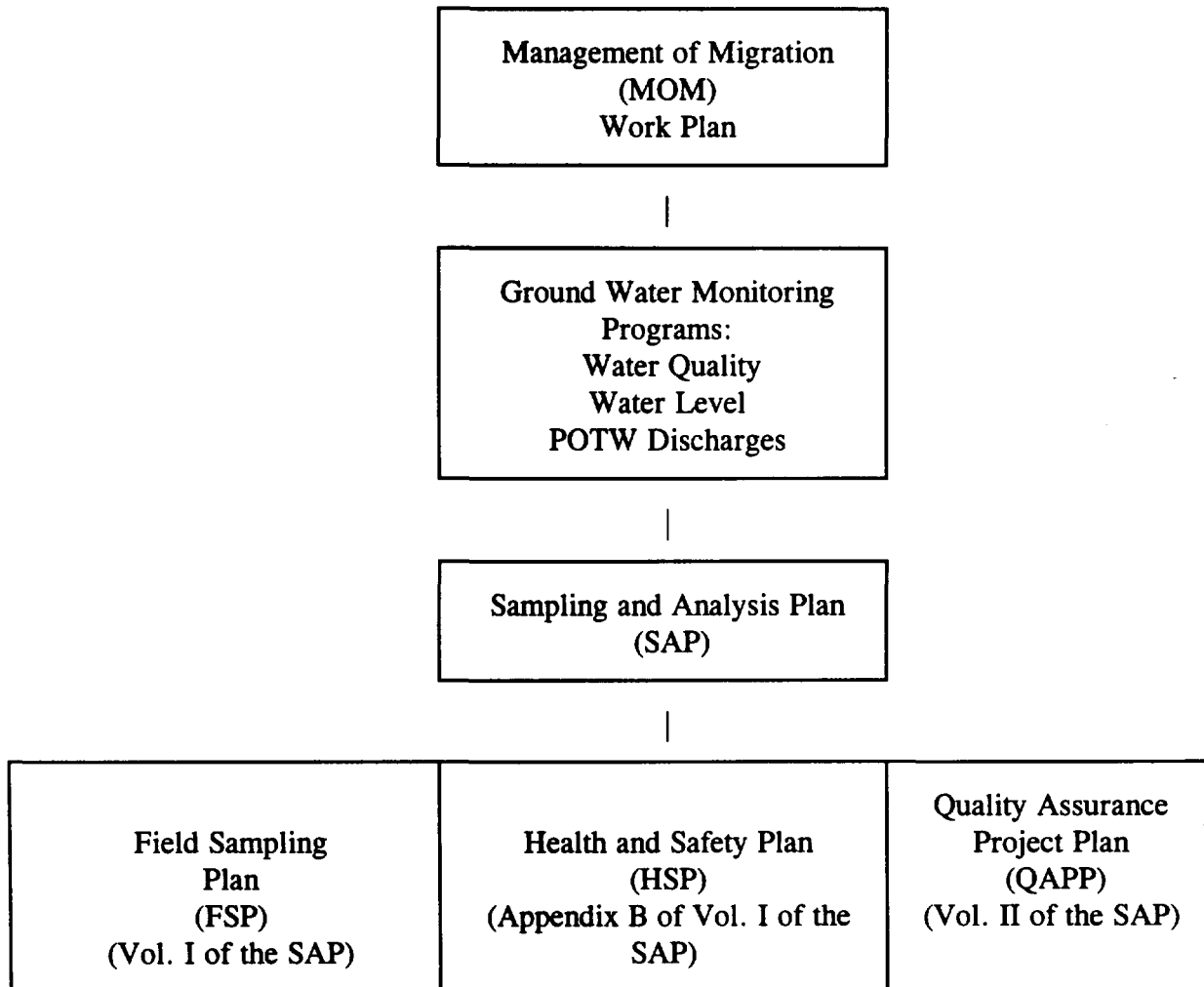
The Sampling and Analysis Plan (SAP) for the MOM Ground Water Monitoring Program at the Tinkham Garage site consists of three supporting documents:

- the Field Sampling Plan (FSP);
- the Health and Safety Plan (HSP); and
- the Quality Assurance Project Plan (QAPP).

The FSP presented in this document (Volume I of II of the MOM SAP) contains the logistics of, and specific sampling and data gathering procedures for field activities needed to perform the MOM ground water monitoring programs. The FSP was developed to be consistent with the EPA guidance document "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," October 1988, Interim Final (EPA/540/G-89/004) and "A Compendium of Superfund Field Operations Methods," (Office of Solid Waste and Emergency Response Directive 9355.0-12, EPA/540/P-87/001).

The HSP contains emergency and non-emergency information as well as health and safety protocols that will be followed to protect the health of site personnel and the public during performance of the MOM GWMP. The HSP is included as Appendix B of Volume I of the MOM SAP.

The QAPP contains the site-specific objectives, policies, organizations, functional activities, and specific Quality Assurance/Quality Control (QA/QC) procedures and acceptance criteria needed to achieve the data quality objectives of the Tinkham site MOM GWMP. The QAPP is Volume II of II of the MOM SAP. The organization of the MOM Work Plan, which is currently limited to the MOM SAP, is shown below.



As described above, the MOM Work Plan will be expanded by preparing additional interim plans for other portions of the MOM remedy. As these interim plans are completed, the above organizational diagram will be revised.

2. SITE BACKGROUND

2.1 Site Location and History

The Tinkham Garage site (site) is located in the Town of Londonderry, New Hampshire near the intersection of Interstate Route 93 and N.H. State Route 102 (Figure 1). The site comprises 375 acres and has been partially developed for residential use with condominiums and single family homes. The undeveloped areas of the site consist of wooded areas, open fields, and wetlands.

Available historical information suggests that volatile organic compounds (VOCs) were discharged in the area behind Tinkham's Garage and on the Woodland Village Condominium property. As a result, organic chemicals have been found in soil and both overburden and bedrock ground water at the site. The nature and extent of VOCs in soil and ground water at the Tinkham Garage site have been characterized during several investigations. These investigations have included a Remedial Investigation/Feasibility Study (RI/FS) performed by NUS Corporation (January 1986), a Feasibility Study performed by Camp Dresser & McKee, Inc. (July 1986), and a Pre-Design Study performed by Malcolm Pirnie (July 1988). As part of the Malcolm Pirnie study, a vacuum extraction pilot study also was performed by Terra Vac to demonstrate the feasibility of this technology to remediate contaminated soils.

2.2 Selected Remedy for the Site

Contamination at the Tinkham Garage site consists of VOC-contaminated soil at four locations: the Garage soils area; the soil pile located behind condominium buildings C and D; the leach field for condominium buildings L and K; and the leachfield for condominium buildings I and J. These locations are shown in Figure 2. Data indicate that surficial contamination has migrated through the vadose zone and into the overburden aquifer at the site. Overburden ground water flow at the site is principally toward the south-southeast. Data indicate the lateral extent of overburden ground water VOC contamination is limited. Local hydrogeologic conditions, augmented by flows induced by the pumping of community water supply wells, have facilitated the migration of contaminants into the underlying fractured bedrock aquifer. Bedrock wells across much of the site have been found to contain VOCs. The network of monitoring wells on the Tinkham Garage site is shown in Figure 2. Table 1 contains a summary of these wells including the most recently reported VOC results for ground water sampled from them.

As required in the Record of Decision (ROD) (September 30, 1986) and Amended ROD (March 10, 1989), the remedial action at the site will consist of the following:

- **Source Control (SC)**, including excavation of contaminated soil from three areas (two condominium leachfields and the "soil pile"), consolidation of this soil with the contaminated soil behind the Tinkham Garage, and on-site treatment using in situ dual vacuum extraction (DVE). The nature and extent of contamination in the

source areas are described in the January 20, 1992 Scope of Work for Source Control Remedial Action prepared by Terra Vac. Terra Vac will address these aspects of the site remediation and will also address overburden ground water contamination in the Garage area during the remediation of soil in that area. Terra Vac completed its Source Control Work Plan for the site in February 1994.

The three areas of contaminated soils were excavated and consolidated with the contaminated Garage area soils by Terra Vac during April 1994. Installation of dual vacuum extraction wells was completed by Terra Vac in May 1994, and startup of the DVE system occurred in November 1994.

- **Management of Migration (MOM)**, including extraction and treatment of overburden and bedrock ground water. Overburden ground water from the Garage area will be treated as necessary by an air stripper designed by Terra Vac. This water will then be mixed with water extracted from the condominium supply wells LGAW and LGSW for further treatment at the Town of Derry Publicly Owned Treatment Works (POTW). A sewer line and pump station were constructed to convey the extracted ground water to the POTW. Discharges from the site to the POTW conveyance line will be permitted by the Towns of Londonderry and Derry and NHDES. GEI Consultants, Inc. (GEI) will provide overall management of the MOM remedial actions at the site. The Tinkham's engineer, HTA, completed design of the on-site portion of the sewer line in June 1994. Construction of the on-site sewer line was completed in August 1994. Operation of the bedrock pumping system started on May 22, 1995. It is anticipated that GEI will take over management of the shallow ground water remediation in the Garage area after about one year (i.e., after soil remediation in the area has been completed by Terra Vac).

Response actions for remediation of the site will be performed in accordance with the August 16, 1989 Cannons Engineering Case Consent Decree. The currently anticipated schedule for all remedial activities through completion of remediation is shown in Figure 3.

2.3 Monitoring Well Network Summary

2.3.1 Existing Site Monitoring Wells

A total of 89 monitoring wells, observation wells or water supply wells have been drilled at the Tinkham site. The monitoring wells were installed for site investigations as early as 1982. Twenty-three wells have been lost, destroyed or otherwise damaged, precluding their use in monitoring ground water quality. Three observation wells were installed exclusively for monitoring ground water elevations in wetlands. Sixty-one monitoring wells and the two former water supply wells (LGAW and LGSW) remain in use for ground water quality monitoring. This existing well network will be used to monitor

ground water elevations and/or water quality for the site. The well locations are shown on Figure 2. Appendix A contains the available boring logs and/or installation diagrams for the Tinkham site wells.

Monitoring wells drilled at the site include the following:

- Twenty-four monitoring wells installed in the garage area by Normandeau Associates, Inc. (NAI). These wells were installed during the period December 1982 to June 1983 for a study performed for Sheehan, Phinney, Bass + Green, P.A. of Manchester, New Hampshire.
- Twenty-seven FW-Series monitoring wells installed in 1983 by the NUS Corporation Field Investigation Team (NUS/FIT).
- Six ERT-Series monitoring wells installed in 1983 by the Environmental Protection Agency (EPA) Emergency Response Team (ERT).
- Fourteen FW-Series monitoring wells installed in 1984 by NUS/FIT for a Remedial Investigation of the site.
- Eight MP-Series monitoring wells and two Ross Drive monitoring wells installed during the 1987-1988 Pre-Design Study by Malcolm Pirnie. The MP-Series wells were installed to investigate ground water quality adjacent to condominium leachfields, I/J and K/L.

The Ross Drive wells were installed as a couplet to investigate chemical concentrations in ground water in the southwest portion of the site south of monitoring well FW17. No VOCs have been detected in samples from these wells.

- A water quality monitoring replacement well (MP-I-3S-R) installed by GEI in 1994 to replace well MP-I-3S, which was obstructed.
- A water quality/water level monitoring well, OW-2D, installed by GEI in 1994 in the wetland southeast of the Garage source area.
- Three site wetland water table observation wells (OW-1, OW-2S, OW-3) installed by GEI in 1994.

Wells at the site once used for water supply include three community water supply wells (LGAW, LGSW, and LGEW) in the condominium area and several lower capacity wells for supplying individual residences. Use of the condominium and residential supply wells has been replaced by a municipal water supply system.

2.3.2 Wetland Areas Observation Wells

In October 1994, wetlands observation wells OW1, OW2S, OW2D and OW3 were installed at the site under the observation of GEI. Procedures for well installation were provided in GEI's letter dated September 30, 1994. Installation of the wells was described and well logs were provided in a letter report by GEI dated November 4, 1994. The purpose of the wells is to provide ground water level monitoring locations to detect changes in ground water elevations which may be indicative of impacts to wetlands. Well OW2D is used in the ground water quality monitoring program. Well OW-3 was screened from 3 to 11 feet below the ground surface, approximately 2 feet below the ground water surface at the time of drilling. Consequently, if the water level in the well remains above the well screen, ground water elevations may be somewhat inaccurate, but OW-3 will serve its intended purpose because changes in ground water levels will be discernable using ground water level measurements at the well. The wetland observation wells will be monitored for ground water or surface water elevations on a monthly basis. The water level monitoring program, including further detail about the network of previously installed wells that will serve as wetland monitoring locations, is discussed in Section 6.4.

2.3.3 Observation Wells for Evaluation of On-Site Ground Water Discharge

In May and June of 1992, GEI drilled 15 borings at 10 locations in performance of a subsurface exploration and testing program evaluating the possibility of locating an effluent infiltration system on-site. Ground water observation wells were installed within the overburden in the shallow borings and piezometers within the bedrock of the deep borings. A total of 12 observation wells or piezometers were installed. The GEI-wells, installed for the purpose of evaluating the feasibility of discharging remedial effluents to a ground water infiltration system, were not installed for the purpose of water quality monitoring and are not currently being proposed for MOM water quality or water level monitoring programs. The GEI-wells are closely spaced in an area of the site covered by other existing monitoring wells.

2.4 Ground Water Characteristics

2.4.1 Shallow Overburden Aquifer

During previous investigations, VOCs have been detected in shallow ground water within the Garage area at a maximum total concentration of 32,000 micrograms per liter ($\mu\text{g/L}$). Data collected during Terra Vac's vacuum extraction pilot study indicated that Total VOC (TVOC) levels in the combined discharge from four dual extraction wells in the Garage area varied from 15,000 to 25,000 $\mu\text{g/L}$, with an average TVOC concentration of 18,000

$\mu\text{g/L}$. The most prevalent VOCs detected include methylene chloride, 1,1,1-trichloroethane, trichloroethylene (TCE), toluene, tetrachloroethylene (PCE) and xylenes.

Previous analyses of ground water from the shallow wells located downgradient of the Garage area by Malcolm Pirnie indicated TVOC levels as high as 1,070 $\mu\text{g/L}$. The downgradient wells sampled by Malcolm Pirnie included FW-11, FW-20, FW-26 and FW-27. The most prevalent VOCs detected included benzene, tetrahydrofuran and various chlorinated VOCs. Additional compounds detected include ethylbenzene and 4-methyl-2-pentanone (MIBK) in well FW-11. The highest TVOC level reported in shallow ground water downgradient of the Garage area was 9,100 $\mu\text{g/L}$ in FW-11 (RI/FS;1986;NUS Corporation).

In addition to the Garage area, overburden monitoring wells located on the Woodland Village Condominium property have been found to contain VOCs at total concentrations as high as 5,637 $\mu\text{g/L}$ (FW-19; Figure 2). Upward vertical gradients in the vicinity of the unnamed tributary and the condominium buildings have facilitated the upward migration of contaminants from the underlying bedrock (see Section 2.4.2 below) into the overburden aquifer in these areas.

Overburden and shallow bedrock ground water in the areas of the Woodland Village Condominium complex leachfields I/J and K/L have been found to be contaminated with VOCs including chlorinated volatile organics, toluene, ethylbenzene and xylenes. TVOCs in ground water samples from the leachfield areas have been reported at a maximum concentration found of 181 $\mu\text{g/L}$ (Malcolm-Pirnie Pre-Design Study in well MP-L-2D on 12/18/87).

Five overburden/shallow bedrock FW-series wells (FW-01, FW-09, FW-10, FW-20, and FW-27) and seven overburden NAI-series wells (NAI-A1, NAI-C1, NAI-F, NAI-I, NAI-K1, NAI-M1, and NAI-U) were sampled for VOCs by GEI in February 1992. Two of the wells, NAI-K1 and NAI-M1, had TVOCs in water greater than 1000 $\mu\text{g/L}$. The highest TVOC concentration reported for the February 1992 sampling event was in NAI-K1 at 4400 $\mu\text{g/L}$. Chlorinated-VOCs (including PCE, TCE, 1,1-dichloroethane (DCA), 1,2-dichloroethane (1,2-DCA), 1,2-dichloroethene (DCE) and vinyl chloride) were the most significant components of the TVOC signatures. Toluene was detected in NAI-K1 at 1100 $\mu\text{g/L}$.

Results of the first four rounds of the ground water quality monitoring program indicate that Total VOC concentrations and concentrations of the target VOCs (PCE and TCE) are generally lower than those detected in earlier ground water samples. The monitoring results were provided in reports by GEI dated September 9, 1994, October 7, 1994, and February 3, 1995 and April 7, 1995.

2.4.2 Deep Bedrock Aquifer

VOCs from the principal source area, the field behind Tinkham's Garage, have migrated into the underlying fractured bedrock aquifer.

Downward vertical gradients in the Garage area have caused the migration of VOCs from overburden ground water into the underlying bedrock. For example, well couplets FW-10/FW-10D and FW-11/FW-11D located 600 feet south and southeast of the Garage area have indicated strong downward vertical gradients. TVOCs concentrations in the bedrock aquifer sampled from FW-11D have been as high as 865 $\mu\text{g/L}$ (07/83). Contamination entering the bedrock aquifer has generally migrated in a south-southwesterly direction along the predominant orientation of water-bearing bedrock fracture zones. Pump tests of LGSW and LGAW (Figure 1) confirm the hydraulic connection of these wells with the Garage area, some 2,500 feet to the northwest. Maximum Total VOC levels measured in LGSW and LGAW during the pump test were 154 $\mu\text{g/L}$ and 1,193 $\mu\text{g/L}$, respectively. VOCs detected included benzene, toluene, ethylbenzene and xylenes (BTEX compounds), vinyl chloride, acetone, tetrahydrofuran, methyl isobutyl ketone (MIBK) and various chlorinated VOCs. Maximum TVOC levels detected in bedrock ground water on the site have been found in the condominium area (well ERT-06; 16,328 $\mu\text{g/L}$).

Recent water quality samples collected from bedrock wells indicate that TVOC levels in the deep bedrock aquifer at the site have decreased.

A summary of the most recent TVOC levels reported for the site monitoring well network is provided in Table 1.

2.5 Management of Migration Remediation Monitoring

MOM remediation will consist of ground water recovery from the former condominium supply wells designated LGSW and LGAW and from the DVE wells installed in the Garage area. Ground water recovered during remediation will be discharged via the sewer connection to the Town of Derry POTW. Ground water recovered from the Garage area will be pretreated by air stripping to meet POTW discharge requirements.

2.5.1 Remediation Goals

The 1986 ROD and the 1989 Amended ROD specify that remediation of ground water in both shallow and deep aquifers shall be performed until concentrations of the indicator compounds TCE and PCE are reduced to 5 $\mu\text{g/L}$ in all on-site monitoring wells or for a period of two years. If ground water remediation goals are achieved for the indicator compounds within two years of remediation, a final determination will be made by EPA as to whether the overall ground water quality is protective of public health and the environment. If remedial goals are not achieved after two years of remedial actions, an

evaluation will be made by EPA to assess progress in meeting objectives for the cleanup of ground water at the site. If steady state conditions have been reached, and it is evident remedial objectives are not achievable, EPA will re-evaluate the objectives and the approach to ground water remediation.

2.5.2 Remediation Monitoring Requirements

To evaluate the MOM remediation program at the Tinkham Garage site, ground water quality monitoring consistent with RCRA (40 CFR 264.100d) requirements as specified in the ROD and Amended ROD for the site will be performed until remediation goals as outlined in Section 2.5.1 are met. Based on GEI's Scope of Work for Management of Migration Remedial Action (GEI, December 15, 1994) GEI will:

- monitor discharges to the POTW, as required by the Town of Londonderry Board of Sewer Commissioners. The existing Industrial Wastewater Discharge Permit (IWDP) indicates that discharge monitoring will be performed primarily by the Town of Londonderry;
- establish and manage a monitoring program for site ground water quality during remedial actions; and
- establish and manage a monitoring program for site ground water levels during remedial actions.

The GEI MOM SAP will be revised if necessary to include monitoring of the shallow ground water remediation system in the Garage area prior to demobilization by Terra Vac. Any proposed amendments to the GEI MOM SAP will be submitted to EPA for prior review and approval.

The specific standard operating procedures (SOPs) to be used in performance of the ground water remediation monitoring programs are described in the following sections of this FSP. In general:

- Monitoring of site water quality will consist of sampling representative ground water from a site-wide network of wells for VOC analyses on a quarterly schedule. Water quality samples will be collected initially and annually thereafter from all functioning monitoring wells as identified in Table 3 and the pumping wells LGAW and LGSW.. The Ground Water Quality Monitoring Program (GWMP) began in June 1994 with the sampling of all functioning monitoring wells. The second and third quarterly sampling rounds (Q2 and Q3) were performed in August/September 1994 and November/December 1994, respectively.

- Tables 1 and 3 currently list all monitoring wells installed at the site except GEI-series wells. The wells shaded in Table 3 are currently not suitable for water quality sampling based on GEI's recent well-status survey (April/May 1994) and the first three quarterly sampling rounds. The shaded wells are either lost, destroyed, or obstructed. Attempts to rehabilitate wells FW11, FW15D and MP-I-3S were made in October 1994 (see GEI letter report dated November 4, 1994). However, the attempts were unsuccessful. MPI-3S was redrilled (MP-I-3S-R), and FW11 was judged suitable for inclusion in the GWMP. FW15D was vandalized and could not be repaired.
- Monitoring of site water levels will consist of monthly measurements of potentiometric elevations in ground water in a site-wide network of wells as identified in Table 2. Results of the monitoring program will be used to detect adverse effects to site wetlands from remedial actions as well as to further define site hydrogeologic conditions. One surface water elevation monitoring station (established in May 1995) is located in wetlands and monitored on a monthly basis (Figure 2).

2.5.3 Performance Evaluation Criteria

The performance of the MOM and SC ground water recovery systems will be evaluated based on the results of the discharge and water quality monitoring programs. Monitoring results will be reported to EPA in periodic reports submitted to the EPA and State of New Hampshire in accordance with provisions of the Consent Decree. Results will be used to determine whether to terminate or continue ground water remediation when either; the remediation goal of reducing concentrations of TCE and PCE in all monitoring wells to less than 5 $\mu\text{g/L}$ has been attained; or a two-year period of remedial action has been completed. If after two years steady state conditions have been reached, and it is evident remedial objectives are not achievable, EPA will re-evaluate the objectives and the approach to ground water remediation.

If impacts on water levels, other than those attributable to seasonal fluctuations, are observed in the wetland observation well network, then the rate of remedial ground water removal will be adjusted to a level at which the wetlands will not be adversely affected.

Possible adverse affects to the wetlands may include a reduction of ground water elevations within the extent of the wetland and/or changes (relative to the variety and amount) in the vegetation that comprises the wetland.

The Ross Drive well couplet (Ross Drive Shallow/Deep) are included in the monthly ground water elevation monitoring program. Previous pumping tests have indicated that no hydraulic connection exists between the Tinkham site and bedrock wells in the Ross Drive/Tokanel Drive area. However, monitoring of the Ross Drive well couplet will

provide indications of potential impacts that on-site ground water extraction may have on water levels at supply wells in the Ross Drive/Tokanel Drive area.

2.5.4 Implementation Schedule

The implementation schedule for major components of both Source Control and MOM remedial actions through the completion of remediation is presented in Figure 3. The schedule shows milestone events. GEI will update the schedule of site activities in progress reports, as necessary, or as requested by EPA. Task update or closure information will be provided to GEI by the responsible parties to keep the project schedule current.

3. SAMPLING AND DATA QUALITY OBJECTIVES

The data obtained from the MOM monitoring program at the Tinkham Garage site will be used to:

- evaluate compliance of site discharges to the POTW in accordance with permitted conditions.
- evaluate site ground water quality conditions on a quarterly basis until; the concentrations of the ROD- designated indicator compounds, TCE and PCE, are reduced to 5.0 $\mu\text{g/L}$ or less in all on-site monitoring program wells; or for a period of two years. If MOM remedial objectives are not achieved after two years of remedial actions, an evaluation will be made by EPA to assess progress in meeting objectives for the cleanup of ground water at the site.
- monitor the fluctuation of water levels in the wetland areas southeast and southwest of the Garage soils area to detect potential adverse impacts to the function and nature of the existing wetlands due to remedial actions.

A primary objective for a long term sampling/monitoring program is to obtain definitive results of known quality through consistency of procedure and method. The hydrological, physical and chemical ground water data collected over the course of the monitoring program must be to the extent possible, representative and comparable from quarter to quarter and year to year. The monitoring program developed by GEI for The Cannon's Sites Group emphasizes the co-objectives of representativeness and comparability in all aspects of field data collection activities, sample management, and analytical protocols. Strict adherence to the field sampling organization and procedures presented in the following sections of this work plan and its appendices, and to the protocols established in the QAPP is necessary to achieve the data quality objectives of the MOM ground water monitoring programs.

4. HEALTH AND SAFETY

A Health and Safety Plan for the Tinkham site GWMP is presented in Appendix B. All personnel involved in the ground water sampling program have been trained in accordance with the requirements of the Occupational Safety and Health Administration Regulation OSHA 1910.120, Hazardous Operations and Emergency Response, and are enrolled in a comprehensive medical monitoring program.

A list of personnel authorized to perform work on this project and verification of their participation in personnel training and health monitoring programs is presented in the Health and Safety Plan.

5. CURRENT WELL STATUS SURVEY

5.1 Introduction

The wells proposed for the Tinkham site ground water monitoring programs have been designated from the results of a well status and suitability survey performed by GEI in April/May of 1994 and the subsequent quarterly sampling rounds (Q1 through Q3).

During the period of April 28 through May 3, 1994, GEI attempted to locate all site wells. Of the 89 wells identified at the site (Table 1), six wells were not found. As found, each well was observed for overt damage and frost heaving or weathering of grouted seals. Permanent well identifications were painted on the protective casings of all wells located. Photographs of each well found were taken and logged. Well stickups, protective casings, and riser sections were measured relative to the ground surface and each other. Permanent well reference points were re-established or chosen, marked and documented in the field notes.

Two objectives were established for the well survey performed by GEI in late April/May of 1994: to begin the MOM water level monitoring program; and to assess the current status of the site's monitoring well network.

5.2 Monthly Water Level Monitoring Program

From the reference point, depth to ground water was measured in all monitoring wells found. These measurements initiated a program of monthly water level monitoring to be performed for the duration of site remedial actions as described in Section 6.4 of this document. In November 1994, the water level monitoring program was expanded to include measurements in the wetland observation wells. All wells functionally suitable for water level measurements are listed in Table 2.

5.3 Current Well Status for Water Quality Sampling

The network of monitoring wells at the Tinkham site is extensive. The network is also about 10 years old (installation dates; Table 1). The integrity of each well located by GEI in April 1994 was evaluated. To assure that a ground water sample will be representative of each well's installed screen or pervious section, the current depth to the bottom of each well was compared against its installation logs (logs of Appendix A). If a well was found to have less than 75 percent of its installed pervious section (i.e., screened or open hole section) remaining open, then that well may no longer be suitable for water quality analytical sampling. If a well's current suitability for water quality sampling is questionable based on the 75 percent criteria or other evaluations made during the well survey, then decisions were made, with EPA's concurrence, to either attempt to rehabilitate the well (see Section 2.5.2), or to remove the well from the water quality monitoring program. A different criterion was applied to the site network of wells for inclusion in the water

level monitoring program. All site wells that currently have about 25 percent of its pervious section open have been included in the water level monitoring program (Table 2).

6. REMEDIAL ACTION MONITORING PROGRAM

6.1 General

The MOM remedial action monitoring program at the Tinkham site has three components:

1. POTW discharge monitoring;
2. A water quality monitoring program at locations across the site; and
3. A water level monitoring program at locations across the site.

6.2 Monitoring of Discharges to the POTW

On June 27, 1994, GEI submitted an Industrial Wastewater Discharge Permit (IWDP) Application for discharges from LGAW, LGSW and the DVE system to the Town of Londonderry sewer connection to the Town of Derry POTW. Supporting documents submitted with the IWDP permit application included: HTA design drawings for the sewer connection; Terra Vac's DVE system schematic drawings and DVE ground water treatment system design parameters; and analytical data reports for ground water samples from LGAW and LGSW.

In a letter dated July 1, 1994, the Town of Londonderry Board of Sewer Commissioners submitted a Discharge Permit Request (DPR) to NHDES for the discharge of 172,800 gallons per day (gpd) from the site and requested that the Town of Derry review and approve the discharge request. On July 15, 1994, the Town of Londonderry submitted a draft IWDP to NHDES. The draft permit indicated that monitoring and reporting for compliance with discharge limitations would be performed by the Town of Londonderry. The monitoring program would include grab samples of discharge for analysis for VOCs and base neutral semivolatile organic compounds (SVOCs), and a time composite sample for analysis for arsenic four times per year. The draft permit also indicated that two time composite samples per year for analysis for priority metals (antimony, beryllium, chromium, lead, nickel, silver, zinc, cadmium, copper, mercury, selenium and thallium) would be obtained by the Town.

In a letter dated August 11, 1994, the Town of Derry submitted a DPR to NHDES for the discharge of 172,800 gpd from the site. Derry's letter indicated that additional analyses of ground water at LGSW appeared necessary due to the detection of lead (0.35 $\mu\text{g/L}$) and zinc (7.4 $\mu\text{g/L}$) at concentrations greater than Derry's local limits of 0.264 $\mu\text{g/L}$ for lead and 0.836 $\mu\text{g/L}$ for zinc.

GEI obtained additional samples from LGSW for analysis for lead and zinc on August 22, 1994 and for zinc on September 9, 1994. Lead was not detected in the August 22, 1994 sample (detection limit of 0.10 $\mu\text{g/L}$). Zinc was reported in the two samples at concentrations (9.0 $\mu\text{g/L}$ and 18 $\mu\text{g/L}$) which remained above the discharge limit. Consequently, in a letter dated

September 22, 1994, GEI requested that the IWDP be revised to exclude discharge from LGSW, which was estimated to be in the range of 22,000 to 43,000 gpd.

On October 4, 1994, NHDES issued an Industrial Wastewater Discharge Permit Request Approval (IDP 94-036A) for the discharge of 129,600 gpd from the site with the exclusion of discharge from LGSW. In a letter dated November 2, 1994, the Town of Derry conditionally approved the DPR.

Concentrations of zinc detected in ground water samples from LGSW on December 7 (0.056 $\mu\text{g/L}$), December 21 (0.120 $\mu\text{g/L}$) and December 30, 1994 (0.033 $\mu\text{g/L}$) were lower than the Derry POTW discharge limit of 0.836 $\mu\text{g/L}$. In a letter dated January 11, 1995, GEI requested that the IDP be modified to include discharge of approximately 30 gpm (about 43,000 gpd) of water pumped from LGSW. Monitoring of discharges from LGSW for total zinc on a bi-monthly basis for the first six months of operation of the LGSW pumping system was proposed and accepted by the Town of Londonderry. Samples of effluent from both LGSW and the combined discharge from LGSW, LGAW and the DVE system for analysis for total zinc during the first six months of operation of LGSW will be performed by GEI. Operation of the LGSW pumping system will be interrupted if zinc is detected in the LGSW effluent at a concentration which results in an exceedance of the POTW discharge limit. If zinc is detected in the isolated LGSW effluent at a concentration greater than the discharge limit, but at a concentration less than the discharge limit in the combined discharge, LGSW and the combined effluent will be resampled within one week of receipt of analytical results. Following receipt of the results from the resampling, the Board of Sewer Commissioners will be contacted and a determination will be made relative to temporarily eliminating discharge of water from LGSW to the sewer.

Approval of GEI's request to modify the IWDP to include discharge from LGSW was delayed, apparently because the modification involved increased flow to the POTW. In a letter dated February 17, 1995, GEI requested interim approval of discharge from LGSW within the 129,600 gpd of the October 1994 DPR Approval. However, GEI also requested ultimate approval of 172,800 gpd to accommodate increased discharge associated with increased dewatering requirements for full-scale operation of the DVE system and springtime high ground water levels. On March 28, 1995, NHDES issued a DPR Approval which modified the October 4, 1994 (IDP 94-036A) to include discharge from well LGSW based on the lower concentrations of zinc detected at this well. The permitted flow remains at 129,600 gpd. On April 21, 1995 the Town of Londonderry issued revisions to the discharge permit (Londonderry Permit IDP-7-122) for 129,600 gallons per day (gpd) (monthly average) from LGAW, LGSW and the DVE system. Copies of the revised discharge permit and the March 28, 1995 NHDES DPR Approval are provided in Appendix C. Table C.1 in Appendix C contains a list of discharge limitations included in the revised discharge permit.

Sampling of LGSW and LGAW for analysis for VOCs will be performed as part of the quarterly ground water monitoring program. Discharges from the DVE system are monitored by Terra Vac.

Operation of the DVE system began on November 21, 1994. Shallow ground water recovered from the Garage area is pretreated by air stripping prior to discharge to the Town of Londonderry sewer. For the duration of soil remediation in the Garage area, monitoring of extracted ground water and soil vapor associated with the dual vacuum extraction system will be performed by Terra Vac in accordance with the Terra Vac Sampling and Analysis Plan (Terra Vac; Project Operations Plan, Volume III; Sampling and Analysis Plan for the Source Control Remedial Action at the Tinkham's Garage site; dated February 7, 1994). System performance monitoring by Terra Vac will include periodic sampling of untreated ground water and of the treated discharge. Terra Vac will also monitor air discharges from the ground water treatment system. Following completion of soil remediation and demobilization of equipment by Terra Vac, operation and maintenance of the shallow ground water recovery and treatment systems will be performed under the direction of GEI. The standard operating procedures for sampling and analysis, system maintenance, record keeping, and reporting established by Terra Vac during soil remediation will be continued by GEI. However, changes to the ground water recovery system may be required in the future based on plume geometry or future use of the area by the Tinkhams. Proposed changes to the ground water recovery system would not impede performance of the shallow ground water remediation and will be approved by EPA and NHDES prior to implementation.

6.3 Monitoring of Site Ground Water Quality

The 1989 Amended ROD specifies that ground water treatment is to proceed until treatment goals are met or for a two-year period from the date pumping of shallow and deep ground water begins. At the end of the two-year period, an evaluation will be made by EPA to assess progress in meeting objectives for the cleanup of ground water at the Site. If steady state conditions have been reached, and it is evident remedial objectives are not achievable, EPA will reevaluate the objectives and its approach to ground water remediation. Ground water remediation will cease upon achieving 5 $\mu\text{g/L}$ of PCE and TCE, respectively, in every well on-site. Upon achieving these goals, an evaluation will be made to determine if water quality is protective of public health and the environment.

If continued ground water remediation is required beyond the anticipated two years, additional monitoring will be conducted as necessary to evaluate attainment of or progress toward ground water remediation goals.

Ground water quality monitoring will be performed consistent with RCRA (40 CFR 264.100d) requirements as specified in the ROD and Amended ROD. Monitoring will be performed on a quarterly basis to detect seasonal variations in VOC concentrations at affected wells.

The network of site monitoring wells designated for the water quality monitoring programs contained in Table 3. Pumping wells LGSW and LGAW are also included in the quarterly sampling program. Well locations are shown in Figure 2. The ground water quality monitoring program will be performed for the duration of remediation. Monitoring of ground water quality at the site will consist of sampling of representative ground water from designated wells for VOC

analysis on a quarterly schedule. The sampling quarters will be scheduled to represent seasons (i.e., August/Summer, November/Fall, February/Winter and May/Spring).

The initial round of (Quarter 1 (Q1)) water quality samples was obtained from all functioning monitoring wells (a total of 56 wells) during June 1994; and all functioning wells will be sampled on an annual basis (i.e., the May sampling round) thereafter.

Quarters 2 (Q2), 3 (Q3) and 4 (Q4) of the Ground Water Quality Monitoring Program were conducted in August 1994, November 1994 and February 1995, respectively. The water quality monitoring wells sampled in Q2 and Q3 were based on earlier analytical results and discussions with EPA. Thirty-two wells were sampled during the Q2 sampling round, and 29 wells were included in the Q3 and Q4 sampling programs.

The 29 wells included in Q3 and Q4 represent the current monitoring well network which will be sampled each summer, fall and winter quarter (Table 4). Proposals, if any to change this network will be submitted to EPA with the report providing the results of the annual (i.e., Spring) sampling round.

6.3.1 The Water Quality Monitoring Analytical Program

Ground water samples collected in performance of the Tinkham site water quality monitoring program will be analyzed for EPA Method 624 Purgeable VOCs (GC/MS - Purge and Trap) by National Environmental Testing, Inc., Cambridge Division (NET), in Bedford, Massachusetts. NET is a participant in the Contract Laboratory Program (CLP) and is a State of New Hampshire certified laboratory. NET's Statement of Qualifications and Standard Operating Procedure (SOP) for Method 624 volatile organic analysis is contained in Appendix B of the QAPP (Volume II of II of the MOM SAP). Analyses performed by NET for the Tinkham site water quality monitoring program will be reported to GEI with appropriate (formerly Level III) data review deliverables as defined in the QAPP. Tinkham site water quality results will be reviewed and validated by procedures consistent with the EPA's Data validation guidelines as defined in the QAPP. In general, data shall be definitive data; compound specific, quantitative with measured precision and accuracy, and traceable.

As indicated in the QAPP, ten percent (10%) of the MOM ground water quality samples collected during the initial quarter (Quarter 1, June 1994), first annual (Quarter 5) and second annual (Quarter 9) will be analyzed using CLP routine analytical services (RAS) to further verify laboratory Method 624 analytical data. Samples for CLP analysis will include samples expected to contain relatively high detectable VOC concentrations as well as samples expected to have relatively low VOC concentrations so that Method 624 data may be verified over a relatively wide range of VOC concentrations.

6.3.1.1 Water Quality QA/QC Samples

QA/QC samples of the field program will include volatile organic analysis (VOA) trip blanks, non-dedicated sampling equipment blanks, field duplicate samples and batch matrix spike/matrix spike duplicate (MS/MSD) analyses. A laboratory-provided trip blank will accompany a set of VOA glassware to a well location during sampling and will remain with the samples in the trip to the laboratory for analysis. Every cooler shipment of VOA samples will contain one such trip blank. All VOC samples will be collected using dedicated or disposable bailers. The only sampling equipment necessary for the Tinkham site water quality monitoring program which will not be disposable or dedicated to and stored in individual wells will be submersible electric pumps used to develop large volume wells for sample collection. Equipment blanks will be collected from the non-dedicated submersible pumps after decontamination between uses (Section 6.5) at a frequency of 1 equipment blank per 10 uses of a given pump. Field duplicate samples will be collected at a frequency of one per 20 samples. A minimum of two field duplicate samples will be obtained during each sampling round. MS/MSD QA samples will be performed and reported by the laboratory routinely as required by method SOPs. The contract laboratory (NET) has agreed to accept and use chain-of-custody designated site-specific MS/MSD submittals for method "batch" QC MS/MSD requirements. Additional sample volume will be submitted for MS/MSD evaluations at a minimum frequency of one per 20 samples. A summary of the frequency of collection and submittal of the water quality monitoring program Quality Control samples is contained in Table 2 of the QAPP.

6.3.1.2 Water Quality VOA Preservative

Water quality monitoring samples for Method 624 VOCs will be collected in laboratory-provided VOA vials. VOC samples will be preserved to a pH of less than or equal to 2 with precharged hydrochloric (HCl) acid in the sample container (VOA vials). The adequacy of the acid preservative will be checked at each sampling location by measuring the pH of a surrogate sample (i.e., a duplicate sample obtained in one additional VOA vial, pre-charged with HCl). Verifications that VOC samples are being acidified to the required preservative pH conditions (i.e., less than or equal to 2) will be done with pH color indicator paper. Steps for correcting the amount of preservative required for a sample, should the pre-charged volume be found inadequate in the surrogate sample check, are contained in Section 4.3 of the QAPP. The sample and glassware tested for preservative adequacy will not be used for analysis.

All samples will be maintained cold at approximately 4° Centigrade °(C) temperature and in the dark as part of the sample preservation.

6.3.2 Water Quality Sample Designation

Each piece of sampleware will be affixed with a self-sticking adhesive label. Each label will be completed with an indelible marker to contain the following information:

GEI Consultants, Inc.
Tinkham Garage Site
GEI Project Number; 92113
Sampling Date and Time
Sample Number
Sampler's Initials
Analysis Requested
Preservation or Filtration Performed (if any)

The sample number is composed of a series of information to identify the sample as unique to the sampling point and sampling event. The sample number labeled in the field and referred to on all associated documents is composed of:

A 5-digit GEI Project Number; a Monitoring Well or Quality Control Sample Number; and a 4-digit number designation for the month and year of the sampling date.

As an example of a sample number, **92113--FW01-0594**, conveys the following:

The Tinkham site GEI Project Number is 92113. The ground water quality sample is from monitoring well FW01, collected in May of 1994.

Field QC samples will be submitted blind to the laboratory. Field duplicate samples will be collected from wells designated by the sampling Task Manager. Each field duplicate sample collected will be given a unique sample number. For example, field duplicate samples from 'FW' series wells will be labeled as FW00, FW99, FW88, etc. Field documents (field log books and sample collection forms) will clearly indicate the source of each duplicate. For example, 92113-ERT00-0594 may be a field duplicate collected at location ERT06 in May of 1994. The May sample collection form for ERT06 would clearly document this field duplicate collection and designation.

The sample code for trip blank samples will be "WX" followed by a sample number identifying the cooler being shipped. This identifier will be included on the appropriate Chain-of-Custody document. For example the trip blank included in a cooler #21 containing VOC samples shipped in May of 1994 would be: **92113-WX-021-0594**. All samples for VOC analysis contained in this cooler (#21) would be identifiable from the Chain-of-Custody document for cooler #21.

6.3.3 The Water Quality Database

GEI will compile and maintain a spreadsheet database (Lotus 1,2,3 or QuattroPro software) to include VOC data reported for site monitoring well locations to date and will update the database with water quality monitoring program results as they are received and validated. Data validation qualifiers will be included in the database format where appropriate.

6.4 Monitoring of Site Ground Water Elevations

The network of site monitoring wells designated for the ground water elevation monitoring program is listed in Table 2 and shown in Figure 2. Monthly monitoring of potentiometric elevations of these wells began in May 1994. The objectives for monitoring ground water elevations in a network of locations covering the site's shallow and deep aquifers are:

- to preempt any adverse impacts to the quality, nature and extent of wetlands on-site due to the remedial actions;
- to monitor ground water potentiometric responses in relationship to changes in the rates of water removed by the remedial design systems; and
- to continue to define the subsurface hydrologic setting of the Tinkham site during the course of the remedial actions.

6.4.1 Wetland Ground Water Elevation Observation Wells

A delineation of site wetlands based on a plan by Lake Shore Inc. entitled E/WET, #91-136-01, dated 2/8/90 and revised 6/91, is shown in Figure 2. Ground water levels in wetlands are monitored on a monthly basis at 12 monitoring wells including three wells (OW1, OW2, and OW3) installed under the direction of GEI and at six monitoring wells installed by others (FW11, FW11D, FW17, FW20, NAI-D2, and NAI-M1, Table 4). Ground water levels at wetlands monitoring wells are input to the Ground Water Elevation Database described in Section 6.4.2.

6.4.1.1 Indicators of RAs Impacting Site Wetlands

Water level fluctuations, including the rate of change and amount of change, will be used as the 'trigger' indices for monitoring and preventing adverse impacts of remedial actions on the quality, nature and extent of site wetlands. Abrupt non-seasonal changes correlated to site remedial actions, as well as sustained non-seasonal lowering of the water level by more than 100 percent of that previously attributed to seasonal variations in wetland observation wells and the monitoring wells identified in Table 2 as wetland monitors sustained for a period greater than

two months will trigger adjustments to the rates of ground water removed from the site aquifers by remedial design systems.

Vegetational changes on the timescale of two years will only be observable if significant dewatering of the site wetlands is allowed to occur. The ground water elevation database discussed below will be plotted and closely tracked by GEI during remediation. Indications that rates of ground water removal are possibly impacting site wetland hydrology will be acted on by:

- notifying the EPA and NHDES of the trend observed;
- reducing the rates of water removed by remedial design systems until the possible impact of the trend can be evaluated; and
- engaging wetland expertise in the evaluation of the trend observed.

6.4.2 The Ground Water Elevation Database

GEI will compile and maintain a spreadsheet database (Lotus 1,2,3 or QuattroPro software) of ground water elevations measured at site monitoring and observation wells.

The database will incorporate the November 1989 to December 1990 monthly measurements recorded by GEI. The database will include monthly potentiometric measurements from May 1994 until remedial objectives are met. After site remedial ground water recoveries commence, new monthly water elevation data will be input to the database, key wells plotted and provided to the Project Manager within one week of completion of the field measurements.

6.5 Data Reporting

Progress reports will be submitted to EPA and the State of New Hampshire in accordance with the provisions of the Consent Decree. Progress reports were submitted monthly by GEI until start-up of the DVE System. During operations of the DVE System, monthly reports will be prepared by Terra Vac. Validated water quality monitoring data will be provided in monthly reports, as appropriate.

Following construction and installation of the remediation systems, progress reports will be submitted to the State and EPA on a quarterly basis. These reports will include water quality analytical results, and operational and monitoring data obtained during each quarter as well as any modifications to systems operation or to the project schedule which occurred or are anticipated.

Each year, prior to the anniversary of the effective date of the Consent Decree, an annual status report will be submitted to the United States District Court for the District of Massachusetts. A

copy of this report will also be submitted to the United States, the EPA, the State of New Hampshire and the "Londonderry Owners" as defined in the Consent Decree.

Ground water quality data reporting will include presenting the monitoring data in tabular form utilizing a widely accepted spreadsheet software (Lotus 123 or Quattro Pro). Sample reporting limits, data qualifiers (as a results of the data validation review), and field duplicate sample results will be presented. Quality Control sample results including trip blanks, equipment blanks and matrix spike/ matrix spike duplicate samples will be reported.

If review of the data suggests the presence of trends, GEI may use trend analysis to quantify patterns of movement in levels of a particular constituent with time using analyses such as the Mann-Kendall test (Gilbert, R.O., 1987. Statistical Methods for Environmental Pollution Monitoring, Van Nostrand, Rhinehold. p. 208-217). Trend analyses may be performed after a sufficient database is developed, possibly after four quarterly sampling rounds are completed.

GEI's water quality data validation memo will be included in ground water quality data reports or quarterly progress reports, as appropriate. The data validation memo will explain why any data qualification action was taken and define the qualifier(s) (flags) applied to the results. The data validation memo will identify specific quality control issues that may be affecting the usability of the data and any recommended actions to improve field or laboratory QA/QC procedures.

The schedule for project status report deliverables and the content of technical evaluations are further discussed in Section 11 of the QAPP (Volume II of the MOM SAP).

7. SAMPLING EQUIPMENT AND PROCEDURES

7.1 General

Quarterly water quality monitoring at the Tinkham site will be performed as outlined below in Section 7.3. A list of the equipment required for the sampling program is provided in Table 5. GEI Standard Operating Procedures (SOPs) for sampling of monitoring wells will be followed. SOPs are provided in the QAPP. Ambient air monitoring for Total VOCs will be performed as required by the site and task specific Health and Safety Plan (Appendix B). The condition of each well including wetted volume will be determined. The percentage of current open pervious section for all functional site wells will be surveyed in May of every year of the remedial program. Ground water from purging of wells will be disposed of on the ground surface within 10 feet of the well as described in Section 7.3.2. Dedicated or disposable bailers will be used to collect VOC samples and will be stored in the well or discarded after sampling. Specific conductivity, pH and temperature will be measured during well development and sampling. Non-dedicated purging and monitoring equipment will be decontaminated after each use in accordance with procedures described in Section 7.5.

Water level elevations will be measured monthly in all active wells listed in Table 2 beginning in May of 1994 and will continue for the duration of remedial actions on-site. The electronic water level indicators will be decontaminated before each use. The Tinkham site ground water elevation database will be updated within 5 working days of completion of monthly field measurements.

7.2 POTW Discharge Monitoring

As indicated in Section 6.2, the existing IDP indicates that POTW discharge monitoring will be conducted by the Town of Londonderry, and bi-monthly discharge sampling for zinc will be performed by GEI during the first six months of operation of the bedrock pumping system. As indicated in Part 4 of Londonderry IDP-7-122, the Town of Londonderry will obtain samples of effluent to monitor discharge compliance. The permit indicates that the Town of Londonderry will conduct unannounced sampling and testing of regulated parameters. (Refer to Appendix C, Table C.1 for a list of discharge limitations and monitoring requirements). GEI will monitor zinc concentrations in discharge from LGSW and the combined effluent (discharge from LGSW, LGAW and the DVE System) at startup and at two-month intervals for the first six months of operation. As indicated in Section 6.2, operation of the LGSW pumping system will be interrupted if zinc is detected in the LGSW effluent at a concentration which would result in an exceedence of the POTW discharge limit. If zinc is detected in the isolated LGSW effluent at a concentration greater than the discharge limit, but remains at a concentration lower than the discharge limit in the combined effluent, then LGSW and the combined effluent will be resampled within one week of receipt of analytical results. Following

receipt of results for the resampling, the Londonderry Sewer Commission will be contacted and a determination will be made relative to temporarily eliminating discharge from LGSW to the sewer.

Samples from LGAW and LGSW for analysis for total zinc are obtained at each well by opening the valve in the discharge line which diverts flow to the well casing. After allowing water to flow from the sampling port at the well casings for a minimum of 15 minutes, samples are collected. Samples of the combined discharge are obtained at a sampling port at the metering station adjacent to the Tinkham's garage.

Samples for zinc analysis are preserved to pH less than 2 using nitric acid. The pH of each sample is measured to verify appropriate preservation.

GEI will monitor and maintain records of the discharge flow rate to the POTW. Flow is measured using a continuous chart recorder with a totalizer. As approved by the Town of Londonderry, each chart on the continuous recorder covers a period of 14 days, and totalizer logs maintained by GEI contain totalizer readings performed at maximum 14-day intervals. Monitoring data will be submitted to the Town of Londonderry on a quarterly basis, as required by the Town..

7.3 Ground Water Sampling

7.3.1 Well Access and Measurements

All well measurements made during the monitoring program will be recorded on GEI's monitoring well sample collection form (TINKHAM/FL5). A copy of the monitoring well sample collection form is provided in Appendix C of the QAPP (Volume II of II of the MOM GWMP SAP).

Well access and well-head measurements will be as follows:

1. Check the well for proper identification and location. Record the project information, well ID, date, time, weather conditions, and persons sampling.
2. After unlocking the well and removing any well caps, screen and record the top-of-well and ambient TVOC levels with the PID meter.
3. Locate the reference points marked on the rims of the protective casing and/or the PVC riser.
4. From the reference point, measure and record the static depth to water in the well with a decontaminated electronic water level indicator.

5. Decontaminate the tape and sensor of the water level meter as it is retrieved with Alconox™-soap-solution soaked and distilled water soaked paper towels.
6. Calculate the estimated static well water volume if sampling using the most recent (i.e., the previous May's) measured depth to bottom of the well.

7.3.2 Well Development and Sampling

Wells will be developed for sampling using the well purging equipment designated in Table 1. Prior to development, ground water pH, conductivity, and temperature will be measured at each well. All water taken from each monitoring well will be discharged to the ground surface less than 10 feet radially from the well. Discharged water will be spread over the ground surface so as not to cause surface soil erosion or to allow sheet flow into surface water bodies.

During the first four quarterly rounds of the water quality monitoring program (Q1 through Q4), discharged water from wells on residential properties and in areas readily accessible to the general public was monitored for VOC vapors using a photoionization detector (PID). This was performed to determine if water from well development could be discharged to the ground surface in such areas, or if the water would require containerization based on a VOC vapor screening criterion of greater than 2 ppm for containerization. No VOC vapors were detected at concentrations greater than 2 ppm during purging of the wells in Q1 through Q4, and no TVOC concentrations greater than 2 mg/L were detected during Q1 through Q4 in ground water samples from wells on residential properties or in areas accessible to the general public. Consequently, water from development of wells in such areas will be discharged to the ground surface. However, PID monitoring of the water for VOC vapors will be performed.

After development, wells will be allowed to recover to within 75 percent of the static water level measured or for two hours, whichever occurs first. Ground water pH, conductivity and temperature will be measured during well development, as described below. For wells at which water levels do not recover to within 75 percent of their initial level, pH, conductivity and temperature will be re-measured after the 2-hour recovery period. If pH, conductivity and temperature remain within ± 15 percent of the final measurement of these parameters during well development, samples will be collected. If the measurements vary greater than 15 percent, then the well will be redeveloped, pH, conductivity and temperature will be measured after a 2-hour recovery period, and the samples will be obtained. Samples for VOCs will be collected using dedicated or disposable bailers. The depth to water in the well will be measured and recorded at the time of sampling.

Intermediate and deep bedrock monitoring wells will be developed for sampling with submersible electric pumps. Wells developed with non-dedicated submersible pumps will

be done in an order that proceeds, to the extent practicable, from least-contaminated to most-contaminated based on previous sample results. Submersible pump well development will be as follows:

1. Lower the submersible pump to a depth within the lower one-third of the open well. For example, if the open depth-to-bottom of the well is 300 feet, the pump will be lowered to develop the well for water quality sampling from below 200 feet. Record the actual depth from the top of casing reference. For the purposes of this document, this depth will be called the sample depth.
2. Adjust the pump to obtain a steady discharge flow rate of 5 to 10 gallons per minute and begin development of the well. Record the time at the start of development and the rate of discharge used for development on the monitoring well sample collection form.
3. After 5 minutes of development, fill a beaker from the pump discharge and measure the pH, temperature, and specific conductivity of the water. Measure the pH and temperature first. Do not measure the specific conductivity and pH simultaneously in the beaker as the function of one probe may affect the function of the other probe. Record the results. Repeat the measurements of pH, temperature, and specific conductivity at 10 minutes and 15 minutes after the start of development. Record the results.
4. Development of the sampling depth in intermediate/deep bedrock monitoring wells with the submersible pump will be considered complete after 15 minutes of steady discharge (75 to 150 gallons will have been removed from the sample depth horizon at this point) and after three consistent (within $\pm 10\%$) pH, conductivity and temperature measurements (performed at five-minute intervals) are obtained. It is not expected that the deep rock wells will be pumped dry to two-thirds depth under these development conditions. Should it happen that the well's water level is lowered by two-thirds in development and the pump goes dry, GEI samplers will be prepared to add a new clean length of pump tubing to the dedicated well development tubing being used. The length of tubing added will be sufficient to lower the pump to within 90 percent of the total open well depth (e.g., to below 270 feet in a 300-foot-deep well). Development at the new depth will be continued for a minimum of 15 minutes at the original discharge rate or until the well goes dry at this depth. Measure the pH, temperature, and specific conductivity every 5 minutes for the additional 15 minutes until three consistent measurements (i.e., $\pm 10\%$) of these parameters are obtained. Record the actions and results.
5. Remove the dedicated tubing and pump from the well. Rinse the outside of the dedicated tubing with clean water (potable water is sufficient). Dry the tubing coil as best as possible; tie the coil and double-bag it with new plastic bags.

6. Prior to sampling, allow the well to recover to within 75 percent of its original water height above well bottom or for two hours, whichever occurs first. For wells with water levels which do not recover to within 75 percent within a 2-hour period, measure pH, conductivity and temperature to determine if redevelopment is necessary (i.e., variance of a greater than $\pm 15\%$, as described above.) Always the depth to water at the time of sampling will be measured and recorded. VOC samples will be collected with bailers at the developed "sampling depth."

Overburden/shallow bedrock monitoring wells will be developed for sampling using dedicated or disposable bailers as follows:

1. Raise and empty the dedicated bailer from its stored position in the well and replace the cotton string attached to it. Where bailers are dedicated, string shall be replaced prior to well development for each sampling round. Lower the bailer to the bottom of well.
2. Begin purging the well by raising the bailer out of the well and discharging the water into a graduated container to measure cumulative volume of water removed from the well. Continue to purge and develop the well such that the bailer removes equal amounts of water from the top, middle and bottom portions of the well.
3. Fill a beaker from the bailer following each well volume and measure the pH, temperature, and conductivity as described for the submersible pump.
4. Development of the well will be considered complete when one of the following conditions is achieved:
 - a. the well has been bailed dry (less than 1 foot of water remains in the well), or;
 - b. a minimum of three well volumes has been purged and pH, temperature and conductivity stabilize (i.e., to within a 10 percent variance), or;
 - c. a maximum of five well volumes has been purged.
5. Suspend the bailer at the top of the riser pipe after completion of development, and allow the well to recover to within 75 percent of its original static water level or for two hours, whichever occurs first, prior to sampling.

Overburden/shallow bedrock monitoring wells will be developed for sampling using dedicated WaTerra™ inertial lift pumps as follows:

1. (The dedicated WaTerras™ are configured for a specific well. They are not stored in the well. They are used only to purge static water from the well for sampling by bailer.) Confirm the correct dedicated WaTerra™ for the well, lower it into the well and begin purging the well.
2. Discharge the purged water into a graduated container to measure the cumulative volume of water removed from the well.
3. Fill a beaker from the WaTerra™ discharge following each well volume and measure the pH, temperature, and conductivity as described for the submersible pump.
4. Development of the monitoring well with the WaTerra™ pump will be considered complete when one of the following conditions is achieved:
 - a. the well has been pumped dry (the pump is no longer removing water and water level is measured to be less than or equal to three feet above the bottom of the well), or;
 - b. a minimum of three well volumes has been purged and pH, temperature and conductivity stabilized (to within a 10 percent variance), or;
 - c. a maximum of five well volumes has been purged.
5. Remove and empty the dedicated WaTerra™ after completion of development. Rinse the outside of the dedicated tubing with clean water (potable water is sufficient). Dry the WaTerra™ as best as possible; and double-bag it with new plastic bags.
6. Allow the well to recover to within 75 percent of its original static water level or for two hours, whichever occurs first, prior to sampling. For wells which do not recover to within 75 percent within 2-hours, measure pH, conductivity and temperature to determine if redevelopment is necessary.

VOC samples are to be collected by dedicated or disposable bailers from the lower one-third of the well. At the time of sampling, after water level recovery has been determined and recorded, one full bailer of water will be removed from the well at sample depth and discarded; effectively rinsing the bailer with sample water before samples are collected.

Samples for purgeable volatile organic analysis (Method 624) will be collected in laboratory-supplied vials (which have been precharged with hydrochloric acid as a preservative) with as little agitation as possible and with zero headspace.

Complete the monitoring well sample collection form and other necessary documentation as each well is sampled.

Secure the well cap and lock before leaving the well location. Remove all sampling materials from the area.

7.4 Decontamination Procedures

Decontamination of non-dedicated sampling or measuring equipment, including but limited to submersible pumps, water level indicators, pH, temperature and specific conductivity probes, and measuring tapes will be done at the location of use, if practicable and will use only soap Alconox™ solution, tap water and distilled water rinses.

The portion of the tape or cable of the water level indicator or measuring tape that was lowered below the well top of casing will be decontaminated with soap-solution-soaked and distilled-water-soaked paper towels during retrieval from the well. The sensor of the water level indicator will be given an additional soap wash and rinse from squeeze bottles and will be wiped dry with clean paper towels.

The portions of the pH, temperature, and specific conductivity probes that come in contact with sample water will be rinsed with soap solution and distilled water from squeeze bottles and wiped dry with clean paper towels after each use.

The submersible pumps down-well leads will be decontaminated with soap-solution-soaked and distilled-water-soaked paper towels as it is retrieved from the well if practicable. The well-dedicated discharge tubing will be coiled on the plastic ground cover and generously rinsed with potable water dispensed from a pressure-sprayer. The tubing will be dried as best as possible, tied and double-bagged for storage. The submersible pump will be decontaminated as follows:

1. A project-dedicated, 4-foot long, 6-inch PVC cylinder with caps will be partially filled with soap solution. The pump will be lowered into the solution and the solution cycled through the pump by running it for a minute.
2. A second project-dedicated cylinder will be used for the water rinses of the pump. Fill this cylinder partially with tap water and rinse the soap from the pump by running it for one minute; pour off this water to the ground and refill the cylinder with a second water-rinse volume and run the pump again for a minute; do a tap water rinse of the pump with tap water from the pressure-sprayer and a final distilled water rinse of the pump using a pressure sprayer. Rinse both cylinders and dry them before re-using.

8. SAMPLE HANDLING AND ANALYSIS

8.1 General

GEI and the contract laboratories for the monitoring programs (discharge and water quality) have established procedures for sample chain-of-custody that are followed from collection through final disposition of the samples, designed to assure that each sample is accounted for at all times. Sample container labels, monitoring well sample records, chain-of-custody records, sample assignment forms, shipping records, laboratory receipt and sign-off sheets must be completed and signed by the appropriate field and laboratory personnel.

8.2 Sample Labeling and Documentation

A self-sticking label will be affixed to each piece of sampleware. Each label will contain the information described in Section 5.3.2 of this document. The analyses to be performed on the samples will be recorded on the monitoring well sample collection form, the Chain-of-Custody form and the sample assignment form (Tinkham/FL5, FL6, and FL7, respectively).

Further documentation of the field activities, procedures and events will be included in the Field Log book (Tinkham/FL1).

8.3 Chain-of-Custody/Sample Assignment

Sample chain-of-custody will be maintained at all times. A copy of GEI's SOP for sample custody and Chain-of-Custody Form (Tinkham/FL6) is provided in the QAPP.

In general, the chain-of-custody record must be used such that it includes the following information:

- Project name and number
- Names of the sampler(s) and person shipping the samples
- Well identification
- Date and time the samples were collected
- Compositing or grab sample designation
- Sample numbers (e.g., 92311-FW01-0594)
- Total number of containers
- Number of each type of container
- Analyses requested and remarks
- Signature of person relinquishing custody
- Date and time of custody transfer
- Signature of person receiving custody

Prior to the shipment of samples, a sample assignment form will be completed (see Tinkham/FL7 in Appendix A of the QAPP). The Sample Assignment Form will provide the contract laboratory sufficient information to process the samples and perform the appropriate analysis.

The Chain-of-Custody Form and Sample Assignment Form will be completed in duplicate through the use of carbon-paper or photocopied. The original copy of the forms will be enclosed in a plastic bag and placed in the coolers with the samples for shipment. The copy of the forms will be retained by GEI.

8.4 Sample Shipments

Sample containers are generally packed in coolers for shipment. Prior to packing all sample container lids will be checked for tightness of seal. All sample labels will be checked for clarity of information, and adhesion of the label to the bottle or vial. Clear plastic tape will be used to wrap the label if necessary. Prior to shipment, organic analysis vials (3 per sample) will be placed in laboratory-provided, bubble-pack, sealable plastic bags. All bottles are to be packed tightly so that no motion is possible. Styrofoam, vermiculite, and bubble pack are suitable in most instances. Ice will be placed in sealed plastic bags or blue ice packs will be used to keep samples at 4°C at all times until receipt by the laboratory. Samples will be protected against freezing during cold weather. The original chain-of-custody and sample assignment forms will be sealed in plastic bags and placed in the cooler with the samples. The cooler will be closed and a signed self-sticking label with the words "Custody Seal" will be placed between the body of the cooler and the cover. The cover will then be sealed. Samples will be shipped so that they are received by the laboratory no later than 48 hours from the time of sample collection and within 24 hours of sample shipment (i.e., overnight shipment).

All shipping of ground water samples will be done through Federal Express or equivalent overnight delivery service. If prompt arrival of the samples cannot be guaranteed, the field personnel will be responsible for proper storage of the samples until adequate transportation arrangements can be made. The laboratory will be notified prior to shipment to arrange for receiving the samples and to prepare for the analyses requested. Based on the concentrations of chemicals detected during previous studies, the samples will be classified as environmental samples. On the air bill for the samples it will be specified that the contents of the cooler are environmental samples. When samples are received by the laboratory, they will notify the Ground Water Sampling Task Manager of the condition of the samples.

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FW-01	overburden/shallow bedrock	Upgrad., 750' NE of the Garage soils; near the Tinkham Realty Bldg.	NUS/FIT 1983	1.5" PVC	327.81	40.2	3	ND [5/95]	W,B ⁽³⁾
FW-02	shallow bedrock; gradient couplet	1525' WSW of the Garage soils; Off McAllister Drive	NUS/FIT 1983	1.5" PVC	295.07	25.5	2.3	ND [5/95]	W,B
FW-02D	intermediate bedrock; gradient couplet	1525' WSW of the Garage soils; Off McAllister Dr., 30' N of FW-02	NUS/FIT 1983	6" open hole	297.23	101.0	144	ND [5/95]	P,B ⁽⁴⁾
FW-03	shallow bedrock; gradient couplet	1075' WSW of Garage; between Mercury & McAllister Drs.	NUS/FIT 1983	1.5" PVC	291.91	23.0	1.7	ND [5/95]	W,B
FW-03D	intermediate bedrock; gradient couplet	1075' WSW of the Garage soils; between Mercury & McAllister Drs.	NUS/FIT 1983	6" open hole	291.14	102.0	143	ND [5/95]	P,B
FW-04	shallow bedrock	1100' SW of the Garage soils; Mercury Drive adj. to ERT-02	NUS/FIT 1983	1.5" PVC	283.38	30.1	2.5	11 [5/95]	W,B
FW-05	shallow bedrock	825' SW of the Garage soils; Mercury Drive adj. to ERT-01	NUS/FIT 1983	1.5" PVC	286.42	30.3	2.5	14 [5/95]	W,B
FW-06	shallow bedrock	1600' SW of the Garage soils; Mercury Drive adj. to LGSW	NUS/FIT 1983	1.5" PVC	270.95	27.5	1.8	ND [5/95]	B ⁽⁵⁾
FW-07 ⁽¹⁾	overburden; pond water level monitor	1700' SW of the Garage soils; 150' SSE of well LGSW	NUS/FIT 1983	1.5" PVC	-- ⁽⁶⁾	4.5	--	ND [12/27/84]	--
FW-08	shallow bedrock; gradient couplet	1475' SW of the Garage soils; 300' E of LGSW	NUS/FIT 1983	1.5" PVC	273.70	29.1	1.7	ND [5/95]	B
FW-08D	intermediate bedrock; gradient couplet	1475' SW of the Garage soils; 300' E of LGSW	NUS/FIT 1983	6" open hole	274.12	102.0	141	13 [5/95]	P,B
FW-09	overburden/shallow bedrock	600' W of the Garage soils; 100' WSW of Tinkham Garage	NUS/FIT 1983	1.5" PVC	307.48	36.0	2.7	ND [5/95]	B

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FW-10	overburden; gradient couplet	600' S of the Garage soils; Off the dirt road	NUS/FIT 1983	1.5" PVC	291.26	28.5	2.1	ND [02/13/92]	NS ⁽⁷⁾
FW-10D	shallow/intermediate bedrock; gradient couplet	600' S of the Garage soils; Off the dirt road	NUS/FIT 1983	6" open hole	292.48	105.4	123	ND [5/95]	P,B
FW-11	overburden; gradient couplet	600' SE of the Garage soils; Off the dirt road	NUS/FIT 1983	1.5" PVC	282.37	24.0	2	123 [5/95]	W,B
FW-11D	shallow/intermediate bedrock; gradient couplet	600' SE of the Garage soils; Off the dirt road	NUS/FIT 1983	1.5" PVC	283.37	98.0	7.8	255 [5/95]	W,B
FW-12	shallow/intermediate bedrock	1100' SSE of the Garage soils; Off the dirt road	NUS/FIT 1983	1.5" PVC	279.33	75.8	6.4	ND [5/95]	W,B
FW-13	overburden	1100' SSE of the Garage soils; Mercury Drive adj. to ERT-01	NUS/FIT 1983	1.5" PVC	279.86	20.6	1.4	ND [5/95]	B
FW-14	overburden/shallow bedrock; gradient couplet	1025' S of the Garage soils; Off the dirt road	NUS/FIT 1983	1.5" PVC	--	44.0	--	ND [12/27/84]	--
FW-14D	intermediate/deep bedrock; gradient couplet	1125' S of the Garage soils; Off the dirt road	NUS/FIT 1983	6" open hole	281.61	205.0	287	10 [12/31/84]	NS
FW-15	overburden/shallow bedrock; gradient couplet	3200' SW of the Garage soils; 300' W of Bldg.s K,L	NUS/FIT 1983	1.5" PVC	--	37.0	--	ND [12/18/84]	--
FW-15D	intermediate/deep bedrock; gradient couplet	3200' SW of the Garage soils; 300' W of Bldg.s k,L	NUS/FIT 1983	6" open hole	--	205.0	--	ND [12/18/84]	--

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FW-16	overburden/shallow bedrock	2450' SW of the Garage soils; Capital Hill Dr., adj. to ERT-06	NUS/FIT 1983	1.5" PVC	256.00	28.0	2.2	ND [5/95]	B
FW-17	overburden/shallow bedrock	2650' SSW of the Garage soils; Capital Hill Dr. along unnamed tributary	NUS/FIT 1983	1.5" PVC	233.27	42.7	3.6	ND [5/95]	W,B
FW-18	overburden	2100' SW of the Garage soils; Constitutional Dr. across from Bldg.s E,F	NUS/FIT 1983	1.5" PVC	252.93	18.0	1.1	ND [5/95]	B
FW-19	overburden	2225' SSW of the Garage soils; Constitutional Dr. across from Bldg.s E,F	NUS/FIT 1983	1.5" PVC	249.11	16.5	1.1	ND [5/95]	B
FW-20	overburden/shallow bedrock	600' E of the Garage soils	NUS/FIT 1983	1.5" PVC	282.15	48.0	3.7	392 [5/95]	B
FW-21	overburden/shallow bedrock; gradient couplet	2225' SW of the Garage soils; Capitol Hill Dr., N of ERT-06	NUS/FIT 1984	1.5" PVC	258.44	19.2	1.6	ND [5/95]	B
FW-21D	intermediate/deep bedrock; gradient couplet	2275' SW of the Garage soils; Capitol Hill Dr., N of ERT-06	NUS/FIT 1984	6" open hole	257.45	205.0	artesian	303 [5/95]	B
FW-22	overburden/shallow bedrock; gradient couplet	2000' S of the Garage soils; 200' E of Bldg.s C,D	NUS/FIT 1984	1.5" PVC	--	18.0	--	ND [12/17/84]	--
FW-22D	intermediate/deep bedrock; gradient couplet	2000' S of the Garage soils; On strike with LGAW, 250 S of the Soil Pile	NUS/FIT 1984	6" open hole	253.47	205.0	294	ND [5/95]	P,B
FW-23	overburden/shallow bedrock; gradient couplet	1700' SSW of the Garage soils; Behind the tennis courts, 225' NW of the Soil Pile	NUS/FIT 1984	1.5" PVC	270.18	26.3	1.3	ND [5/95]	B

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FW-23D	intermediate/deep bedrock; gradient couplet	1750' SSW of the Garage soils; Behind the tennis courts, 150' NW of the Soil Pile	NUS/FIT 1984	6" open hole	260.77	205.0	290	28 [5/95]	P,B
FW-24	overburden/shallow bedrock; gradient couplet	1900' SW of the Garage soils; Off Constitutional Dr., adj. to well ERT-03	NUS/FIT 1984	1.5" PVC	256.98	27.0	2.5	ND [5/95]	B
FW-24D	intermediate/deep bedrock; gradient couplet	1900' SW of the Garage soils; Off Constitutional Dr., adj. to well ERT-03	NUS/FIT 1984	6" open hole	258.23	205.0	300.0	6 [5/95]	P,B
FW-25	overburden/shallow bedrock; gradient couplet	1325' ESE of the Garage soils; On the dirt road off of the curve of Ross Dr. to Gilcrest Rd.	NUS/FIT 1984	1.5" PVC	285.35	38.0	3.6	ND [5/95]	W,B
FW-25D	intermediate/deep bedrock; gradient couplet	1375' ESE of the Garage soils; On the dirt road off of the curve of Ross Dr. to Gilcrest Rd.	NUS/FIT 1984	6" open hole	282.44	205.0	292	ND [5/95]	P,B
FW- 26	overburden/shallow bedrock; gradient couplet	Upgrad., 800' ENE of the Garage soils; Edge of field behind the orchard	NUS/FIT 1984	1.5" PVC	--	24.5	--	ND [12/10/87]	--
FW-26D	intermediate/deep bedrock; gradient couplet	Upgrad., 975' ENE of the Garage soils; 225' NE of well FW-26; on strike with FW10D and FW08D	NUS/FIT 1984	6" open hole	291.84	135.0	191	ND [5/95]	P,B
FW-27	overburden/shallow bedrock	400' SE of the Garage soils	NUS/FIT 1984	1.5" PVC	286.44	25.3	1.9	40 [5/95]	B
FW-28D	intermediate/deep bedrock	1400' SE of the Garage soils; on strike with well LGAW; 'trigger' well for Ross Dr.	NUS/FIT 1984	6" open hole	272.39	205.0	290	ND [5/95]	P,B

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ERT-01	intermediate/deep bedrock	875' SW of the Garage soils; Off Mercury Drive	EPA/ER T 1983	6" open hole	283.67	300.0	artesian	40 [5/95]	B
ERT-02	intermediate bedrock	1100' SW of the Garage soils; Off Mercury Drive	EPA/ER T 1983	6" open hole	281.64	60.0	82	14 [5/95]	P,B
ERT-03	intermediate bedrock	1900' SW of the Garage soils; Off Constitutional Drive	EPA/ER T 1983	6" open hole	257.43	60.0	85	ND [5/95]	P,B
ERT-04	intermediate bedrock	2725' SW of the Garage soils; Off Capitol Hill Dr.; bedrock well closest to Bldgs. K,L,M and N	EPA/ER T 1983	6" open hole	266.67	60.0	72	ND [5/95]	P,B
ERT-06	intermediate bedrock	2475' SW of the Garage soils; Off Capitol Hill Drive	EPA/ER T 1983	6" open hole	254.93	60.0	82	187 [5/95]	P,B
ERT-08	intermediate/deep bedrock	Upgrad., 975' WSW of the Garage soils; Off McAllister Drive	EPA/ER T 1983	6" open hole	306.78	300.0	432	ND [5/95]	P,B
MP-I- 1S	overburden	125' WSW (upgradient) of leachfield I/J	Malcolm Pimie 1987	2" PVC	--	20.0	--	5 [12/03/87]	--
MP-I- 2S	overburden	Within leachfield I/J	Malcolm Pimie 1987	2" PVC	--	20.0	--	38 [12/03/87]	--
MP-I- 2D	shallow bedrock	Within leachfield I/J	Malcolm Pimie 1987	2" PVC	--	40.0	--	60 [12/03/87]	--

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MP-I-3S	shallow bedrock	275' NE (downgradient) of leachfield I/J	Malcolm Pirnie 1987	2" PVC	240.94	28.0	3.4	62 [12/03/87]	NS
MP-I-3S- R	shallow bedrock	275' NE (downgradient) of leachfield I/J	GEI 1994	1.5" PVC	—	24.5	1.5	178 [5/95]	W,B
MP-L-1S	overburden	150' SW (upgradient) of leachfield K/L	Malcolm Pirnie 1987	2" PVC	278.48	20.0	1.8	ND [06/13/94]	B
MP-L-2S	overburden	Within leachfield K/L	Malcolm Pirnie 1987	2" PVC	271.67	9.0	0.5	920 ⁽⁴⁾ [06/13/94]	B
MP-L-2D	shallow bedrock	Within leachfield K/L	Malcolm Pirnie 1987	2" PVC	271.55	21.0	3.4	239 [5/95]	B
MP-L-3S	shallow bedrock	200' NE (downgradient) of leachfield K/L	Malcolm Pirnie 1987	2" PVC	262.57	24.5	3.2	169 [5/95]	W,B
LGSW	intermediate/deep bedrock	1600' SW of the Garage soils; Off Mercury Dr., adj. to well FW-06	—	—	269.05	300.0	artesian	35 [5/95]	—
LGEW	intermediate/deep bedrock	1650' SW of the Garage soils; Off Mercury Dr.	—	—	266.13	286.0	—	28 [12/26/84]	NS
LGAW	intermediate/deep bedrock	2425' SSW of the Garage soils; Off Constitutional Dr.	—	—	252.00	300.0	artesian	188 [5/95]	—
NAI-A1	overburden	440' SW of the Garage soils	NAI 1982	2" PVC	302.38	17.0	1.8	ND [5/95]	B

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NAI-A2	shallow bedrock; gradient couplet	430' W of the Garage soils	NAI 1983	6" open hole	304.21	100.0	140	64 [07/07/83]	NS
NAI-A3	intermediate bedrock; gradient couplet	430' SW of the Garage soils	NAI 1983	1.5" PVC	304.21	190.0	17	72 [07/07/83]	NS
NAI-B	overburden	255' SW of the Garage soils	NAI 1982	2" PVC	304.54	20.5	2.1	ND [11/19/82]	NS
NAI-C1	overburden	60' SW of the Garage soils	NAI 1982	2" PVC	298.19	17.0	1.9	38 [5/95]	B
NAI-C2	shallow bedrock; gradient couplet	120' NW of the Garage soils	NAI 1983	6" open hole	299.96	100.0	134	362 [07/07/83]	NS
NAI-C3	intermediate bedrock; gradient couplet	120' NW of the Garage soils	NAI 1983	1.5" PVC	299.96	190.0	16.3	566 [5/95]	W,B
NAI-D1	overburden	1,115' SW of the Garage soils	NAI 1982	2" PVC	272.62	7.0	1.2	ND [5/95]	B
NAI-D2	shallow bedrock; gradient couplet	1,260' SW of the Garage soils	NAI 1983	6" open hole	273.79	100.0	140	ND [07/07/83]	NS
NAI-D3	intermediate bedrock; gradient couplet	1,260' SW of the Garage soils	NAI 1983	1.5" PVC	273.79	190.0	16.7	ND [07/07/83]	NS
NAI-E	overburden	775' SSW of the Garage soils	NAI 1982	2" PVC	288.97	17.5	1.5	ND [5/95]	B
NAI-F	overburden	505' SSE of the Garage soils	NAI 1982	2" PVC	283.63	25.0	4.0	ND [5/95]	W,B
NAI-H	overburden	920' S of the Garage soils	NAI 1982	2" PVC	282.66	21.0	2.6	ND [5/95]	B

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NAI-I	overburden	240' SSW of the Garage soils	NAI 1982	2" PVC	294.00	17.0	2.0	ND [5/95]	B
NAI-J	overburden	270' N of the Garage soils	NAI 1983	1.25" stainless steel	--	3.5	--	30 [07/07/83]	--
NAI-K1	overburden	60' NW of the Garage soils	NAI 1983	1.5" PVC	296.17	9.5	0.6	1048 [5/95]	B
NAI-K2	shallow bedrock	45' NW of the Garage soils	NAI 1983	1.5" PVC	296.02	22.7	1.6	513 ⁽⁶⁾ [11/16/94]	W,B
NAI-L	overburden	210' E of the Garage soils	NAI 1983	1.25" stainless steel	--	2.8	--	ND [07/07/83]	--
NAI-M1	overburden; gradient couplet	130' SE of the Garage soils	NAI 1983	1.5" PVC	289.97	13.0	1.0	1839 [5/95]	B
NAI-M2	shallow bedrock; gradient couplet	130' SE of the Garage soils	NAI 1983	1.5" PVC	289.97	24.0	1.9	1678 [5/95]	W,B
NAI-N	overburden	300' E of the Garage soils	NAI 1983	1.25" stainless steel	288.77	3.2	0.2	ND ⁽⁶⁾ [07/07/83]	B
NAI-O	overburden	470' SE of the Garage soils	NAI 1983	1.25" stainless steel	--	7.4	--	ND [07/07/83]	--
NAI-P	overburden	875' SE of the Garage soils	NAI 1983	1.25" stainless steel	--	3.0	--	ND [07/07/83]	--

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Tinkham Garage Site
Londonderry, New Hampshire

Well No.	Type of Well	Relationship to Site Contamination; and Location ⁽¹⁾	Installed By:	Construction	Measuring Point El. ⁽²⁾ (ft.)	Installed Depth to Bottom (ft.)	Approx. Wetted Vol. (gal.)	Most Recently Reported Total VOCs ($\mu\text{g/L}$) [date]	Sampling Equipment
NAI-U	overburden	785' NW of the Garage soils	NAI 1982	2" PVC	327.61	17.0	1.9	ND [5/95]	B
RD-D (Ross Drive-Deep)	intermediate/deep bedrock	2,600' S of the Garage soils; off end of Ross Drive	Malcolm Pirmie 1988	6" open hole	231.82	204.0	295	ND [5/95]	P,B
RD-S (Ross Drive-Shallow)	overburden	2,650' S of the Garage soils; off end of Ross Drive	Malcolm Pirmie 1987	2" PVC	231.29	30.0	3.8	ND [5/95]	W,B
OW-1	wetland water table observation well	400' E of the Garage soils	GEI 1994	2" PVC	285.96	6.0	0.9	--	NS
OW-2S	wetland water table observation well	700' SE of the Garage soils	GEI 1994	2" PVC	279.78	11.0	1.6	--	NS
OW-2D	wetland overburden; water quality monitoring well	700' SE of the Garage soils	GEI 1994	2" PVC	279.77	19.0	2.9	1376 [5/95]	B
OW-3	wetland water table observation well	2200' SSW of the Garage soils	GEI 1994	2" PVC	260.61	12.0	2.0	--	NS

Footnotes:

- (1) Well locations are shown on Figure 2 of the FSP; MOM SAP, Volume I of II. Wells denoted by **xxx** have been removed from Figure 2 for reasons including: the well is lost; destroyed; or otherwise non-functional.
- (2) Elevation of the top of casing of the well (the reference point for well measurements) in feet above the National Geodetic Vertical Datum (NGVD) of 1929.
- (3) W,B = dedicated WaTerra™ lift pump to purge; sampled with a dedicated or disposable bailer.
- (4) P,B = submersible pump to purge; sampled with a dedicated or disposable bailer.
- (5) B = dedicated or disposable bailer to purge and sample.
- (6) -- = information not available, not applicable, or not known.
- (7) NS = not (currently) sampled in the MOM Water Quality Monitoring Program because the screened or open interval of the well is significantly obstructed.
- (8) MP-L-2S, NAI-K2, and NAI-N were dry during the May 1995 (Quarter 5) sampling round.

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (l)	MAY – 94		JUN – 94	
		DEPTH TO GW–TOC (ft)	GW ELEV– TOC (ft)	DEPTH TO GW–TOC (ft)	GW ELEV– TOC (ft)
ERT–01	283.67	0.00	283.67	NOT MEASURED	
ERT–02	281.64	1.55	280.09	2.58	279.06
ERT–03	257.43	1.28	256.15	1.74	255.69
ERT–04	266.67	11.77	254.90	12.66	254.01
ERT–06	254.93	4.16	250.77	4.88	250.05
ERT–08	306.78	3.98	302.80	5.41	301.37
FW–01	327.81	5.22	322.59	6.40	321.41
FW–02	295.07	3.40	291.67	3.76	291.31
FW–02D	297.23	4.06	293.17	4.57	292.66
FW–03	291.91	4.44	287.47	6.68	285.23
FW–03D	291.14	3.66	287.48	4.53	286.61
FW–04	283.38	3.56	279.82	4.67	278.71
FW–05	286.42	3.18	283.24	4.00	282.42
FW–06	270.95	6.05	264.90	6.85	264.10
FW–08	273.70	7.94	265.76	9.13	264.57
FW–08D	274.12	6.96	267.16	7.76	266.36
FW–09	307.48	4.90	302.58	5.87	301.61
FW–10	291.26	3.77	287.49	5.08	286.18
FW–10D	292.48	18.94	273.54	19.12	273.36
FW–11	282.37	2.94	279.43	3.86	278.51
FW–11D	283.37	10.34	273.03	10.42	272.95
FW–12	279.33	6.27	273.06	6.97	272.36
FW–13	279.86	5.15	274.71	6.03	273.83
FW–14D	281.61	9.25	272.36	9.55	272.06
FW–15D	285.84	15.75	270.09	16.60	269.24
FW–16	256.00	5.40	250.60	6.47	249.53
FW–17	233.27	2.43	230.84	2.80	230.47
FW–18	252.93	5.54	247.39	5.73	247.20
FW–19	249.11	3.84	245.27	4.00	245.11
FW–20	282.15	4.15	278.00	4.70	277.45
FW–21	258.44	3.07	255.37	4.45	253.99
FW–21D	257.45	0.00	257.45	0.00	257.45
FW–22D	253.47	5.16	248.31	5.17	248.30
FW–23	270.18	11.42	258.76	12.76	257.42
FW–23D	260.77	9.14	251.63	9.45	251.32
FW–24	256.98	1.22	255.76	1.24	255.74
FW–24D	258.23	0.00	258.23	0.00	258.23
FW–25	285.35	4.84	280.51	5.70	279.65
FW–25D	282.44	4.66	277.78	5.51	276.93
FW–26D	291.84	2.23	289.61	3.35	288.49
FW–27	286.44	3.78	282.66	4.98	281.46

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	MAY - 94		JUN - 94	
		DEPTH TO GW - TOC (ft)	GW ELEV - TOC (ft)	DEPTH TO GW - TOC (ft)	GW ELEV - TOC (ft)
FW-28D	272.39	7.38	265.01	7.80	264.59
MP-I-3S	240.94	8.63	232.31	9.45	231.49
MP-I-3S-REPLACE	240.65				
MP-L-1S	278.48	8.74	269.74	9.45	269.03
MP-L-2D	271.55	NOT MEASURED		NOT MEASURED	
MP-L-2S	271.67	NOT MEASURED		NOT MEASURED	
MP-L-3S	262.57	5.29	257.28	5.83	256.74
NAI-A1	302.38	4.59	297.79	5.83	296.55
NAI-A2	304.21	4.80	299.41	6.00	298.21
NAI-B	304.54	4.60	299.94	5.63	298.91
NAI-C1	298.19	5.61	292.58	6.20	291.99
NAI-C2	299.96	NOT MEASURED		7.70	292.26
NAI-C3	299.96	8.32	291.64	9.35	290.61
NAI-D1	272.62	1.42	271.20	1.60	271.02
NAI-D2	273.79	NOT MEASURED		2.71	271.08
NAI-E	288.97	4.29	284.68	5.40	283.57
NAI-F	283.63	2.44	281.19	3.68	279.95
NAI-H	282.66	3.36	279.30	4.24	278.42
NAI-I	294.00	3.86	290.14	5.05	288.95
NAI-K1	296.17	6.87	289.30	6.43	289.74
NAI-K2	296.02	6.68	289.34	7.17	288.85
NAI-M1	289.97	3.62	286.35	4.13	285.84
NAI-M2	289.97	3.62	286.35	4.09	285.88
NAI-N	288.77	5.06	283.71	DRY	
NAI-U	327.61	4.26	323.35	1.44	326.17
OW-1	285.96				
OW-2S	279.78				
OW-2D	279.77				
OW-3	260.61				
RD-D	231.82	3.44	228.38	3.97	227.85
RD-S	231.29	9.94	221.35	5.85	225.44

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (I)	JUL - 94		AUG - 94	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
ERT-01	283.67	0.24	283.43	0.00	283.67
ERT-02	281.64	4.37	277.27	4.74	276.90
ERT-03	257.43	2.38	255.05	2.48	254.95
ERT-04	266.67	15.92	250.75	17.06	249.61
ERT-06	254.93	6.16	248.77	6.58	248.35
ERT-08	306.78	6.52	300.26	6.95	299.83
FW-01	327.81	8.34	319.47	9.00	318.81
FW-02	295.07	4.26	290.81	4.36	290.71
FW-02D	297.23	5.03	292.20	5.20	292.03
FW-03	291.91	8.74	283.17	9.18	282.73
FW-03D	291.14	7.89	283.25	7.14	284.00
FW-04	283.38	6.23	277.15	6.60	276.78
FW-05	286.42	5.12	281.30	5.00	281.42
FW-06	270.95	9.30	261.65	10.42	260.53
FW-08	273.70	9.50	264.20	10.04	263.66
FW-08D	274.12	7.91	266.21	8.80	265.32
FW-09	307.48	8.12	299.36	10.82	296.66
FW-10	291.26	7.99	283.27	9.58	281.68
FW-10D	292.48	22.48	270.00	23.20	269.28
FW-11	282.37	5.94	276.43	7.62	274.75
FW-11D	283.37	12.07	271.30	12.98	270.39
FW-12	279.33	9.88	269.45	11.57	267.76
FW-13	279.86	8.30	271.56	11.32	268.54
FW-14D	281.61	11.71	269.90	12.94	268.67
FW-15D	285.84	19.40	266.44	21.12	264.72
FW-16	256.00	8.15	247.85	8.60	247.40
FW-17	233.27	3.29	229.98	3.17	230.10
FW-18	252.93	7.00	245.93	7.54	245.39
FW-19	249.11	4.77	244.34	4.98	244.13
FW-20	282.15	5.84	276.31	6.16	275.99
FW-21	258.44	6.33	252.11	6.49	251.95
FW-21D	257.45	0.00	257.45	0.00	257.45
FW-22D	253.47	5.51	247.96	5.90	247.57
FW-23	270.18	15.44	254.74	16.58	253.60
FW-23D	260.77	11.08	249.69	11.84	248.93
FW-24	256.98	1.83	255.15	1.95	255.03
FW-24D	258.23	0.62	257.61	1.18	257.05
FW-25	285.35	9.05	276.30	11.28	274.07
FW-25D	282.44	9.54	272.90	11.43	271.01
FW-26D	291.84	6.32	285.52	7.30	284.54
FW-27	286.44	7.10	279.34	7.94	278.50

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	JUL - 94		AUG - 94	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
FW-28D	272.39	10.55	261.84	11.68	260.71
MP-I-3S	240.94	10.65	230.29	11.32	229.62
MP-I-3S-REPLACE	240.65				
MP-L-1S	278.48	12.78	265.70	14.40	264.08
MP-L-2D	271.55	8.98	262.57	9.63	261.92
MP-L-2S	271.67	6.54	265.13	NOT MEASURED	
MP-L-3S	262.57	6.86	255.71	7.25	255.32
NAI-A1	302.38	9.44	292.94	11.06	291.32
NAI-A2	304.21	8.72	295.49	10.00	294.21
NAI-B	304.54	8.00	296.54	9.54	295.00
NAI-C1	298.19	7.92	290.27	9.18	289.01
NAI-C2	299.96	9.54	290.42	10.62	289.34
NAI-C3	299.96	12.88	287.08	12.34	287.62
NAI-D1	272.62	3.74	268.88	6.00	266.62
NAI-D2	273.79	4.25	269.54	5.25	268.54
NAI-E	288.97	8.46	280.51	10.21	278.76
NAI-F	283.63	5.88	277.75	7.48	276.15
NAI-H	282.66	7.20	275.46	9.98	272.68
NAI-I	294.00	7.48	286.52	8.86	285.14
NAI-K1	296.17	8.00	288.17	8.73	287.44
NAI-K2	296.02	8.22	287.80	8.73	287.29
NAI-M1	289.97	6.14	283.83	6.95	283.02
NAI-M2	289.97	6.10	283.87	6.90	283.07
NAI-N	288.77	DRY		DRY	
NAI-U	327.61	7.90	319.71	8.70	318.91
OW-1	285.96				
OW-2S	279.78				
OW-2D	279.77				
OW-3	260.61				
RD-D	231.82	4.62	227.20	4.99	226.83
RD-S	231.29	7.02	224.27	7.40	223.89

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	SEP – 94		OCT – 94	
		DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)	DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)
ERT-01	283.67	0.58	283.09	0.00	283.67
ERT-02	281.64	4.40	277.24	3.12	278.52
ERT-03	257.43	2.34	255.09	1.80	255.63
ERT-04	266.67	16.40	250.27	15.34	251.33
ERT-06	254.93	5.95	248.98	5.41	249.52
ERT-08	306.78	6.09	300.69	5.04	301.74
FW-01	327.81	8.16	319.65	6.83	320.98
FW-02	295.07	3.80	291.27	3.41	291.66
FW-02D	297.23	4.70	292.53	4.30	292.93
FW-03	291.91	8.35	283.56	5.66	286.25
FW-03D	291.14	7.95	283.19	5.42	285.72
FW-04	283.38	6.25	277.13	4.97	278.41
FW-05	286.42	5.13	281.29	4.54	281.88
FW-06	270.95	7.30	263.65	6.03	264.92
FW-08	273.70	10.45	263.25	9.25	264.45
FW-08D	274.12	9.78	264.34	8.89	265.23
FW-09	307.48	10.29	297.19	8.55	298.93
FW-10	291.26	9.75	281.51	8.68	282.58
FW-10D	292.48	25.44	267.04	23.03	269.45
FW-11	282.37	7.31	275.06	4.66	277.71
FW-11D	283.37	14.78	268.59	12.52	270.85
FW-12	279.33	11.90	267.43	10.68	268.65
FW-13	279.86	11.85	268.01	11.83	268.03
FW-14D	281.61	13.85	267.76	13.29	268.32
FW-15D	285.84	20.58	265.26	OBSTRUCTED	
FW-16	256.00	7.57	248.43	6.49	249.51
FW-17	233.27	2.98	230.29	2.74	230.53
FW-18	252.93	7.05	245.88	6.40	246.53
FW-19	249.11	5.04	244.07	4.65	244.46
FW-20	282.15	5.80	276.35	4.92	277.23
FW-21	258.44	5.65	252.79	4.08	254.36
FW-21D	257.45	0.00	257.45	0.00	257.45
FW-22D	253.47	5.75	247.72	6.09	247.38
FW-23	270.18	16.16	254.02	15.22	254.96
FW-23D	260.77	11.63	249.14	11.73	249.04
FW-24	256.98	1.89	255.09	1.18	255.80
FW-24D	258.23	1.08	257.15	0.00	258.23
FW-25	285.35	11.60	273.75	10.56	274.79
FW-25D	282.44	11.47	270.97	10.15	272.29
FW-26D	291.84	7.57	284.27	4.94	286.90
FW-27	286.44	7.65	278.79	6.40	280.04

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (I)	SEP - 94		OCT - 94	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
FW-28D	272.39	11.45	260.94	10.28	262.11
MP-I-3S	240.94	10.85	230.09	10.24	230.70
MP-I-3S-REPLACE	240.65				
MP-L-1S	278.48	14.83	263.65	13.75	264.73
MP-L-2D	271.55	6.71	264.84	7.74	263.81
MP-L-2S	271.67	DRY		DRY	
MP-L-3S	262.57	6.70	255.87	5.80	256.77
NAI-A1	302.38	12.05	290.33	12.10	290.28
NAI-A2	304.21	10.20	294.01	9.43	294.78
NAI-B	304.54	9.36	295.18	8.48	296.06
NAI-C1	298.19	8.55	289.64	7.40	290.79
NAI-C2	299.96	10.30	289.66	9.24	290.72
NAI-C3	299.96	12.87	287.09	10.72	289.24
NAI-D1	272.62	5.35	267.27	2.60	270.02
NAI-D2	273.79	6.55	267.24	4.18	269.61
NAI-E	288.97	11.15	277.82	11.72	277.25
NAI-F	283.63	7.30	276.33	4.97	278.66
NAI-H	282.66	9.70	272.96	9.41	273.25
NAI-I	294.00	8.75	285.25	7.40	286.60
NAI-K1	296.17	8.05	288.12	6.86	289.31
NAI-K2	296.02	8.45	287.57	7.51	288.51
NAI-M1	289.97	6.30	283.67	4.50	285.47
NAI-M2	289.97	6.30	283.67	4.50	285.47
NAI-N	288.77	DRY		DRY	
NAI-U	327.61	7.85	319.76	6.25	321.36
OW-1	285.96			5.20	280.76
OW-2S	279.78			5.49	274.29
OW-2D	279.77			5.12	274.65
OW-3	260.61			3.10	257.51
RD-D	231.82	4.92	226.90	4.43	227.39
RD-S	231.29	10.16	221.13	6.61	224.68

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	NOV – 94		DEC – 94	
		DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)	DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)
ERT–01	283.67	0.00	283.67	0.00	283.67
ERT–02	281.64	3.75	277.89	1.49	280.15
ERT–03	257.43	1.72	255.71	1.21	256.22
ERT–04	266.67	16.45	250.22	15.29	251.38
ERT–06	254.93	5.10	249.83	4.30	250.63
ERT–08	306.78	4.83	301.95	3.05	302.93
FW–01	327.81	7.38	320.43	5.22	322.59
FW–02	295.07	3.45	291.62	3.14	291.93
FW–02D	297.23	4.47	292.76	3.80	293.43
FW–03	291.91	6.67	285.24	3.14	288.77
FW–03D	291.14	5.90	285.24	4.20	286.94
FW–04	283.38	5.60	277.78	3.32	280.06
FW–05	286.42	4.50	281.92	3.76	282.66
FW–06	270.95	6.35	264.60	5.55	265.40
FW–08	273.70	10.20	263.50	8.81	264.89
FW–08D	274.12	9.55	264.57	11.85	262.27
FW–09	307.48	8.65	298.83	5.50	301.98
FW–10	291.26	9.55	281.71	7.72	283.54
FW–10D	292.48	22.55	269.93	33.47	259.01
FW–11	282.37	4.75	277.62	2.72	279.65
FW–11D	283.37	12.04	271.33	13.87	269.50
FW–12	279.33	10.60	268.73	8.70	270.63
FW–13	279.86	10.80	269.06	8.33	271.53
FW–14D	281.61	12.10	269.51	15.52	266.09
FW–15D	285.84	OBSTRUCTED		OBSTRUCTED	
FW–16	256.00	6.24	249.76	4.77	251.23
FW–17	233.27	2.85	230.42	2.30	230.97
FW–18	252.93	6.90	246.03	5.61	247.32
FW–19	249.11	4.75	244.36	4.23	244.88
FW–20	282.15	4.90	277.25	3.83	278.32
FW–21	258.44	3.98	254.46	2.50	255.94
FW–21D	257.45	0.00	257.45	0.00	257.45
FW–22D	253.47	5.45	248.02	5.25	248.22
FW–23	270.18	15.47	254.71	14.01	256.17
FW–23D	260.77		260.77	10.96	249.81
FW–24	256.98	1.18	255.80	0.99	255.99
FW–24D	258.23	0.50	257.73	0.00	258.23
FW–25	285.35	10.55	274.80	8.11	277.24
FW–25D	282.44	10.30	272.14	8.38	274.06
FW–26D	291.84	4.85	286.99	2.25	289.59
FW–27	286.44	6.55	279.89	3.73	282.71

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	NOV - 94		DEC - 94	
		DEPTH TO GW-TOC(ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC(ft)	GW ELEV-TOC (ft)
FW-28D	272.39	10.10	262.29	9.23	263.16
MP-I-3S	240.94	11.12	229.82	9.86	231.08
MP-I-3S-REPLACE	240.65	8.98	231.67	10.81	229.84
MP-L-1S	278.48	14.28	264.20	13.45	265.03
MP-L-2D	271.55	8.10	263.45	6.36	265.19
MP-L-2S	271.67	DRY		DRY	
MP-L-3S	262.57	5.65	256.92	4.62	257.95
NAI-A1	302.38	12.00	290.38	11.76	290.62
NAI-A2	304.21	10.20	294.01	9.23	294.98
NAI-B	304.54	9.90	294.64	7.52	297.02
NAI-C1	298.19	8.30	289.89	6.35	291.84
NAI-C2	299.96	10.05	289.91	8.36	291.60
NAI-C3	299.96	10.65	289.31	10.15	289.81
NAI-D1	272.62	1.90	270.72	NOT MEASURED	
NAI-D2	273.79	3.80	269.99	12.60	261.19
NAI-E	288.97	11.52	277.45	11.21	277.76
NAI-F	283.63	4.85	278.78	2.25	281.38
NAI-H	282.66	9.30	273.36	2.60	280.06
NAI-I	294.00	7.80	286.20	5.53	288.47
NAI-K1	296.17	7.95	288.22	5.62	290.55
NAI-K2	296.02	8.15	287.87	6.68	289.34
NAI-M1	289.97	4.55	285.42	3.62	286.35
NAI-M2	289.97	4.60	285.37	3.64	286.33
NAI-N	288.77	DRY		DRY	
NAI-U	327.61	6.83	320.78	4.25	323.36
OW-1	285.96	4.89	281.07	3.68	282.28
OW-2S	279.78	5.45	274.33	3.79	275.99
OW-2D	279.77	5.19	274.58	3.64	276.13
OW-3	260.61	3.10	257.51	2.97	257.64
RD-D	231.82	4.60	227.22	4.11	227.71
RD-S	231.29	6.75	224.54	6.06	225.23

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	JAN - 95		FEB - 95	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
ERT-01	283.67	0.00	283.67	0.00	283.67
ERT-02	281.64	2.18	279.46	3.39	278.25
ERT-03	257.43	1.26	256.17	1.62	255.81
ERT-04	266.67	13.36	253.31	13.70	252.97
ERT-06	254.93	4.56	250.37	5.02	249.91
ERT-08	306.78	3.91	302.87	NOT MEASURED	
FW-01	327.81	4.57	323.24	6.30	321.51
FW-02	295.07	3.22	291.85	FROZEN	
FW-02D	297.23	3.85	293.38	4.45	292.78
FW-03	291.91	3.93	287.98	5.85	286.06
FW-03D	291.14	4.18	286.96	4.98	286.16
FW-04	283.38	4.00	279.38	5.28	278.10
FW-05	286.42	2.62	283.80	4.40	282.02
FW-06	270.95	5.83	265.12	6.70	264.25
FW-08	273.70	6.77	266.93	8.35	265.35
FW-08D	274.12	9.09	265.03	7.07	267.05
FW-09	307.48	4.74	302.74	5.85	301.63
FW-10	291.26	5.00	286.26	5.60	285.66
FW-10D	292.48	30.18	262.30	11.70	280.78
FW-11	282.37	2.93	279.44	3.65	278.72
FW-11D	283.37	20.23	263.14	12.13	271.24
FW-12	279.33	6.76	272.57	7.25	272.08
FW-13	279.86	5.40	274.46	5.92	273.94
FW-14D	281.61	13.13	268.48	9.96	271.65
FW-15D	285.84	OBSTRUCTED		OBSTRUCTED	
FW-16	256.00	5.48	250.52	6.90	249.10
FW-17	233.27	2.10	231.17	2.75	230.52
FW-18	252.93	5.25	247.68	6.48	246.45
FW-19	249.11	4.17	244.94	4.70	244.41
FW-20	282.15	4.02	278.13	4.62	277.53
FW-21	258.44	2.91	255.53	4.10	254.34
FW-21D	257.45	0.00	257.45	0.00	257.45
FW-22D	253.47	5.70	247.77	5.24	248.23
FW-23	270.18	10.12	260.06	12.97	257.21
FW-23D	260.77	10.41	250.36	10.08	250.69
FW-24	256.98	FROZEN		FROZEN	
FW-24D	258.23	0.00	258.23	0.00	258.23
FW-25	285.35	5.55	279.80	6.00	279.35
FW-25D	282.44	6.29	276.15	6.42	276.02
FW-26D	291.84	2.21	289.63	3.10	288.74
FW-27	286.44	3.85	282.59	5.25	281.19

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	JAN - 95		FEB - 95	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
FW-28D	272.39	8.01	264.38	8.17	264.22
MP-I-3S	240.94	8.31	232.63	9.99	230.95
MP-I-3S-REPLACE	240.65	8.39	232.26	9.94	230.71
MP-L-1S	278.48	9.10	269.38	NOT MEASURED	
MP-L-2D	271.55	6.32	265.23	7.04	264.51
MP-L-2S	271.67	DRY		DRY	
MP-L-3S	262.57	4.88	257.69	5.45	257.12
NAI-A1	302.38	6.69	295.69	6.25	296.13
NAI-A2	304.21	5.99	298.22	6.50	297.71
NAI-B	304.54	5.39	299.15	6.24	298.30
NAI-C1	298.19	6.14	292.05	9.35	288.84
NAI-C2	299.96	7.64	292.32	10.25	289.71
NAI-C3	299.96	9.35	290.61	10.15	289.81
NAI-D1	272.62	1.49	271.13	FROZEN	
NAI-D2	273.79	7.47	266.32	3.04	270.75
NAI-E	288.97	6.17	282.80	5.65	283.32
NAI-F	283.63	2.42	281.21	3.38	280.25
NAI-H	282.66	3.67	278.99	4.05	278.61
NAI-I	294.00	3.49	290.51	5.00	289.00
NAI-K1	296.17	5.88	290.29	DRY	
NAI-K2	296.02	6.85	289.17	12.05	283.97
NAI-M1	289.97	3.48	286.49	4.62	285.35
NAI-M2	289.97	3.45	286.52	4.62	285.35
NAI-N	288.77	4.94	283.83	5.30	283.47
NAI-U	327.61	3.56	324.05	5.47	322.14
OW-1	285.96	3.92	282.04	4.79	281.17
OW-2S	279.78	4.45	275.33	5.26	274.52
OW-2D	279.77	4.06	275.71	4.84	274.93
OW-3	260.61	2.98	257.63	3.19	257.42
RD-D	231.82	3.58	228.24	3.98	227.84
RD-S	231.29	5.58	225.71	6.12	225.17

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (I)	MAR – 95		APR – 95	
		DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)	DEPTH TO GW–TOC (ft)	GW ELEV–TOC (ft)
ERT–01	283.67	0.00	283.67	0.00	283.67
ERT–02	281.64	2.35	279.29	1.70	279.94
ERT–03	257.43	1.48	255.95	1.35	256.08
ERT–04	266.67	13.51	253.16	13.08	253.59
ERT–06	254.93	4.55	250.38	4.24	250.69
ERT–08	306.78	4.10	302.68	4.15	302.63
FW–01	327.81	5.59	322.22	5.32	322.49
FW–02	295.07	3.57	291.50	3.28	291.79
FW–02D	297.23	4.00	293.23	4.00	293.23
FW–03	291.91	4.50	287.41	3.96	287.95
FW–03D	291.14	4.20	286.94	4.28	286.86
FW–04	283.38	4.23	279.15	3.58	279.80
FW–05	286.42	4.00	282.42	3.86	282.56
FW–06	270.95	6.25	264.70	6.10	264.85
FW–08	273.70	8.21	265.49	8.13	265.57
FW–08D	274.12	6.82	267.30	7.01	267.11
FW–09	307.48	5.27	302.21	4.60	302.88
FW–10	291.26	4.76	286.50	3.63	287.63
FW–10D	292.48	10.93	281.55	10.00	282.48
FW–11	282.37	2.88	279.49	2.71	279.66
FW–11D	283.37	10.98	272.39	10.87	272.50
FW–12	279.33	6.62	272.71	6.05	273.28
FW–13	279.86	5.37	274.49	4.68	275.18
FW–14D	281.61	9.50	272.11	9.20	272.41
FW–15D	285.84	OBSTRUCTED		OBSTRUCTED	
FW–16	256.00	6.01	249.99	5.28	250.72
FW–17	233.27	2.65	230.62	2.45	230.82
FW–18	252.93	5.87	247.06	5.62	247.31
FW–19	249.11	4.35	244.76	4.20	244.91
FW–20	282.15	4.01	278.14	3.86	278.29
FW–21	258.44	3.46	254.98	2.93	255.51
FW–21D	257.45	0.00	257.45	0.00	257.45
FW–22D	253.47	5.21	248.26	5.15	248.32
FW–23	270.18	13.09	257.09	12.49	257.69
FW–23D	260.77	9.92	250.85	9.65	251.12
FW–24	256.98	FROZEN		1.10	255.88
FW–24D	258.23	0.00	258.23	0.00	258.23
FW–25	285.35	5.47	279.88	4.76	280.59
FW–25D	282.44	6.02	276.42	5.34	277.10
FW–26D	291.84	2.10	289.74	2.00	289.84
FW–27	286.44	3.55	282.89	3.63	282.81

TABLE 2 – WATER LEVEL MONITORING PROGRAM – 1994–1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	MAR – 95		APR – 95	
		DEPTH TO GW – TOC (ft)	GW ELEV – TOC (ft)	DEPTH TO GW – TOC (ft)	GW ELEV – TOC (ft)
FW-28D	272.39	7.95	264.44	7.60	264.79
MP-I-3S	240.94	9.69	231.25	9.73	231.21
MP-I-3S-REPLACE	240.65	9.64	231.01	9.95	230.70
MP-L-1S	278.48	9.56	268.92	9.35	269.13
MP-L-2D	271.55	NOT MEASURED		7.23	264.32
MP-L-2S	271.67	NOT MEASURED		4.79	266.88
MP-L-3S	262.57	5.23	257.34	4.85	257.72
NAI-A1	302.38	6.04	296.34	4.70	297.68
NAI-A2	304.21	6.16	298.05	5.12	299.09
NAI-B	304.54	5.63	298.91	4.62	299.92
NAI-C1	298.19	7.36	290.83	8.58	289.61
NAI-C2	299.96	8.17	291.79	9.04	290.92
NAI-C3	299.96	9.26	290.70	9.32	290.64
NAI-D1	272.62	FROZEN		1.40	271.22
NAI-D2	273.79	2.50	271.29	2.60	271.19
NAI-E	288.97	5.19	283.78	4.28	284.69
NAI-F	283.63	2.31	281.32	2.24	281.39
NAI-H	282.66	3.69	278.97	2.82	279.84
NAI-I	294.00	4.14	289.86	3.92	290.08
NAI-K1	296.17	7.42	288.75	9.41	286.76
NAI-K2	296.02	7.61	288.41	10.15	285.87
NAI-M1	289.97	3.65	286.32	5.30	284.67
NAI-M2	289.97	3.65	286.32	5.49	284.48
NAI-N	288.77	4.94	283.83	4.95	283.82
NAI-U	327.61	4.70	322.91	4.29	323.32
OW-1	285.96	3.96	282.00	3.98	281.98
OW-2S	279.78	4.93	274.85	4.59	275.19
OW-2D	279.77	4.33	275.44	4.08	275.69
OW-3	260.61	FROZEN		3.10	257.51
RD-D	231.82	4.01	227.81	3.77	228.05
RD-S	231.29	6.11	225.18	5.77	225.52

TABLE 2 - WATER LEVEL MONITORING PROGRAM - 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	MAY - 95		JUNE - 95	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
ERT-01	283.67	1.95	281.72	0.00	283.67
ERT-02	281.64	3.20	278.44	7.40	274.24
ERT-03	257.43	1.55	255.88	3.48	253.95
ERT-04	266.67	14.50	252.17	22.48	244.19
ERT-06	254.93	4.95	249.98	19.40	235.53
ERT-08	306.78	5.20	301.58	5.05	300.93
FW-01	327.81	6.20	321.53	7.35	320.46
FW-02	295.07	3.50	291.57	3.67	291.40
FW-02D	297.23	4.25	292.98	4.53	292.70
FW-03	291.91	5.83	286.08	7.44	284.47
FW-03D	291.14	10.93	280.21	7.10	284.04
FW-04	283.38	5.02	278.36	9.18	274.20
FW-05	286.42	5.73	280.69	5.12	281.30
FW-06	270.95	6.85	264.10	9.40	261.55
FW-08	273.70	9.00	264.70	13.05	260.65
FW-08D	274.12	9.85	264.27	18.36	255.76
FW-09	307.48	5.46	302.02	6.80	300.68
FW-10	291.26	4.97	286.29	6.93	284.33
FW-10D	292.48	10.87	281.61	25.30	267.18
FW-11	282.37	3.51	278.86	4.83	277.54
FW-11D	283.37	11.74	271.63	33.28	250.09
FW-12	279.33	6.00	272.53	13.85	265.48
FW-13	279.86	5.76	274.10	7.59	272.27
FW-14D	281.61	9.46	272.15	27.05	253.76
FW-15D	285.84	OBSTRUCTED		OBSTRUCTED	
FW-16	256.00	6.05	249.95	16.37	239.63
FW-17	233.27	2.00	230.47	3.15	230.12
FW-18	252.93	6.08	246.85	7.64	245.29
FW-19	249.11	4.40	244.71	5.37	243.74
FW-20	282.15	4.30	277.85	5.80	276.35
FW-21	258.44	4.10	254.34	5.95	252.49
FW-21D	257.45	0.00	257.45	8.13	249.32
FW-22D	253.47	8.15	245.32	42.75	210.72
FW-23	270.18	13.60	256.58	15.35	254.83
FW-23D	260.77	10.45	250.32	44.86	215.91
FW-24	256.98	1.48	255.50	2.80	254.18
FW-24D	250.23	0.25	257.98	5.47	252.76
FW-25	285.35	5.56	279.79	7.28	278.07
FW-25D	282.44	6.15	276.29	12.40	270.04
FW-26D	291.84	2.76	289.08	4.20	287.64
FW-27	286.44	4.08	281.56	7.03	279.41

TABLE 2 - WATER LEVEL MONITORING PROGRAM -- 1994-1995
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Well Number (in monitoring program)	TOC ELEV (ft) (1)	MAY - 95		JUNE - 95	
		DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)	DEPTH TO GW-TOC (ft)	GW ELEV-TOC (ft)
FW-28D	272.39	8.15	264.24	23.34	249.05
MP-I-3S	240.94	10.55	230.39	11.28	229.66
MP-I-3S-REPLACE	240.65	10.42	230.23	11.89	228.76
MP-L-1S	278.48	10.40	268.08	11.85	266.63
MP-L-2D	271.55	7.52	264.03	8.40	263.15
MP-L-2S	271.67	DRY		DRY	
MP-L-3S	262.57	5.60	256.97	8.40	254.17
NAI-A1	302.38	6.11	296.27	8.05	294.33
NAI-A2	304.21	6.60	297.61	7.95	296.26
NAI-B	304.54	6.12	298.42	7.54	297.00
NAI-C1	298.19	10.10	288.09	10.60	287.59
NAI-C2	299.96	10.25	289.71	10.94	289.02
NAI-C3	299.96	11.85	288.11	11.24	288.72
NAI-D1	272.62	1.55	271.07	3.07	269.55
NAI-D2	273.79	5.65	268.14	23.75	250.04
NAI-E	288.97	5.39	283.58	7.05	281.92
NAI-F	283.63	3.25	280.38	5.29	278.34
NAI-H	282.66	3.95	278.71	5.50	277.16
NAI-I	294.00	5.46	288.54	7.20	286.80
NAI-K1	296.17	DRY		DRY	
NAI-K2	296.02	10.76	285.26	10.65	285.37
NAI-M1	289.97	6.70	283.27	8.09	281.88
NAI-M2	289.97	6.85	283.12	8.20	281.77
NAI-N	288.77	DRY		DRY	
NAI-U	327.61	5.45	322.16	6.77	320.84
OW-1	285.96	4.60	281.36	5.75	280.21
OW-2S	279.78	5.11	274.67	5.68	274.10
OW-2D	279.77	4.62	275.15	5.45	274.32
OW-3	260.61	3.18	257.43	3.20	257.41
RD-D	231.82	4.24	227.58	4.65	227.17
RD-S	231.29	6.24	225.05	6.72	224.57

TABLE - 3 WATER QUALITY MONITORING PROGRAM WELLS
 Management of Migration
 Tinkham Garage Site
 Londonderry, New Hampshire

Well Number	Well Number	Year Installed	Depth to Bottom at Installation (feet BGS)	Depth to Bottom in 1994 (feet BGS)	Pervious Section (feet BGS)	Pervious Section Length (feet)	Exposed Pervious Section in 1994 (feet)	Percent of Pervious Section Exposed in 1994	Included in Water Quality Monitoring Program	Comments
ERT-01	ERT-01	1983	300	300	300-18.5	281.5	281.5	100	YES	artesian
ERT-02	ERT-02	1983	60	55.7	60-10	50	45.7	91	YES	not secure
ERT-03	ERT-03	1983	60	60.1	60-11	49	49	100	YES	artesian
ERT-04	ERT-04	1983	60	61	60-17	43	43	100	YES	
ERT-06	ERT-06	1983	60	58.1	60-14	46	44.1	96	YES	
ERT-08	ERT-08	1983	300	300	300-20	280	280	100	YES	not secure
FW-01	FW-01	1983	40.2	39	40.2-10.2	30	28.8	96	YES	
FW-02	FW-02	1983	25.5	25.1	25.5-5.5	20	19.6	98	YES	
FW-02D	FW-02D	1983	101	116	101-6	95	95	100	YES	
FW-03	FW-03	1983	23	23	23-3	20	20	100	YES	
FW-03D	FW-03D	1983	102	100	102-3	99	99	100	YES	
FW-04	FW-04	1983	30.1	31	30.1-10.1	20	19.9	100	YES	
FW-05	FW-05	1983	30.3	30.2	30.3-10.3	20	19.9	100	YES	
FW-06	FW-06	1983	27.5	25.8	27.5-7.5	20	18.3	92	YES	
FW-07	FW-07	1983	4.5	NA	4.5-0	4.5	NA	NA	NO	well not found
FW-08	FW-08	1983	29.1	26.3	29.1-9.1	20	17.2	86	YES	horizontal crack in casing
FW-08D	FW-08D	1983	102	101.8	102-5	97	96.8	100	YES	
FW-09	FW-09	1983	36	30.9	33.0-6.0	27	24.9	92	YES	
FW-10	FW-10	1983	28.5	15.6	28.5-6.5	22	9.1	41	NO	obstruction at 15.6'
FW-10D	FW-10D	1983	105.4	101.5	101-31	70	70	100	YES	
FW-11	FW-11	1983	24	16	24-4	20	12	60	YES	obstruction at 16.'; not secure
FW-11D	FW-11D	1983	98	96.4	98-34	64	62.4	98	YES	
FW-12	FW-12	1983	75.8	74.2	75.8-50.8	25	23.4	94	YES	
FW-13	FW-13	1983	20.6	18.1	20-5	15	13.1	87	YES	
FW-14	FW-14	1983	44	2.34	44-14	30	0	0	NO	obstruction at 2.3'
FW-14D	FW-14D	1983	205	58.6	205-26	179	121	68	NO	
FW-15	FW-15	1983	37	NA	37-4	33	NA	NA	NO	destroyed well
FW-15D	FW-15D	1983	204.5	18	205-14	191	4	2	NO	vandalized; obstruction at 18'
FW-16	FW-16	1983	28	27.8	28-4	24	23.8	99	YES	
FW-17	FW-17	1983	42.7	40.8	42.7-5.2	37.5	35.6	95	YES	
FW-18	FW-18	1983	18	15.5	18-4	14	11.5	82	YES	not secure
FW-19	FW-19	1983	16.5	14.1	16.5-4	12.5	10.1	81	YES	
FW-20	FW-20	1983	48	38.1	48-6	42	32.1	76	YES	not secure
FW-21	FW-21	1984	19.2	19.3	19.2-4.2	15	15	100	YES	
FW-21D	FW-21D	1984	205	203.8	205-5	200	198.8	99	YES	artesian
FW-22	FW-22	1984	18	NA	18-0	18	NA	NA	NO	obstruction at top of casing, not sec

TABLE - 3 WATER QUALITY MONITORING PROGRAM WELLS
 Management of Migration
 Tinkham Garage Site
 Londonderry, New Hampshire

Well Number	Well Number	Year Installed	Depth to Bottom at Installation (feet BGS)	Depth to Bottom in 1994 (feet BGS)	Pervious Section (feet BGS)	Pervious Section Length (feet)	Exposed Pervious Section in 1994 (feet)	Percent of Pervious Section Exposed in 1994	Included in Water Quality Monitoring Program	Comments
FW-22D	FW-22D	1984	205	202.8	205-9	198	193.8	99	YES	
FW-23	FW-23	1984	26.3	24.9	26.3-6.3	20	18.6	93	YES	
FW-23D	FW-23D	1984	205	203.4	205-8	197	195.4	99	YES	
FW-24	FW-24	1984	27	27.6	27-7	20	20	100	YES	
FW-24D	FW-24D	1984	205	203.4	205-12	193	191.4	99	YES	artesian
FW-25	FW-25	1984	38	35.5	38-18	20	17.5	88	YES	
FW-25D	FW-25D	1984	205	204	205-44	161	160	99	YES	
FW-26	FW-26	1984	24.6	NA	22.3-7.3	15	NA	NA	NO	destroyed well
FW-26D	FW-26D	1984	135	129.8	135-16	119	113.8	96	YES	
FW-27	FW-27	1984	25.3	24.8	25.3-15.3	10	9.5	95	YES	
FW-28D	FW-28D	1984	205	215.9	205-33	172	172	100	YES	
MP-I-1S	MP-I-1S	1987	20	NA	5-2	3	NA	NA	NO	well not found
MP-I-2D	MP-I-2D	1987	40	NA	40.0-20.0	20	NA	NA	NO	well not found
MP-I-2S	MP-I-2S	1987	20	NA	5-2	3	NA	NA	NO	well not found
MP-I-3S	MP-I-3S	1987	28	12.5	28.0-8.0	20	4.5	23	NO	obstruction at 12.5'
MP-I-3S-R	MP-I-3S-R	1994	24.5	24.5	24.4-14.5	10	10	100	YES	replacement well installed in 1994
MP-L-1S	MP-L-1S	1987	20	21.6	5-2	3	3	100	YES	
MP-L-2D	MP-L-2D	1987	21	20.8	10-2	8	8	100	YES	
MP-L-2S	MP-L-2S	1987	9	8.2	5-2	3	3	100	YES	
MP-L-3S	MP-L-3S	1987	24.5	24.6	24.5-4.5	20	20	100	YES	
NAI-A1	NAI-A1	1982	17	16.8	17-7	10	9.8	98	YES	
NAI-A2	NAI-A2	1983	100	60.3	100-30	70	30.3	43	NO	obstruction at 60.3'
NAI-A3	NAI-A3	1983	190	133.5	190-135	55	0	0	NO	obstruction at 133.5'
NAI-B	NAI-B	1982	20.5	15.7	20.5-7.5	13	8.2	63	NO	obstruction at 15.7'
NAI-C1	NAI-C1	1982	17	15.1	17-7	10	8.1	81	YES	not secured
NAI-C2	NAI-C2	1983	100	64.9	100-28	72	36.9	51	NO	obstruction at 65'
NAI-C3	NAI-C3	1983	190	60	190-135	55	0	0	YES	obstruction at top of rock; questiona
NAI-D1	NAI-D1	1982	7	8	7-2	5	5	100	YES	
NAI-D2	NAI-D2	1983	100	67.3	100-10	90	57.3	64	NO	obstruction at 67.3'
NAI-D3	NAI-D3	1983	190	134.2	190-135	55	0	0	NO	obstruction at 134.2'
NAI-E	NAI-E	1982	17.5	17.5	17.5-7.5	10	10	100	YES	
NAI-F	NAI-F	1982	25	24.8	25-5	20	19.8	99	YES	
NAI-H	NAI-H	1982	21	19.3	21-6	15	13.3	89	YES	
NAI-I	NAI-I	1982	17	17.3	17-7	10	10	100	YES	
NAI-J	NAI-J	1983	3.5	NA	3.5-0.5	3	NA	NA	NO	destroyed well
NAI-K1	NAI-K1	1983	9.5	8.9	9.5-4.5	5	4.4	88	YES	

TABLE - 3 WATER QUALITY MONITORING PROGRAM WELLS
 Management of Migration
 Tinkham Garage Site
 Londonderry, New Hampshire

Well Number	Well Number	Year Installed	Depth to Bottom at Installation (feet BGS)	Depth to Bottom in 1994 (feet BGS)	Pervious Section (feet BGS)	Pervious Section Length (feet)	Exposed Pervious Section in 1994 (feet)	Percent of Pervious Section Exposed in 1994	Included in Water Quality Monitoring Program	Comments
NAI-K2	NAI-K2	1983	22.7	22.2	22.7-17.7	5	4.8	96	YES	
NAI-L	NAI-L	1983	2.8	NA	2.8-0	2.8	NA	NA	NO	well not found
NAI-M1	NAI-M1	1983	13	12.1	13-3	10	9.1	91	YES	
NAI-M2	NAI-M2	1983	24	21.5	24-19	5	2.5	50	YES	obstruction at 21.5'
NAI-N	NAI-N	1983	3.2	2.4	3.2-0.2	3	2.2	73	YES	
NAI-O	NAI-O	1983	7.4	NA	7.4-2.4	5	NA	NA	NO	casing tipped over
NAI-P	NAI-P	1983	3	NA	3.0-0	3	NA	NA	NO	well not found
NAI-U	NAI-U	1982	17	15.3	17-7	10	8.3	83	YES	
RD-D	RD-D	1988	204	201.4	204-57	147	144	98	YES	
RD-S	RD-S	1987	30	30.6	25-5	20	20	100	YES	
LGAW	LGAW	UNK	300	300	UNK	UNK	UNK	100	YES	artesian; MOM remedy well
LGEW	LGEW	UNK	288	UNK	UNK	UNK	UNK	UNK	NO	
LGSW	LGSW	UNK	300	300	UNK	UNK	UNK	100	YES	artesian; MOM remedy well
OW-1	OW-1	1994	6.0	6.0	6.0-2.0	4	4	100	NO	wetland water table well
OW-2S	OW-2S	1994	11.0	11.0	11.0-3.0	8	8	100	NO	wetland water table well
OW-2D	OW-2D	1994	19.0	19.0	19.0-14.0	5	5	100	YES	
OW-3	OW-3	1994	12.0	12.0	12.0-3.0	9	9	100	NO	wetland water table well

Notes: 1994 survey of all site wells was performed by GEI on April 28, 29 and May 3.

Shading indicates wells which are currently not included in the MOM Water Quality Sampling Program

BGS - below ground surface

Pervious Section - the screened or open hole section of a monitoring well.

NA - not applicable

UNK - unknown

**Table 4 - MONITORING WELLS SAMPLED DURING QUARTERS 3 AND 4,
NOVEMBER 1994 AND FEBRUARY 1995
Management of Migration Water Quality
Monitoring Program
Tinkham Garage Site
Londonderry, New Hampshire**

MOM WQMP Quarter 4 - February 1995		
MONITORING WELLS		
FW04 ⁽¹⁾	FW21D	NAI-M2
FW05 ⁽¹⁾	FW24	ERT-01 ⁽¹⁾
FW08D	FW24D	ERT-02 ⁽¹⁾
FW11 ⁽¹⁾	FW27	ERT-06 ⁽¹⁾
FW11D ⁽¹⁾	NAI-C1	MP-I-3S-R
FW16 ⁽¹⁾	NAI-C3	MP-L-2S ⁽¹⁾
FW19	NAI-K1	MP-L-2D ⁽¹⁾
FW20 ⁽¹⁾	NAI-K2	MP-L-3S ⁽¹⁾
FW21	NAI-M1	OW2D
MOM Bedrock Pumping Wells		
LGAW	LGSW	

Note:

1. Monitoring wells where monitoring for volatile organic compound vapors is performed during well development.

TABLE 5 - EQUIPMENT REQUIREMENTS
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire

Safety Equipment (Level D - Dermal)

Health and Safety Plan (copy)
Portable Photoionization Detector
Disposable Tyvek Coveralls (optional)
Duct Tape
Safety Goggles
Safety Boots
Chemical Resistant Gloves
Chemical Resistant Boots

Safety Equipment (Level C - Respiratory, if required)

Full-face Respirators
Organic Vapor Cartridges

Sampling and Measuring Equipment

Field Sampling Plan (copy)
Previous Quarter's Analytical Results Summary (copy)
Water Level Indicator(s)
Extra Non-Dedicated Teflon Well Bailers (1.5")
Disposable Bailers
New Cotton String or Rope for Bailers
Dedicated and Non-Dedicated Submersible Pump(s) (WaTerra™ and electric pumps)
Generator and Gasoline for Pump
pH Meter with Temperature Probe
pH/Temperature Meter Calibration Log (Tinkham/FL2)
pH 4.0 and 7.0 Calibration Solutions
Specific Conductivity Meter
Specific Conductivity Meter Calibration Log (Tinkham/FL3)
1,413 micromhos/cm Calibration Solution
Six-foot Folding Rule
300-foot Measuring Tape
Alconox™ Soap
Pump Decon. cylinders (2)
Distilled Water
Paper Towels and/or Rags
Sampling Glassware and Bubble Pack Mailers (laboratory-provided)
Coolers with Blue Ice Packs (laboratory-provided)
Clear Plastic Tape
Re-sealable Plastic Bags

**TABLE 5 - EQUIPMENT REQUIREMENTS
Management of Migration
Tinkham Garage Site
Londonderry, New Hampshire**

Other

Quality Assurance Project Plan (copy)

Site Maps

Project Logbooks (Tinkham/FL1)

Cellular Phone

Calculator

Watch

Pocket Knife

Marking Pens

Camera

Photograph Log Forms

Carbon Paper

Monitoring Well Sample Collection Forms (Tinkham/FL5)

Chain-of-Custody Forms (Tinkham/FL6)

Sample Assignment Forms (Tinkham/FL7)

Non-conformance Report Forms (Tinkham/FL8)

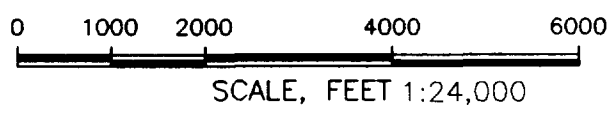
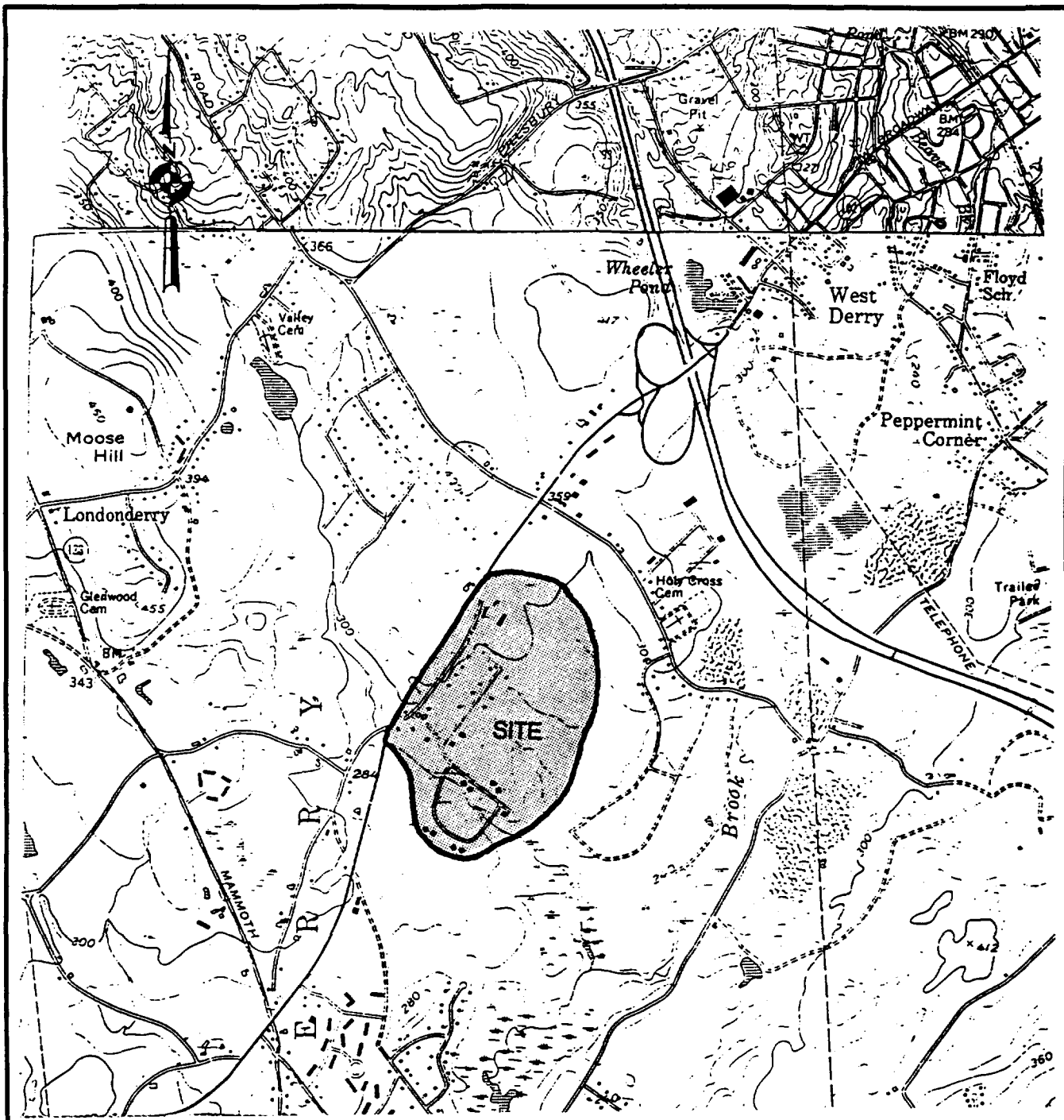
Extra Bottle Labels

Keys for Locked Wells and Gates

Spare AA Batteries for Meters


Blank Federal Express Airbills

This list of equipment is to be updated as field experience necessitates.



Map is taken from U.S.G.S. Topographic 7.5 Minute Series Map of Derry, New Hampshire Quadrangle (1985) and Windham, New Hampshire Quadrangle (1974).

92113SLM 7/13/95 P01

Cannons Engineering - Londonderry Site Technical Committee	Management of Migration Sampling and Analysis Plan Tinkham Garage Site Londonderry, New Hampshire	SITE LOCATION MAP
 GEI Consultants, Inc.	Project 92113	July 1995 Fig. 1

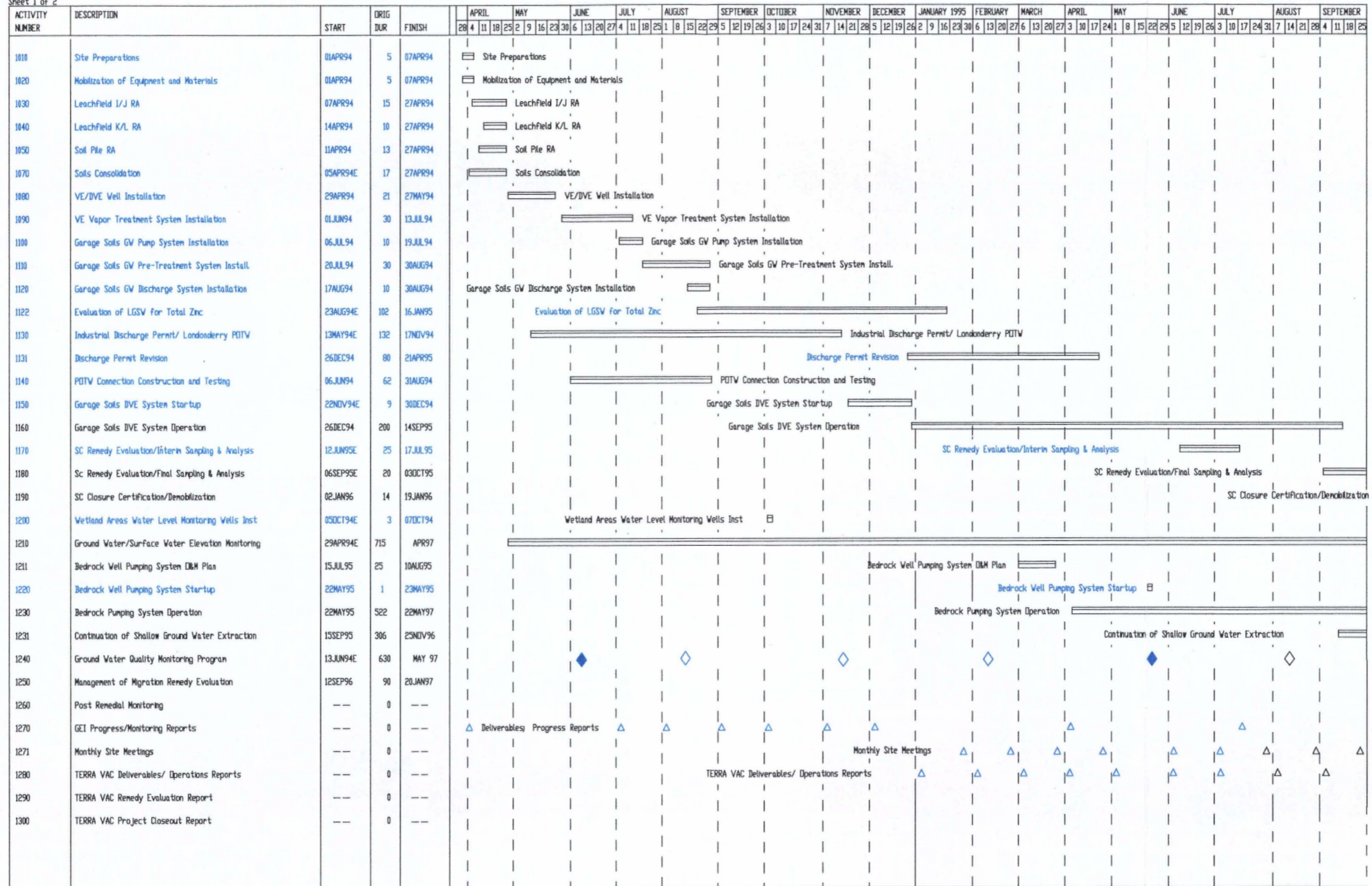
TARGET SHEET

THE MATERIAL DESCRIBED BELOW
WAS NOT SCANNED BECAUSE:

- OVERSIZED
- NON-PAPER MEDIA
- OTHER:

DESCRIPTION: DOC# 11810, MANAGEMENT OF MIGRATION
SAMPLING PLAN, FIGURE 2, SITE PLAN.

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW
BY APPOINTMENT
AT THE EPA NEW ENGLAND SUPERFUND RECORDS CENTER,
BOSTON, MA



921335 7/17/95 PCL BI

- [Solid Bar] DESC
- [Triangle] MILESTONE
- [Double Bar] CRITICAL

- ◆ ANNUAL GROUND WATER QUALITY SAMPLING EVENT OR COMPREHENSIVE SAMPLING ROUND
- ◇ QUARTERLY GROUND WATER QUALITY SAMPLING EVENT
- BLUE ACTIVITIES ARE COMPLETED.

PROJECT SCHEDULEE
REVISION DATE: JULY 17, 1995

GEI Consultants, Inc. Project 92113

RUN DATE 28FEB95
START DATE 01APR94
DATA DATE 01APR94
FINISH DATE MAY97

Schedule of Remedial Actions
Tinkhan Garage Site
Londonderry, NH
Figure 3
Tinkhan Garage Site

SURETRAK

APPENDIX A

Available Boring Logs and Monitoring Well Installation Diagrams

Well No.
 A1?

Condeau Associates, Inc.

WELL LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)	OWNER <u>SPB&G</u>
soil	.5	.5	LOCATION <u>Londonderry, NH</u>
			WELL NO. <u> A </u>
sand, buff colored, fine to medium	16.7	17.2	DATE COMPLETED <u>12/17/82</u>
refusal at 17.2 feet			DRILLING COMPANY <u>N.E. Gravel Wells</u>
			DRILLING METHOD <u>Auger</u>
			SAMPLING METHOD <u>Auger flight</u>
			SAMPLES EXAMINED BY <u>D. Foster</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>301.34' (msl)</u>
			CASING <u>2" I.D. to 7'</u>
			SCREEN TYPE <u>Slotted PVC</u>
			DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>
			SETTING <u>7' - 17' below lsd.</u>
			PUMPING TEST DATE <u> </u>
			DURATION <u> </u>
			STATIC WATER LEVEL <u>8.39' below lsd.</u>
			<u>12/20/82</u>
			PUMPING WATER LEVEL <u> </u>
			YIELD <u> </u>
			REMARKS
			Measuring point is top of
			steel protective casing
			0.95 feet above land
			surface.

Gandean Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER
Topsoil	0.3	0-0.3	SPB & G
Sand and gravel; some moisture, more bony at 7'	9.7	0.3-10	LOCATION <u>Londonderry, NH</u>
Saturated sand and gravel; hard layer at 17' (possibly fractured or soft ledge)	8	10-18	WELL NO. <u>A 2,3</u>
Ledge; (schistose bedrock) soft spot for 16" at 20' ledge hardens substantially but is still broken or fractured at 23' Soft spot at 24' Ledge, highly fractured at 24.5' Soft spot for 6" at 26.5' Ledge hardened 26.5-30' appears to be schist, rock type high in biotite content Soft spot, picked up approx. 1 gpm at 43' Soft spot, no water at 53' Soft spot for 6" at 67' Rock darkened at 90'	182	18-200	DATE COMPLETED <u>June 7, 1983</u>
			DRILLING COMPANY <u>Lakes Region Artesian</u>
			DRILLING METHOD <u>Air rotary</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>J. Kohler</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R.P. <u>approx. 303' (msl)</u>
			CASING <u>1.5-in. PFC</u>
			SCREEN TYPE <u>Slotted PFC</u>
			DIAM. <u>1.5-in.</u> SLOT NO. <u>10</u> <u>A2, 30-100' (open hole)</u>
			SETTING <u>A3, 135-190' (screen)</u>
			PUMPING TEST DATE <u>6-17-83</u>
			DURATION <u>Short term</u>
			STATIC WATER LEVEL <u>A2, 7.90'</u> <u>A3, 8.69'</u>
			PUMPING WATER LEVEL <u>Suction limits</u>
			<u>A2, 0.73 gpm</u>
			YIELD <u>A3, 0.39 gpm</u>
			REMARKS <u>Measuring point is approx. one foot above land surface.</u>

andean Associates, Inc.

WELL LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)	OWNER <u>SP&C</u>	
Sand, brown, fine to medium;			LOCATION <u>Londonderry, NH</u>	
some pebbles	18	18	WELL NO. <u>B</u>	
Sand, very fine; silty; water saturated	2.7	20.7	DATE COMPLETED <u>12/17/82</u>	
Refusal at 20.7 feet			DRILLING COMPANY <u>N.E. Gravel Wells</u>	
			DRILLING METHOD <u>Auger</u>	
			SAMPLING METHOD <u>Auger flight</u>	
			SAMPLES EXAMINED BY <u>D. Foster</u>	
			REFERENCE POINT <u>Land surface</u>	
			ELEVATION OF R. P. <u>303.39' (msl)</u>	
			CASING <u>2" I.D. to 7.5'</u>	
			SCREEN TYPE <u>Slotted PVC</u>	
			DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>	
			SETTING <u>7.5' - 205' below lsd.</u>	
			PUMPING TEST DATE _____	
			DURATION _____	
			STATIC WATER LEVEL <u>7.62' below lsd.</u> <u>12/22/82</u>	
			PUMPING WATER LEVEL _____	
			YIELD _____	
			REMARKS <u>Measuring point is top of steel protective casing 1.08 feet above land surface</u>	

Andean Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB&G</u>
Sand, brown, fine to medium; some pebbles and cobbles	7	7	LOCATION <u>Londonderry, NH</u> WELL NO. <u>C</u>
Sand, brown, fine to medium; silty; some pebbles and cobbles	5	12	DATE COMPLETED <u>12/18/82</u> DRILLING COMPANY <u>N.E. Gravel Wells</u> DRILLING METHOD <u>Auger</u>
Sand, gray, fine to medium; some pebbles	5.7	17.7'	SAMPLING METHOD <u>Auger flight</u> SAMPLES EXAMINED BY <u>D. Bruehl</u>
Refusal at 17.7 feet			REFERENCE POINT <u>Land surface</u> ELEVATION OF R. P. <u>297.11' (msl)</u> CASING <u>2" I.D. to 7'</u>
			SCREEN TYPE <u>Slotted PVC</u> DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>
			SETTING <u>7' - 17' below lsd.</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>4.89' below lsd,</u> <u>12/22/82</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Measuring point is 1.19 feet above land surface. Strong "organic" odor noted while drilling from 8' to 17.7'.</u>

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB & G</u>
Fill material, organic vapors detected - needed respirators	0.3	0-0.3	LOCATION <u>Londonderry, NH</u>
Sand and gravel; Respirators off, drilling in sand and gravel at 7'	14.7	0.3-15	WELL NO. <u>C2,3</u>
Cobble at 9'			DATE COMPLETED <u>June 9, 1983</u>
Some moisture at 10'			DRILLING COMPANY <u>Lakes Region Artesian</u>
Water saturated sand	3	15-18	DRILLING METHOD <u>Air rotary</u>
Ledge; biotite rich schist; Rock fractured at 21'	182	18-200	SAMPLING METHOD <u>Ditch</u>
Soft spot 6"-8" at 24'			SAMPLES EXAMINED BY <u>J. Kohler</u>
Set pipe at 28'			REFERENCE POINT <u>Land surface</u>
Soft spot at 30'			ELEVATION OF R.P. <u>approx. 299' (msl)</u>
Soft for about 1.5' at 40'			CASING <u>1.5-in. PVC</u>
Soft for about 6" at 60'			SCREEN TYPE <u>Slotted PVC</u>
Soft for about 6" at 93'			DIAM. <u>1.5 in.</u> SLOT NO. <u>10</u>
Rock became uniform with few apparent soft areas below 93'			<u>C2, 28-100' (open hole)</u>
Apparent yield at 200'			<u>C3, 135-190' (screen)</u>
was 4 gpm. Water had fool odor and appeared to foam when blown from hole.			PUMPING TEST DATE <u>6-17-83</u>
			DURATION <u>Short term</u>
			STATIC WATER LEVEL <u>C2, 8.86'</u>
			STATIC WATER LEVEL <u>C3, 9.27'</u>
			PUMPING WATER LEVEL <u>Suction limits</u>
			<u>C2, 0.32 gpm</u>
			YIELD <u>C3, no measurable yield</u>
			REMARKS <u>Measuring point is approx. one foot above land surface.</u>

Normandeau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB&C</u>
Topsoil/forest litter	0.7	0.7	LOCATION <u>Londonderry, NH</u>
sand, brown, silty; some pebbles and cobbles	6.8	7.5	WELL NO. <u>D</u>
Refusal at 7.5 feet			DATE COMPLETED <u>12/20/82</u>
Water saturated soil first noted when drilling			DRILLING COMPANY <u>N.E. Gravel Wells</u>
at 3.3'.			DRILLING METHOD <u>Auger</u>
			SAMPLING METHOD <u>Auger flight</u>
			SAMPLES EXAMINED BY <u>D. Bruehl</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>271.32' (msl)</u>
			CASING <u>2" I.D., to 2'</u>
			SCREEN TYPE <u>Slotted PVC</u>
			DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>
			SETTING <u>2' - 7' below lsd.</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>1/15' below lsd.</u> <u>on 12/22/82</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Measuring point is 1.05 feet above land surface.</u>

Panda Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER
Topsoil	0.3	0-0.3	SPB & G
Overburden (soil), water at 1-1.5'	4.7	0.3-5	LOCATION <u>Londonderry, NH</u>
Ledge;	195	5-200	WELL NO. <u>D 2, 3</u>
Fractured and soft at 5'			DATE COMPLETED <u>June 11, 1983</u>
Ledge firms at 7'			DRILLING COMPANY <u>Lakes Region Artesian</u>
Set pipe at 10'			DRILLING METHOD <u>Air rotary</u>
Soft for 6-8" at 13'			SAMPLING METHOD <u>Ditch</u>
Soft for 1', some possible			SAMPLES EXAMINED BY <u>J. Kohler</u>
water at 20'			REFERENCE POINT <u>Land surface</u>
Rock dust changed color -			ELEVATION OF R.P. <u>approx. 273' (msl)</u>
whiter and chips more			CASING <u>1.5-in. PIC</u>
numerous, hard rock,			SCREEN TYPE <u>Slotted PIC</u>
possibly chert, 25-30'			DIAM. <u>1.5 in</u> SLOT NO. <u>10</u>
Rock dust darker at 32'			<u>D2, 10-100' (open hole)</u>
Rock dust lighter at 35'			SETTING <u>D3, 135-190' (screen)</u>
Soft for 1' at 40', some			PUMPING TEST DATE <u>6-17-83</u>
water,			DURATION <u>Short term</u>
Soft for 1' at 58', drilling			STATIC WATER LEVEL <u>D2, 4.29'</u>
very slowly (40-97')			<u>D3, 4.29'</u>
Soft for 1.5' at 76'			PUMPING WATER LEVEL <u>Suction limits</u>
Soft for 1', some possible			<u>D2, 2.11 gpm</u>
water at 97'			YIELD <u>D3, 0.38 gpm</u>
Soft for 6" at 165', more			REMARKS <u>Measuring point</u>
water possible			<u>is approx. one foot</u>
Yielded 4.5 gpm at 200'			<u>above land surface.</u>

Seymour Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER
sd, buff, find: some gravel	17.7	17.7	SPB&G
refusal at 17.7 feet			LOCATION: Londonderry, NH
			WELL NO. E
			DATE COMPLETED 12/20/82
			DRILLING COMPANY N.E. Gravel Wells
			DRILLING METHOD Auger
			SAMPLING METHOD Auger flight
			SAMPLES EXAMINED BY D. Foster
			REFERENCE POINT Land surface
			ELEVATION OF R. P. 288.08' (msl)
			CASING 2" I.D. to 7.5'
			SCREEN TYPE Slotted PVC
			DIAM. 2" I.D. SLOT NO. 10
			SETTING 7.5' - 17.5' below l
			PUMPING TEST DATE
			DURATION
			STATIC WATER LEVEL 8.27' below lsd. 12/22/82
			PUMPING WATER LEVEL
			YIELD
			REMARKS
			Measuring point is top of steel protective casing 0.94 feet above land surface

McManis Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB&G</u>
Sand, yellow/tan, medium	1	1	LOCATION <u>Londonderry, NH</u>
Organic soil	.3	1.3	WELL NO. <u>F</u>
sand, tan	11.5	12.8	DATE COMPLETED <u>12/18/82</u>
silt/clay	2.2	15	DRILLING COMPANY <u>N.E. Gravel Wells</u>
Sand, tan	10	25	DRILLING METHOD <u>Auger</u>
Refusal at 25 feet			SAMPLING METHOD <u>Auger flight</u>
			SAMPLES EXAMINED BY <u>D. Foster</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>282.44' (msl)</u>
			CASING <u>2" I.D. to 5"</u>
			SCREEN TYPE <u>Slotted PVC</u>
			DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>
			SETTING <u>5' to 25' below lsd.</u>
			PUMPING TEST: DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>0.73' below lsd.</u>
			<u>12/22/82</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS
			Measuring point is top of steel protective casing
			1.08 feet above land surface

Grandjean Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u> SPB&G </u>
Topsoil/forest litter	0.5	0.5	LOCATION <u> Londonderry, NH </u>
sand, brown, silty; some pebbles and cobbles	4.5	5	WELL NO. <u> G </u>
Refusal at 5 feet			DATE COMPLETED <u> 12/20/82 </u>
			DRILLING COMPANY <u> N.E. Gravel Wells </u>
Note: Three other borings attempted nearby.			DRILLING METHOD <u> Auger </u>
Refusal ranged from 3 to 5 feet deep. No			SAMPLING METHOD <u> Auger flights </u>
water saturated layer noted.			SAMPLES EXAMINED BY <u> D. Foster </u>
			REFERENCE POINT <u> Land surface </u>
			ELEVATION OF R. P. <u> 269.12' (msl) </u>
			CASING <u> none installed </u>
			SCREEN TYPE <u> none installed </u>
			DIAM. <u> </u> SLOT NO. <u> </u>
			SETTING <u> </u>
			PUMPING TEST DATE <u> </u>
			DURATION <u> </u>
			STATIC WATER LEVEL <u> </u>
			PUMPING WATER LEVEL <u> </u>
			YIELD <u> </u>
			REMARKS
			Not completed as a
			monitoring well because
			no water saturated layer
			was detected.

Comandean Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPE&G</u>	
Sand, buff, medium	12	12	LOCATION <u>Londonderry, NH</u>	
			WELL NO. <u>H</u>	
Sand, buff, medium; and gravel	2	14	DATE COMPLETED <u>12/19/82</u>	
			DRILLING COMPANY <u>N.E. Gravel Wells</u>	
Sand, buff, medium	7.3	21.3	DRILLING METHOD <u>Auger</u>	
			SAMPLING METHOD <u>Auger flight</u>	
Refusal at 21.3 feet			SAMPLES EXAMINED BY <u>D. Foster</u>	
			REFERENCE POINT <u>Land surface</u>	
			ELEVATION OF R. P. <u>281.55 (msl)</u>	
			CASING <u>2" I.D. to 6'</u>	
			SCREEN TYPE <u>Slotted PVC</u>	
			DIAM. <u>2" I.D.</u> SLOT No. <u>10</u>	
			SETTING <u>6' to 21' below lsd.</u>	
			PUMPING TEST DATE _____	
			DURATION _____	
			STATIC WATER LEVEL <u>5.58' below lsd.</u>	
			<u>12/22/82</u>	
			PUMPING WATER LEVEL _____	
			YIELD _____	
			REMARKS	
			Measuring point is top of	
			steel protective casing	
			1.10 feet above land	
			surface.	

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB&</u>
Sand, fine to medium, tan	17.2	17.2	LOCATION <u>Londc</u>
Refusal at 17.2 feet			WELL NO. <u>I</u>
			DATE COMPLETED <u>12/21</u>
			DRILLING COMPANY <u>N.E. C</u>
			DRILLING METHOD <u>Auger</u>
			SAMPLING METHOD <u>Auger</u>
			SAMPLES EXAMINED BY <u>D. Fos</u>
			REFERENCE POINT <u>Land s</u>
			ELEVATION OF R. P. <u>293.04</u>
			CASING <u>2" I.D.</u>
			SCREEN TYPE <u>Slotted</u>
			DIAM. <u>2" I.D.</u>
			SETTING <u>7' to 1'</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>4.57'</u>
			<u>12/22/</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS
			Measuring point
			steel protective
			feet above land

Well No. J

Andeau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB & G</u>
Topsoil, dark brown	1	0-1	LOCATION <u>Londonderry, NH</u>
Sand, brown, gravelly	2.5	1-3.5	
REFUSAL at 3.5 feet			
			WELL NO. <u>J</u>
			DATE COMPLETED <u>6-21-83</u>
			DRILLING COMPANY <u>NAI</u>
			DRILLING METHOD <u>Power auger</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>D. Bruehl</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>249.17' (msl)</u>
			CASING <u>1.25-in. stainless st.</u>
			SCREEN TYPE <u>Johnson stainless steel</u>
			DIAM. <u>1.25-in.</u> SLOT NO. <u>10</u>
			SETTING <u>0.5 - 3.5 feet</u>
			PUMPING TESTS DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>4.63', 6/23/83</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>water level measuring point is 2.55-feet above land surface.</u>

Andeau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB & G</u>
No log (same materials			
were encountered as in			LOCATION <u>Londouder</u>
adjacent Monitor well K2)			WELL NO <u>K1</u>
			DATE COMPLETED <u>June 29</u>
			DRILLING COMPANY <u>N.E. Gra</u>
			DRILLING METHOD <u>Air rotar</u>
			SAMPLING METHOD <u>None ta</u>
			SAMPLES EXAMINED BY <u>—</u>
			REFERENCE POINT <u>Land s.</u>
			ELEVATION OF R. P. <u>Approx. 20</u>
			CASING <u>1.5-in. PVC</u>
			SCREEN TYPE <u>Slotted PV</u>
			DIAM. <u>1.5-in</u> SLOT >
			SETTING <u>4.5-9.5</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>4.03', 7</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Measuring po approx. one foot a land surface.</u>

Falcon Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER
Fill	3	0-3	SPB & G
Stratified sand and gravel	7	3-10	LOCATION <u>Londonderry, NH</u>
Boulders in 6-12" range at 5'			WELL NO. <u>K 2</u>
Ledge, schistose;	15	10-25	DATE COMPLETED <u>June 29, 1983</u>
Quartz and schist, mixed - possibly gneiss at 15'			DRILLING COMPANY <u>N.E. Gravel Wells</u>
Soft spot for 12" at 20'			DRILLING METHOD <u>Auger / Air rotary</u>
About 4 gpm water at 23'. Water had odor and foamed.			SAMPLING METHOD <u>Split spoon & ditch</u>
Went to 25' because of hole collapse and filling in. Set pipe to 16'.			SAMPLES EXAMINED BY <u>J. Kohler</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R.P. <u>Approx. 295' (msl)</u>
			CASING <u>1.5-in. PVC</u>
			SCREEN TYPE <u>Slotted PVC</u>
			DIAM. <u>1.5-in</u> SLOT NO. <u>10</u>
			SETTING <u>17.9 - 22.7 feet</u>
			PUMPING TESTS DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>5.60', 7/6/83</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Measuring point is approx. one foot above land surface.</u>

Well No. L

Andeau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB & G</u>
Black organic soil	1	0-1	
Sand and gravel, brown	2.1	1-3.1	LOCATION <u>Londonderry, NH</u>
REFUSAL at 3.1 feet			WELL NO. <u>L</u>
			DATE COMPLETED <u>6-23-83</u>
			DRILLING COMPANY <u>NAI</u>
			DRILLING METHOD <u>Hand auger</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>D. Bruehl / R. Breton</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>287.73' (msl)</u>
			CASING <u>1.25-in. stainless</u>
			SCREEN TYPE <u>Johnson stainless steel</u>
			DIAM. <u>1.25-in.</u> SLOT NO. <u>10</u>
			SETTING <u>0-2.8 feet*</u>
			PUMPING TESTS DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>2.43', 6/23/83</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Water level measuring point is 2.4-feet above land surface.</u>
			* Screen sticks 2.2'
			above land surface and
			has no cement seal.

Well No. M1, 2

Lanceau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SPB & G</u>
Fill	3	0-3	
Sand and gravel; loose sand over very hard gray sand mixed with silt and clay with some rock fragments at 5'. Stratified sand at 10' Coarse rock fragments at 13' Bluish gray clay and silt veneer at 13.5' (on top of ledge) Ledge; schistose / gneiss Rock change - white dust at 18' Soft layer for 8", dust color becomes tan at 21' Rock appears to have high quartz content, oil sheen on drill cuttings 0.5 gpm water at 25'.	10.5	3-13.5	LOCATION <u>Londouderry, NH</u> WELL NO. <u>M1, 2</u> DATE COMPLETED <u>June 28, 1983</u> DRILLING COMPANY <u>N.E. Gravel Wells</u> DRILLING METHOD <u>Auger / Air rotary</u> SAMPLING METHOD <u>Split spoon / ditch</u> SAMPLES EXAMINED BY <u>J. Kohler</u> REFERENCE POINT <u>Land surface</u> ELEVATION OF R. P. <u>Approx. 289' (msl)</u> CASING <u>1.5-in PVC</u> SCREEN TYPE <u>Slotted PVC</u> DIAM. <u>1.5-in.</u> SLOT NO. <u>10</u> <u>M1, 3-13'</u> SETTING <u>M2, 19-24'</u> PUMPING TEST DATE _____ DURATION _____ STATIC WATER LEVEL <u>M1, 3.17', 7/6/83</u> <u>M2, 3.33', 7/6/83</u> PUMPING WATER LEVEL _____ YIELD _____ REMARKS <u>Measuring point is approx. one foot above land surface.</u>

Well No. N

Andeau Associates, Inc.

WELL LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)	
Black organic topsoil	1.5	0-1.5	OWNER <u>SPB & G</u>
Sand and gravel, brown	1.7	1.5-3.2	LOCATION <u>Londonderry, NH</u>
REFUSAL at 3.2 feet			WELL NO. <u>N</u>
			DATE COMPLETED <u>6-21-83</u>
			DRILLING COMPANY <u>NAI</u>
			DRILLING METHOD <u>Power auger</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>D. Bruehl</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>285.89' (msl)</u>
			CASING <u>1.25-in. stainless</u>
			SCREEN TYPE <u>Johnson stainless steel</u>
			DIAM. <u>1.25-in.</u> SLOT NO. <u>10</u>
			SETTING <u>0.2-3.2 feet</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>3.77', 6/23/83</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>Water level measuring point is 2.90-feet above land surface.</u>

NAI
Normandeau Associates, Inc.

WELL LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)	
Topsoil, dark brown	0.5	0-0.5	OWNER <u>SPB&G</u>
Sand and gravel, brown, silty	7.4	0.5-7.4	LOCATION <u>Londonderry, NH</u>
REFUSAL at 7.9 feet			WELL NO. <u>0</u>
			DATE COMPLETED <u>6-23-83</u>
			DRILLING COMPANY <u>NAI</u>
			DRILLING METHOD <u>Hand auger</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>Bruchl / Breton</u>
			REFERENCE POINT <u>Land surface</u>
			ELEVATION OF R. P. <u>282.4' (msl)</u>
			CASING <u>1.25" stainless</u>
			SCREEN TYPE <u>Johnson stainless steel</u>
			DIAM. <u>1.25-in</u> SLOT NO. <u>10</u>
			SETTING <u>2.4 - 7.4 feet</u>
			PUMPING TEST DATE _____
			DURATION _____
			STATIC WATER LEVEL <u>6.72', 6/23/83</u>
			PUMPING WATER LEVEL _____
			YIELD _____
			REMARKS <u>water level measuring point is 4.0-foot above land surface.</u>

Normandeau Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>S.P.B. & G.</u>
Organic matter, soft, black	1	0-1	LOCATION <u>Londonderry</u>
Sand, gravelly, silty	2.4	1-3.4	WELL NO. <u>P</u>
REFUSAL at 3.4 feet.			DATE COMPLETED <u>6-23-8.</u>
			DRILLING COMPANY <u>NAI</u>
			DRILLING METHOD <u>Hand aug.</u>
			SAMPLING METHOD <u>Ditch</u>
			SAMPLES EXAMINED BY <u>Bruehl/E</u>
			REFERENCE POINT <u>Land Surf</u>
			ELEVATION OF R.P. <u>275.84' (m)</u>
			CASING <u>1.25" stainless</u>
			SCREEN TYPE <u>Johnson stainless</u>
			DIAM. <u>1.25-in</u> SLOT NO
			SETTING <u>0-3.0 feet</u>
			PUMPING TESTS DATE
			DURATION
			STATIC WATER LEVEL <u>6.26', 6</u>
			PUMPING WATER LEVEL
			YIELD
			REMARKS <u>Water level measuring point is 5.20 feet above land surface.</u>

Performance Associates, Inc.

WELL LOG

DESCRIPTION	THICK- NESS (FEET)	DEPTH (FEET)	OWNER <u>SBRAC</u>	
Sand, tan, coarse	17.7	17.7	LOCATION <u>Londonderry, NH</u>	
refusal at 17.7 feet			WELL NO. <u>U</u>	
			DATE COMPLETED <u>12/21/82</u>	
			DRILLING COMPANY <u>N.E. Gravel Wells</u>	
			DRILLING METHOD <u>Auger</u>	
			SAMPLING METHOD <u>Auger flight</u>	
			SAMPLES EXAMINED BY <u>D. Foster</u>	
			REFERENCE POINT <u>Land surface</u>	
			ELEVATION OF R. P. <u>326.16' (msl)</u>	
			CASING <u>2" I.D. to 7'</u>	
			SCREEN TYPE <u>Slotted PVC</u>	
			DIAM. <u>2" I.D.</u> SLOT NO. <u>10</u>	
			SETTING <u>7' - 17' below lsd.</u>	
			PUMPING TEST DATE _____	
			DURATION _____	
			STATIC WATER LEVEL <u>5.33' below lsd.</u>	
			<u>12/22/82</u>	
			PUMPING WATER LEVEL _____	
			YIELD _____	
			REMARKS	
			Measuring point is top of steel casing 1.42 feet above land surface.	



PROJECT Tinkham's Garage		TCO No 3211-11	SHEET 1 of 2	HOLE No FW-01			
LOCATION Corner of McAllister Drive and Rt. 102			ANGLE FROM HORIZ 30°				
BEGUN 5-3-83	COMPLETED 5-10-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 847	HOLE DIA. 3"			
OVERBURDEN (ft) 20.2'		ROCK (ft) 24.3'	TOTAL DEPTH 44.5'				
CORE RECOVERY (ft) 18.75'	CORE BXS. 2	SAMPLES 5	EL. TOP of CASING 327.55'	GROUND EL. 325.45'			
DEPTH to GW/TIME 2.9' / 5-11-83		DEPTH to TOP of ROCK 15.3' to Decomposed Rock 22.2' to Bedrock					
SAMPLE HAMMER WEIGHT/FALL 140#/30"		CASING LEFT in HOLE = DIA./LENGTH 1.5"/42"		NUS INSPECTOR S. Parker			
DEPTH SAMPLE #	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
	CORE/REC (ft)	QSD	PEN/REC (ft)	DEPTH INTERVAL (ft)			
5'	SS-1		24/18	0-2	1/12"-1-4"	Topsoil fine to medium brown sand, trace fine gravel	1
	SS-2		24/18	5-7	22-22-24-24"	fine to medium brown sand, trace gravel	
	SS-3		24/18	10-12	22-24-40-4"	f. to m. SAND fine to medium brown sand, trace gravel grading to brown gray fine sand.	
15'	SS-4		10/6	15-15.3	147-150/4"	Decomposed Rock fine-medium sand and silt, little gravel, rusty brown (decomposed rock)	2
	SS-5		2/2	20-20.2	100/2"	Fractured Bedrock (SCHIST) Run #1 20.2'-25.2' heavily weathered, fractured gray schist	
	60/59	0%				Run #2 25.2'-30.2' heavily weathered, fractured gray schist	
25'	60/48	0%				Run #3 30.2'-35.2' heavily weathered, fractured gray schist	
	60/60	36%					
GRANULAR SOILS		COHESIVE SOILS		REMARKS: 1) WW-1, 3/9/83, washwater from tank 2) WW-2, 3/10/83, washwater from Run #1, 22'			
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY				
0-4	V LOOSE	< 2	V SOFT				
4-10	LOOSE	2-4	SOFT				
10-30	M DENSE	4-8	M STIFF				
30-50	DENSE	8-15	STIFF				
> 50	V DENSE	> 30	HARD				



PROJECT

Tyrone's Garage
LOCATION

LOG No

SHEET

HOLE No

1000000

1 of 1

10000

Corner of McAllister Drive and St. 100

DEPTH	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	MOIST.
		CORE REC (ft)	RQD	PEN. REC (psi)	DEPTH INTERVAL (ft)	BLOWS/6"			
0'		50 35	55%					Run to 35.0' to 40.2'	sl. finely fractured grey schist
10'								Bottom of casing is 10.2'	
								Installed:	
								-Screen from 40.2' to 10.2'	
								-12" riser	
								-Cottawa sand backfill from 40' to 8'	
								-Santonite from 7' to 6'	
								-Cased, cemented, and locked	

REMARKS



PROJECT Tinkham's Garage	TDD No 2211-11	SHEET 1 of 1	MOLE No FW-02
LOCATION South of McAllister Drive-Helm Property	ANGLE FROM HORIZ 90°		

BEGUN 5/10/83	COMPLETED 5/11/83	DRILLER New England Boring Contractors, Inc.	DRILL MAKE & MODEL Mobile 847	MOLE DIA 3"	OVERBURDEN (ft) 3.5'	ROCK (ft) 22'	TOTAL DEPTH 25.5'
CORE RECOVERY (ft) 20'	CORE BXS 2	SAMPLES 1	EL. TOP of CASING 294.87'	GROUND EL. 291.97'	DEPTH to GW/TIME 12'/5-11-83	DEPTH to TOP of ROCK 3.5' to Decomposed Rock 5.5' to Bedrock	
SAMPLE HAMMER WEIGHT/FALL 140#/30"		CASING LEFT in HOLE : DIA / LENGTH 1.5"/27.5'		NUS INSPECTOR K. Parker / J. Blunkett			

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
		CORE/REC (ft)	ROD	PEN/REC (ft)	DEPTH INTERVAL (ft)				BLOWS/6"
0-5				26/12	2-2	1/12"-2-6"	Topsoil light brown fine-coarse sand, little silt	1	
						f. to c. SAND			
5						Decomposed Rock	Decomposed Rock		
		50/60	52%				Run #1 5'6"-10'5" fractured gray schist	2	
10							Run #2 10'6"-15'5" fractured gray schist	3	
		50/60	46%				Fractured Bedrock (SCHIST)		
15								Run #3 15'6"-20'6" fractured gray schist	4
		50/60	52%						
20							Run #4 20'6"-25'6" fractured gray schist with migmatitic zones of quartz and feldspars	5	
		50/60	50%						
25							Bottom of Boring @ 25.5' Installed: -Screen from 25.5' to 5.5' -7.5' riser -Ottawa sand backfill from 25.5' to 3.5' -Bentonite from 3.5' to 1.5' -Cased, cemented, and locked	6	

<table border="1"> <tr> <th>GRANULAR SOILS</th> <th>COHESIVE SOILS</th> </tr> <tr> <td>BLOWS/FT</td> <td>DENSITY</td> </tr> <tr> <td>0-4</td> <td>v LOOSE</td> </tr> <tr> <td>4-10</td> <td>LOOSE</td> </tr> <tr> <td>0-30</td> <td>m DENSE</td> </tr> <tr> <td>30-50</td> <td>DENSE</td> </tr> <tr> <td>>50</td> <td>v DENSE</td> </tr> </table>	GRANULAR SOILS	COHESIVE SOILS	BLOWS/FT	DENSITY	0-4	v LOOSE	4-10	LOOSE	0-30	m DENSE	30-50	DENSE	>50	v DENSE	<table border="1"> <tr> <td>BLOWS/FT</td> <td>DENSITY</td> </tr> <tr> <td><2</td> <td>v SOFT</td> </tr> <tr> <td>2-4</td> <td>SOFT</td> </tr> <tr> <td>4-8</td> <td>m STIFF</td> </tr> <tr> <td>8-15</td> <td>STIFF</td> </tr> <tr> <td>15-30</td> <td>v STIFF</td> </tr> <tr> <td>>30</td> <td>HARD</td> </tr> </table>	BLOWS/FT	DENSITY	<2	v SOFT	2-4	SOFT	4-8	m STIFF	8-15	STIFF	15-30	v STIFF	>30	HARD	REMARKS: 1) WW-1, washwater taken from tank 2) WW-2, washwater, 7'6" 3) WW-3, washwater, 10' 4) WW-4, washwater, 14' 5) WW-5, washwater, 18' 6) WW-6, washwater, 23'
GRANULAR SOILS	COHESIVE SOILS																													
BLOWS/FT	DENSITY																													
0-4	v LOOSE																													
4-10	LOOSE																													
0-30	m DENSE																													
30-50	DENSE																													
>50	v DENSE																													
BLOWS/FT	DENSITY																													
<2	v SOFT																													
2-4	SOFT																													
4-8	m STIFF																													
8-15	STIFF																													
15-30	v STIFF																													
>30	HARD																													



PROJECT: Tankhead's Garage
 LOCATION: McArthur Drive, 30' North of FW-02
 TDD No: B211-11 SHEET: 1 OF 1 FILE No: FA-110
 ANGLE FROM HORIZ: 90°

BEGIN: 6-7-83 COMPLETED: 6-7-83 DRILLER: Henry Michaud & Son
 DRILL MAKE & MODEL: Cyclone TH-60 HOLE DIA: 6.5" OVERBURDEN: 6' ROCK (ft): 98' TOTAL DEPTH: 104'

CORE RECOVERY (ft): N/A CORE BXS: N/A SAMPLES: N/A EL TOP of CASING: 287.22' GROUND EL: 285.42' DEPTH to GW/TIME: DEPTH to TOP of ROCK: 5'
 SAMPLE HAMMER WEIGHT/FALL: N/A CASING LEFT in HOLE = DIA / LENGTH: 6" / 37.3' NUS INSPECTOR: S. PASCOR

DEPTH (ft)	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	STRAIN
		CORE REC (%)	ROD	PEN. REC (%)	DEPTH (ft)	BLWS/6"			
							f. to c. SAND	fine to coarse sand	
20'							Fractured Bedrock (SCHIST)	Bedrock (schist)	
40'									
60'									
80'									
100'							Bottom of Boring @ 101'		

TRIMULAR SOUS / COHESIVE SOILS REMARKS

0-4	20-24	24-28	28-32	32-36	36-40
100	100	100	100	100	100

1. Set depth to 100 ft
 2. Final depth 101 ft
 3. Final depth 101 ft
 4. Final depth 101 ft



PROJECT	TOD No	SHEET	HOLE No.
Tinkham's Garage	9211-11	9	FW-03
LOCATION	ANGLE FROM HORIZ		
Tullis' Backyard	30°		

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	MOLE DIA.	OVERBURDEN (ft)	ROCK (ft)	TOTAL DEPTH
5-12-83	5-12-83	New England Boring Contractors Inc.	Mobile 347	3"	3'	20'	22'
CORE RECOVERY (ft)	CORE BXS	SAMPLES	EL. TOP OF CASING	GROUND EL.	DEPTH to GW/TIME	DEPTH to TOP of ROCK	
19.7'	2	1	291.39'	289.64'	1.2'/5-12-83	3'	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT in HOLE = DIA / LENGTH		NUS INSPECTOR			
140#/30"		1.5"/25"		J. Plunkett			

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
		CORE REC (ft)	#GD	PEN/REC (lb)	DEPTH INTERNAL (ft)				BLOWS/6"
0-1'	s-1			24/18	0-2	1-1-2-32	Topsoil f. to c. SAND	Topsoil light brown fine-coarse sand, little silt, little clay	1
5'		50/60	32%				Run #1 3'-8' slightly fractured gray schist		2
10'		50/56	33%				Run #2 8'-13' fractured gray schist		3
15'		50/60	32%				Run #3 13'-18' slightly fractured gray schist		4
20'		50/60	30%				Run #4 18'-23' slightly fractured gray schist		5
							Bottom of Boring @ 23' installed: -Screen from 23' to 3' -5' riser -Ottawa sand backfill from 23' to 1' -Bentonite from 1' to 0' -Cased, cemented, and locked		5

GRANULAR SOILS		COHESIVE SOILS		REMARKS:
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	v LOOSE	0-2	v SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	M DENSE	4-8	M STIFF	
30-50	DENSE	8-15	STIFF	
>50	v DENSE	15-30	v STIFF	
		>30	HARD	

- 1) obstruction at 2', cored through boulder 2.5 min./ft., no recovery
- 2) WW-1, washwater at 2'
- 3) WW-2, washwater 8'
- 4) 2" fracture with soil seam at 13' WW-3, washwater at 13'
- 5) WW-4, washwater 18'
- 6) WW-5, washwater 20'



PROJECT: Tinham's Garage
 LOCATION: 15' S.E. of FA-03 (Tullis Land)
 TCD No: 3211-11
 SHEET: 1 of 1
 HOLE No: FA-033

REGUM: 6-7-83
 COMPLETED: 6-7-83
 DRILLER: Henry Michaud & Son
 DRILL MAKE & MODEL: Cyclone TH-50
 HOLE DIA: 5.5"
 OVERBURDEN (ft): 3'
 ROCK (ft): 97'
 TOTAL DEPTH: 102'
 CORE RECOVERY (ft): N/A
 CORE BXS: N/A
 SAMPLES: N/A
 EL. TOP of CASING: 291.15'
 GROUND EL: 229.65'
 DEPTH to GW/TIME: 3'
 DEPTH to TOP of ROCK: 3'
 SAMPLE HAMMER WEIGHT/FALL: N/A
 CASING LEFT in HOLE = DIA/LENGTH: 6"/35'
 NUS INSPECTOR: E. Pongha

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (ft)	RCO	PEN REC (ft)	DEPTH (ft)			
0						6" to 6" SAND	Fine to coarse sand	
20						Fractured Bedrock (SCHIST)	Bedrock (schist)	1
21								2
22								3
23								4
24								5
25								6
26								7
27								8
28								9
29								10
100							Bottom of Coring ? 102'	

REMARKS: Water bearing fracture 101'
 Fracture 101'
 Fracture 102'
 Fracture 103'
 Fracture 104'
 Fracture 105'
 Fracture 106'
 Fracture 107'
 Fracture 108'
 Fracture 109'
 Fracture 110'



PROJECT Tinham's Garage	TOO No 8211-11	SHEET 1 of 1	HOLE No FW-04
LOCATION Tullis property frontyard (Mercury Drive)		ANGLE FROM HORIZ 90°	

BEGUN 5-17-83	COMPLETED 5-16-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 847	HOLE DIA. 3"	OVERBURDEN (ft) 10.1'	ROCK (ft) 20'	TOTAL DEPTH 30.1'
CORE RECOVERY (ft) 20'	CORE BXS. 2	SAMPLES 3	EL. TOP of CASING 282.36'	GROUND EL. 281.56'	DEPTH to GW/TIME 2.2'/5-16-83	DEPTH to TOP of ROCK 10.1'	
SAMPLE HAMMER WEIGHT/FALL 140#/30"		CASING LEFT IN HOLE = DIA./LENGTH 1.5"/32'		NUS INSPECTOR J. Plunkett			

DEPTH (ft)	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
	CORE REC (%)	ROQ	PER/REC (%)	DEPTH INTERVAL (ft)				BLOWS/6"
0-5	55-4		24/18	0-2	1-4-8-23	Topsoil Topsoil light brown fine-coarse sand, little silt, little gravel		
5-10	25-2		24/12	5-7	18-16-16-11	f. to c. SAND brown fine-med. sand, some weathered gravel, rust colored		
10-15	55-3	25-24	40%	1/1	10-10.1	100/1"	Run #1 10.1'-12.1' slightly fractured gray schist	1
15-20	50/50		100%				Run #2 12.1'-17.1' slightly fractured gray schist	2
20-25	50/50		78%				Run #3 17.1'-22.1' slightly fractured gray schist	3
25-30	50/50		92%				Run #4 22.1'-27.1' fractured gray schist with intrusive veins (monzonite)	4
30-30.1	25/24		50%				Run #5 27.1'-30.1' fractured gray schist	
30.1-30.1							Bottom of Boring @ 30.1' Installed: -Screen from 30.1' to 10.1' -12' riser -Ottawa sand backfill from 30.1' to 8' -Bentonite from 8' to 3' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	LOOSE	< 2	SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
> 50	DENSE	15-30	V STIFF
		> 30	HARD

REMARKS:

- 1) Core barrel plugged had to pull at 12'
- 2) WW-1, washwater, 12'
- 3) WW-2, washwater, 15'
- 4) WW-3, washwater, 18'
- 5) WW-4, washwater, 25'



PROJECT Dunham's Garage	TOD No 5011-11	SHEET 1 of 1	HOLE No R-02
LOCATION Mercury Drive East of ERT - 01	ANGLE FROM HORIZ 90°		

BEGUN 5-16-83	COMPLETED 5-17-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 547	HOLE DIA. OVERRIDEN 3"	ROCK (ft) 21.3'	TOTAL DEPTH 30.3'
CORE RECOVERY (ft) 20'	CORE BXS. 2	SAMPLES 3	EL. TOP of CASING 296.43'	GROUND EL. 274.63'	DEPTH to GW/TIME 1:24:15-1:27	DEPTH to TOP of ROCK 10.3' to Decomposed Rock 10.3' to Bedrock
SAMPLE HAMMER WEIGHT/FALL 140#/30"	CASING LEFT in HOLE = DIA / LENGTH 1.5" / 32'		NUS INSPECTOR J. Bl. [unclear]			

DEPTH	SAMPLE No	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	FOOT
		PEN/REC (L/A)	POD	PEN/REC (L/A)	DEPTH (FEET)			
5'	SS-1			24/26	0-2	1-2-3-11	Topsoil f. to m. SAND	Topsoil fine-medium brown sand, little clay, little gravel
10'	SS-2			24/19	5-7	18-11-20-21		fine sand, little clay, little silt, little medium sand
15'	SS-3	60/36	23%	4/4	0-10.3	100/4"	Decomposed Rock	Decomposed Rock
20'		60/60	56%				Fractured Bedrock (SCHIST)	Run #1 10.3'-15.3' quartzite - heavily weathered and decomposed gray schist
25'		60/60	64%					Run #2 15.3'-20.3' gray schist with intrusive monzonite, slightly fractured
		60/60	74%					Run #3 20.3'-25.3' heavily weathered, fractured gray schist, migmatitic zoning
30'								Run #4 25.3'-30.3' fractured gray schist, weathered in fractures
							Bottom of boring = 30.3' Installed: - screen from 20.3' to 10.3' - 12" riser - Ottawa sand backfill from 30' to 3' - monzonite from 3' to 5' - cased, grouted, and locked	

IRREGULAR SOILS, COHESIVE SOILS	REMARKS	
10-4		
4-0		
1-10		



PROJECT	TOD No	SHEET	HOLE No
Tinkham's Garage	8211-11	1 of 1	FW-06
LOCATION	ANGLE FROM HORIZ		
South side of Mercury Dr. adjacent to LGSW	90°		

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	HOLE DIA	OVERBURDEN (ft)	ROCK (ft)	TOTAL DEPTH
5-17-83	5-19-83	New England Boring Contractors Inc.	Mobile 347	3"	7.5'	20'	27.5'
CORE RECOVERY (%)	CORE BOXS	SAMPLES	EL. TOP of CASING	GROUND EL.	DEPTH to GW/TIME	DEPTH to TOP of ROCK	
19%	2	2	270.31'	260.85'	2.5'/5-18-83	5.0' to Decomposed Rock 7.5' to Bedrock	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT in HOLE x DIA./LENGTH		NUS INSPECTOR			
140#/30"		1.5' x 29.5'		J. Plunkett			

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
		CORE REC (%)	#00	PEN. REC (%)	DEPTH INTERVAL (ft)				BLOWS/6"
0-5	SS-1			24/12	0-2	1-3-3-4	Topsoil	Topsoil light brown fine-medium sand little silt last 2" rust red decomposed rock	
5-10	SS-2			15/10	5-6.3'	17-18-100/3"	Decomposed Rock	Fine-medium brown sand and decomposed rock (roller bit to 7.5')	
10-15	50/57	90%					Run #1 7.5'-12.5' fractured gray schist		1
15-20	50/60	34%					Fractured Bedrock (SCHIST)	Run #2 12.5'-17.5' fractured gray schist	2
20-25	50/60	50%					Run #3 17.5'-22.5' fractured gray schist		3
25-30	50/60	32%					Run #4 22.5'-27.5' fractured gray schist		
Bottom of Boring @ 27.5'							Installed:		
							-Screen from 27.5' to 7.5'		
							-9" riser		
							-Ottawa sand backfill from 27.5' to 5.5'		
							-Bentonite from 5.5' to 3.5'		
							-Cased, cemented, and locked		

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	15-30	V STIFF
		> 30	HARD

REMARKS:

- 1) MW-1, washwater, 12'
- 2) MW-2, washwater, 16'
- 3) Clay seam 2" at 20'



PROJECT	TOD No	SHEET	WOLE No
Pinkham's Garage	3211-11	1 of 1	FW-08
LOCATION	ANGLE FROM HORIZ		
South side of Mercury Dr. next to swimming pool.	90°		

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	MOLE DIA	OVERBURDEN (ft)	ROCK (ft)	TOTAL DEPTH
5-18-83	5-18-83	New England Boring contractors Inc.	Mobile 847	3"	9.1'	20'	29.1'
CORE RECOVERY (ft)		CORE BXS	SAMPLES	EL. TOP of CASING	GROUND EL.	DEPTH to GW/TIME	DEPTH to TOP of ROCK
19.1'		2	2	273.53'	271.93'	3.5'/5-18-83	9.1'
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT in MOLE = DIA / LENGTH		NUS INSPECTOR		
140#/30"			1.5"/31"		J. Plunkett		

DEPTH	CORRECTION	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		PEN/REC (s.f.)	POD	PEN/REC (s.f.)	DEPTH INTERVAL (ft)			
5'				24/12	0-2	1-3-3-3	Topsoil and f. to m. SAND 8" Topsoil light brown fine-medium sand little silt	
10'				24/18	5-7	21-33-70-80	TILL gray-brown - fine to medium sand little silt, trace gravel (roller bit to 9'1")	
15'		50/60	32%				Run #1 9.1'-14.1' heavily fractured gray schist with light blue quartz and feldspar rich inclusions, fractures are heavily weathered	1
20'		60/52	52%			Fractured Bedrock (SCHIST)	Run #2 14.1'-19.1' fractured gray schist	2,3
25'		50/57	58%				Run #3 19.1'-24.1' fractured gray schist	4
30'		60/60	94%				Run #4 24.1'-29.1' fractured gray schist	5
							Bottom of Boring @ 29.1' Installed: -Screen from 29.1' to 9.1' -11' riser -Ottawa sand backfill from 29.1' to 7.1' -Bentonite from 7.1' to 2' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS		REMARKS:
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	
0-4	v LOOSE	< 2	v SOFT	1) WW-1 at 14'6"
4-10	LOOSE	2-4	SOFT	2) WW-2 at 18'6"
10-30	m DENSE	4-8	m STIFF	3) 18' - 18'8" soil seam
30-50	DENSE	8-15	STIFF	4) WW-3 at 23'
> 50	v DENSE	> 30	HARD	5) WW-4 at 24.1'



PROJECT _____ JOB No _____ SHEET _____ HOLE No _____
 LOCATION _____ ANGLE FROM HORIZ _____
 25 ft. Southeast of PW-02, next to building 202 202

BEGUN _____ COMPLETED _____ DRILLER _____ DRILL MAKE & MODEL _____ HOLE DIA OVERBURDEN _____ ROCK (ft) _____ TOTAL DEPTH _____
 6-6-82 6-6-82 Henry Michaud & Son Cyclone 74-60 6.8" 6" 67' 100'

CORE RECOVERY (ft) _____ CORE BXS _____ SAMPLES _____ EL TOP OF CASING / GROUND EL _____ DEPTH to GW/TIME _____ DEPTH to TOP of ROCK _____
 N/A N/A N/A 274.13' 272.03' 5'

SAMPLE HAMMER WEIGHT/FALL _____ CASING LEFT IN HOLE = DIA / LENGTH _____ NUS INSPECTOR _____
 N/A 6" / 40.5' G. Tosco

DEPTH	SAMPLE	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		NO. OF CORE RECS	RECORDED	DEPTH RECORDED	BLOWS/6"			
0'						0' to 5' SAND	fine to medium sand	
5'						Fractured Bedrock (SCHIST)	Bedrock encountered at 5'	1
10'							2	
15'							3	
20'							4	
25'							5	
30'							bottom of casing 3' out	

TRIANGULAR SILE COHESIVE SOIL REMARKS _____
 0-4 _____
 4-2 _____
 2-1 _____
 1-1 _____
 1-0 _____
 0-0 _____



PROJECT Dinkham's Garage		TOD No 2211-11	SHEET 1 of 2	HOLE No FW-23
LOCATION West of garage on Seismic line #1			ANGLE FROM HORIZ 90°	

BEGUN 5-19-83	COMPLETED 5-20-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 847	HOLE DIA. 3"	OVERBURDEN (ft) 16'	ROCK (ft) 20'	TOTAL DEPTH 36'
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CORE RECOVERY (ft) 19.9'	CORE BXS 2	SAMPLES 4	EL TOP of CASING 307.04'	GROUND EL. 305.45'	DEPTH to GW/TIME 2.3'/5-20-83	DEPTH to TOP of ROCK 16'
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SAMPLE HAMMER WEIGHT/FALL 140 ^{lb} /30"	CASING LEFT in HOLE = DIA / LENGTH 1.5"/28'	NUS INSPECTOR J. Plunkett
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DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
		CORE/REC (ft)	POD	PEN/REC (ft)	DEPTH INTERVAL (ft)				BLOWS/6"
0-5'	SS-1			24/12	0-2	1-2-3-6	Topsoil and f. to m. SAND	8" Topsoil fine to medium light brown sand, trace silt, trace fine gravel	
5-10'	SS-2			24/15	5-7	18-24-28-30	TILL	medium-coarse light brown sand, little silt, little gravel slightly compacted (till)	
10-15'	SS-3			24/19	10-12	19-24-28-20		medium-coarse light brown sand, little silt, little gravel slightly compacted (till)	
15-20'	SS-4			11/9	15-15.9	23-100/5"		7" of medium-coarse light brown sand, little silt, little gravel, slightly compacted	1
20-25'		60/60	50%				Fractured Bedrock (SCHIST)	Run #1 16'-21' heavily fractured gray schist	2
25-30'		60/60	50%					Run #2 21'-25' heavily fractured gray schist	
30-35'		60/60	54%					Run #3 26'-31' fractured gray schist	3
35-40'		60/60	34%					Run #4 31'-36' fractured gray schist	4

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	0-2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
>50	V DENSE	15-30	V STIFF
		>30	HARD

REMARKS:

- 1) Clay seam at 16' to 16'3"
- 2) WW-1 at 20'
- 3) WW-2 at 27'
- 4) WW-3 at 34'



PROJECT Tinkham's Garage		TOD No 9211-11	SHEET 1 of 1	HOLE No Fw-10
LOCATION Southwest of garage, just East of Seismic line			ANGLE FROM HORIZ 90°	

BEGUN 5-22-83	COMPLETED 5-23-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 847	HOLE DIA 3"	OVERBURDEN (ft) 29.5'	ROCK (ft) 0'	TOTAL DEPTH 29.5'
CORE RECOVERY (%) N/A	CORE BXS. N/A	SAMPLES 6	EL. TOP of CASING 291.09'	GROUND EL. 299.39'	DEPTH to GW/TIME 1.2'/5-23-83	DEPTH to TOP of ROCK N/A	
SAMPLE HAMMER WEIGHT/FALL 140#/30"		CASING LEFT in HOLE = DIA./LENGTH 1.5"/29.5'		MUS INSPECTOR J. Plungett			

DEPTH (ft)	CORRECTION (ft)	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (in)	ROD	PEN/REC (in)	DEPTH INTERNAL (ft)			
0-1				25/14	0-2	1/12"-3-3	Topsoil and light brown fine sand, little silt, trace coarse sand and cobble	
5-2				24/12	5-7	33-60-69-54	f. to c. SAND light brown med-coarse sand, little fine gravel, trace gravel, trace decomposed rock	
10-3				24/24	10-12	21-46-61-120	Compacted TILL gray fine-medium sand, little silt, little fine gravel, slightly compacted (silt)	
15-4				24/16	15-17	54-63-74-98		
20-5				11/10	20-20.9	53-100/5"	gray fine-medium sand, little silt, little fine gravel, some cobble and gravel (compacted till)	
25-6				9/5	25-25.8	59-100/3"		
30-7							Bottom of Boring @ 28.5' Installed: -Screen from 28.5' to 6.5' -7.5' riser -Ottawa sand backfill from 28.5' to 4.5' -Dentonite from 4.5' to 2.5' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	15-30	V STIFF
		> 30	HARD

REMARKS:



PROJECT Tinkham's Garage		TCO No 3211-11	SHEET 1 of 1	MOLE No FW-11
LOCATION Behind garage at Southeast corner of open field			ANGLE FROM HORIZ 90°	

BEGUN 5-24-83	COMPLETED 5-24-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 947	MOLE DIA 3"	OVERBURDEN (ft) 24'	ROCK (ft) N/A	TOTAL DEPTH 24'
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CORE RECOVERY (ft) N/A	CORE BXS. N/A	SAMPLES 5	EL. TOP OF CASING 292.57'	GROUND EL. 200.77'	DEPTH to GW/TIME 0'/5-24-83	DEPTH to TOP of ROCK N/A
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SAMPLE HAMMER WEIGHT/FALL 140#/30"	CASING LEFT in MOLE = DIA / LENGTH 1.5"/25'	NUS INSPECTOR J. Plunkett
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DEPTH	SAMPLE NO	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (ft)	ROD	PEN/REC (lb)	DEPTH INTERVAL (ft)	BLOWS/6"			
0-5'	SS-1			24/14	0-2	1/12"-3-18	m. to c. SAND	Topsoil: Dark brown sand and humus light brown medium-coarse sand, little silt, little fine gravel	
5-10'	SS-2			24/18	5-7	12-20-20-20		light brown-gray medium sand, little silt, little clay, trace fine gravel	
10-15'	SS-3			24/14	10-12	16-18-22-31		gray fine-medium sand, little silt, little clay, trace fine gravel	1
15-20'	SS-4			24/14	15-17	28-31-34-46	TILL	gray fine-medium sand, little silt, little clay, trace fine gravel, trace cobble	2
20-25'	SS-5			18/12	20-21.5	34-47-50		gray fine-medium sand, little silt, little clay, trace fine gravel, trace cobble (compacted till)	3
25'								Bottom of Spring @ 24' Installed: -Screen from 24' to 4' -6' riser -Ottawa sand backfill from 24' to 3' -Bentonite from 3' to 1' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
>50	V DENSE	> 30	HARD

REMARKS:

- 1) SS-3: first indication of contamination: 5 ppm methane equivalent on OVA.
- 2) SS-4: 5 ppm methane equivalent on OVA.
- 3) Drilled to 25', sand blew in hole to 24'.



PROJECT	TOD No	SHEET	WELL No
Tinkham's Garage	111-11	2	11-110
LOCATION	ANGLE FROM HORIZ		
Behind the garage, southeast corner of open field, 5' west of TW-11			

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	HOLEDIA OVERBYPHEN	ROCK (ft)	TOTAL DEPTH
6-8-83	6-18-83	New England Spring Contractors Inc.	Mobile 847	(ft)	63'	88'

CORE RECOVERY (ft)	CORE BOXS	SAMPLES	TEL TOP OF CASING	GROUND EL.	DEPTH TO QA TIME	DEPTH TO TOP of ROCK
63.2'	7	2	230.00'	231.17'	6-13-83	130.5' to Decomposed Rock 34' to Bedrock

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE = DIA /LENGTH	NUS INSPECTOR
140#/30"	1.5"/100'	J. Blumhert

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		PER REC (ft)	#30	PER REC (ft)	BLWS/6"			
5'						Refer to log for well TW-11	Refer to log well TW-11	
10'								
15'								
20'								
25'	ss-1		6/6	25-25.5	117/6"	TILL	light brown-gray, fine-medium sand, little silt and clay, trace fine gravel, heavily compacted (compacted till)	
30'	ss-2		10/12	30-31	51-74		compacted till	
35'						Decomposed Rock		
40'								
45'								

UNSATURATED SOILS (COHESIVE SOILS)	REMARKS
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4-4	4-4	4-4	4-4
4-5	4-5	4-5	4-5
4-6	4-6	4-6	4-6
4-7	4-7	4-7	4-7
4-8	4-8	4-8	4-8
4-9	4-9	4-9	4-9
4-10	4-10	4-10	4-10



PROJECT: Trondheim's Garage TCO No: 3211-11 SHEET: 2 of 3 HOLE No: FW-11

LOCATION: 5' west of FW-11

DEPTH IN FEET	SAMPLE #	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	FEET IN HOLE
		CORE REC CORRECTION	ROD	PEN/REC CORRECTION	TEST INTERNAL			
39'	49/44		15%				Run #2 39'-43' fractured gray schist	1
43'	50/60		100%				Run #3 43'-48' fractured gray schist	2
48'	50/60		50%			Fractured Bedrock	Run #4 48'-53' fractured gray schist	3
53'	50/60		14%			(SCHIST)	Run #5 53'-58' fractured gray schist	4
58'	50/60		90%				Run #6 58'-63' fractured gray schist with quartzite	5
63'	50/60		35%				Run #7 63'-68' fractured gray schist with quartzite vein	6
68'	50/60		94%				Run #8 68'-73' light gray quartzite (vein) slightly fractured	7
73'	60/60		74%				Run #9 73'-78' fractured gray schist with quartzite vein	8

REMARKS:

1) Washwater taken at 38'	5) WW-6 at 58'
2) WW-2 at 42'	7) WW-7 at 63'6"
3) WW-3 at 44'	8) WW-8 at 58'
4) WW-4 at 49'	9) WW-9 at 73'
5) WW-5 at 53'	



PROJECT: Trucking Garage
 LOCATION: 51' west of TW-11
 JOB No: 8011401
 SHEET: 3 of 3
 HOLE No: TW-11

DEPTH FEET	SAMPLE No	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION
		LOG#	PERC	LOG#	PERC		
20'	601591	70%					Run #10 78'-83' fractured gray schist with quartzite vein
35'	60160	10%				Bedrock (SCHIST)	Run #11 83'-88' fractured gray schist
30'	60160	5%					Run #12 88'-93' heavily fractured gray schist with quartz vein
35'	60160	50%					Run #12 93'-98' fractured gray schist
20'							Bottom of Boring 98' Installed: -Screen from 93' to 98' -40' liner -Dodge sand backfill from 98' to 99' -Bentonite from 99' to 99' -Natural backfill to surface -Cased, cemented, and locked

REMARKS

10' run #10 at 82'6"
 10' run #11 at 81'
 10' run #12 at 98'



PROJECT	TDD No	SHEET	MOLE No
Tinkham's Garage	2211-11	1 of 3	FW-12
LOCATION	ANGLE FROM HORIZ		
West of seismic line #1, station 5 + 50	90°		

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	MOLE DIA	OVERBURDEN (ft)	ROCK (ft)	TOTAL DEPTH
5-25-83	5-26-83	New England Boring Contractors Inc.	Mobile 347	3"	49.3'	25.5'	75.3'
CORE RECOVERY (ft)	CORE BXS	SAMPLES	EL. TOP of CASING	GROUND EL.	DEPTH to GW/TIME	DEPTH to TOP of ROCK	
24.5'	3	10	279.33'	277.43'	3.1'/5-26-83	49.25'	
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT in MOLE = DIA / LENGTH		NUS INSPECTOR				
140#/20"	1.5"/77.3'		J. Plunkett				

DEPTH	CORRECTION	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REC (ft)	POD	PEN/REC (ft)	DEPTH INTERNAL (ft)			
0-5'				24/4	0-2	2-2-2-2	Topsoil	Topsoil brown fine-medium sand, little coarse sand, little silt, trace cobbles
5-10'				18/5	5-6.5	37-65-57	TILL	light brown-gray, medium sand, little silt, little coarse sand, little fine gravel, little gravel, trace cobbles (compacted till)
10-15'				24/18	10-12	28-33-47-61		compacted till
15-20'				18/3	15-16.5	27-53-52		compacted till
20-25'				24/12	20-22	28-27-34-107		compacted till
25-30'				9/3	25-25.3	51-100/3"		compacted till-with a higher clay and silt content, grayer in appearance and more compact
30-35'				12/8	30-31	107-120		compacted till (gray)

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	15-30	V STIFF
		> 30	HARD

REMARKS:



PROJECT

FIG. NO.

SHEET

NO. OF SHEETS

Location
 Truck's Garage

FIG. NO.

2 of 3

FIG. NO.

West of seismic line #1, station E + 30

DEPTH SAMPLE NO.	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	UNIT
	TYPE REC.	ACC.	PER. REC.	WATER CONTENT % SOLIDS % SOLAS. #			
35-38			12.8	35-36	33-330	compact silty gray	
40							
42			12.8	40-41	32-31	compact silty gray	
44						TILL	
45			18.0	45-46.5	39-50-52	no recovery	
50	50/56	0%				Run #1 49.31-54.31 heavily fractured gray schist	
55	50/59	20%				Run #2 54.31-59.31 fractured gray schist	
60	50/43	0%				Run #3 59.31-64.31 highly fractured gray schist with clay seams in fractures	
65	50/50	10%				Run #4 64.31-69.31 fractured gray schist with quartzite	
70	50/50	20%				Run #5 69.31-74.31 fractured gray schist with quartzite veins and clay seams in fractures	

REMARKS

- 1) Run #1 49.31-54.31
- 2) Run #2 54.31-59.31
- 3) Run #3 59.31-64.31
- 4) Run #4 64.31-69.31
- 5) Run #5 69.31-74.31



PROJECT Tinkham's Garage	TOD No. 2211-11	SHEET 2 of 2	SCALE No. PW-12
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LOCATION
West of seismic line #1, station 5 + 50

DEPTH SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
	CONC. REC. (%)	RQD	PEN. REC. (%)	SPT INTERNAL TEST	BLOWS/6"				
75'	13/17	20%					<p>Run #6 74.3' - 75.75' Gray quartzite (metals)</p> <p>Bottom of Boring @ 75.75'</p> <p>Installed:</p> <ul style="list-style-type: none"> -Screen from 75.75' to 50.75' -52.75' riser -Ottawa sand backfill from 75.75' to 49' -Bentonite from 49' to 43' -Cased, cemented, and locked 		

REMARKS



PROJECT: Tinkham's Garage
 LOCATION: On seismic line #2 at station 3 + 30
 PCO No: 8211-11
 SHEET: 1 of 2
 HOLE No: 24113
 ANGLE FROM HORIZ: 30°

BEGUN: 5-1-33 COMPLETED: 5-1-33 DRILLER: New England Boring Contractors Inc.
 DRILL MAKE & MODEL: Mobile 347 HOLE DIA: 3" OVERBURDEN: 16" ROCK (ft): 28' TOTAL DEPTH: 34'
 CORE RECOVERY (ft): 29.2' CORE BXS: 2 SAMPLES: 4 EL TOP of CASING: 272.30' GROUND EL: 270.30' DEPTH to GW/TIME: 1.77/5-1-33 DEPTH to TOP of ROCK: 16'
 SAMPLE HAMMER WEIGHT/FALL: 110#/30" CASING LEFT in HOLE + DIA / LENGTH: 1.5"/46" NUS INSPECTOR: J. J. Dwyer

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (%)	RQD	PEN/REC (blows)	DEPTH INTERVAL (ft)			
0-5'	SS-1			23/19	0-2	1/18"-2	Topsoil fine to medium sand, little silt, little clay, little cobble. (sandy till)	
5-10'	SS-1			24/12	5-7	14-28-16-17	TILL	
10-15'	SS-3			24/20	10-12	28-29-31-32	compacted sandy till	
15-20'	SS-1			11/5	15-15.3	21-100/5"	Fractured Bedrock (SCHIST)	Run #1 16'-21' fractured gray schist
20-25'	50/50	30%						Run #2 21'-25' fractured gray schist
25-30'	50/52	32%						Run #3 26'-31' fractured gray schist
30-35'	50/60	30%						Run #4 31'-35' fractured gray schist

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	✓ LOOSE	2-4	✓ SOFT
4-10	LOOSE	4-8	M STIFF
0-30	M DENSE	8-15	STIFF
30-50	✓ DENSE	5-30	✓ STIFF
>50	✓ DENSE	>30	HARD

REMARKS:
 1) HW-1 at 18.5'
 2) HW-2 at 22'
 3) HW-3 at 23.6'
 4) HW-4 at 27'
 5) HW-5 at 35'



PROJECT: Tinkham's Garage
 LOCATION: On seismic line #2 at station 9 + 20

DEPTH FEET	SAMPLE NO.	ROCK		SOIL		BLOWS/6"	STRATUM DESCRIPTION	DETAILED DESCRIPTION	REMARKS
		CORE NO.	POD	PER. REC.	TEST NO.				
40	40/62	402					Fractured Bedrock (SCHIST)	Run #6 36'-41' fractured gray schist	
35'	40/63	403						Run #6 41'-46' fractured gray schist	
								Bottom of Boring @ 44' Installed: -Screen from 44' to 14' -16" riser -Gravel sand backfill from 44' to 16' -Bentonite from 16' to 6' -Cased, cemented, and locked	

REMARKS

6' above at 23'
 2' below at 25'



PROJECT Tinkham's Garage TOG NO. P2-0407-08 SHEET 1 of 2 HOLE NO. FW-140
 LOCATION Approx 150 ft SE of FW-14 off dirt road in woods ANGLE FROM HORIZ. Vertical

BEGIN 11/19/04 COMPLETED 11/20/04 DRILLER Lakes Region Artesian Wells DRILL MAKE & MODEL Chicago Pneumatic GSDW Air Hammer HOLE DIA. 6" OVERBURDEN (ft) 26 ROCK (ft) 179 TOTAL DEPTH 205

CORE RECOVERY (ft) N/A CORE EXS. N/A SAMPLES 16 EL. TOP of CASING 281.67 GROUND EL. 280.4 DEPTH to GW/TUBE DEPTH to TOP of ROCK 26'

SAMPLE HAMMER WEIGHT/FALL N/A CASING LEFT in HOLE - DIA./LENGTH 6'/30' MUS INSPECTOR B. Buckley/R. DeLuca

DEPTH (ft)	SAMPLE NO.	ROCK		SOIL		Bedrock Cottings samples	DETAILED DESCRIPTION size of cuttings / lithology	NOTES
		CORE/REC (in.)	RGB	PEN/REC (in.)	DEPTH INTERNAL (ft)			
0-25							Overburden - see log for FW-14 for description	
25-30						1	Bedrock - fine /schist- some iron staining	
30-35						2	very coarse-chunks / weathered schist	
35-40						3	possible fracture - fine to medium /schist	
40-45						4	coarse /schist	
45-50						5	medium /intrusive zone of foliated binary granite with minor garnet	
50-55						6	medium /schist	
55-60								
60-65								
65-70								
70-75						7	medium to coarse /schist	
75-80								
80-85						8	fine to medium /schist	
85-90								
90-95						9	medium to coarse /schist	
95-100						10	soft spot - medium to coarse /schist	
100-105								
105-110								
110-115						11	fine to coarse /schist	
115-120						12	drilling obstruction noted - large chunks / weathered schist	
120-125								
125-130						13	fine to coarse /weathered schist	
130-135						14	fine to coarse /weathered schist, some foliated binary granite	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	> 30	HAUD

REMARKS:
 #size of cuttings generated by air hammer drilling



PROJECT
Tinkham's Garage

TOO NO.
FJ-8407-08

SHEET
2 of 2

HOLE NO.
FW-140

LOCATION *Approx. 150' SE of FW-14 of dirt road in woods*

DEPTH	SAMPLE NO.	ROCK		SOIL		Blowback Cuttings Samples	DETAILED DESCRIPTION size of cuttings / lithology	NOTES
		CORE/NO. (in.)	RQB	PDV REC (in.)	DEPTH INTERVAL (ft)			
<i>200</i>							<i>medium to coarse / schist</i>	
							<i>fine to coarse / schist and foliated bitum.</i>	
<i>225</i>							<i>bottom of borehole @ 200' depth</i>	

REMARKS:

** size of cuttings generated by air hammer drilling*



PROJECT	TOO No	SHEET	HOLE No
FINNAM'S GARAGE	3211-11	1 of 2	FA-5
LOCATION	ANGLE FROM HORIZ		
West of apartment buildings K and L	30°		

BEGUN	COMPLETED	DRILLER	DRILL MAKE & MODEL	HOLE DIA	OVERBURDEN (ft)	ROCK (ft)	TOTAL DEPTH
6-2-33	6-2-37	New England Boring Contractors Inc	Mobile 867	3"	15.7'	21.3'	37'
CORE RECOVERY (ft)	CORE BXS	SAMPLES	EL. TOP of CASING	GROUND EL.	DEPTH to GW/TIME	DEPTH to TOP of ROCK	
22.3'	3	3	294.13'	292.38'		15.7'	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT in HOLE = DIA / LENGTH		NUS INSPECTOR			
140#/30"		1.5"/39"		J. Plunnett			

DEPTH	CORRECTION	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REC (ft)	QD	PEN/REC (ft)	DEPTH INTERNAL (ft)	BLOWS/6"			
0-5'				24/18	0-2	1-2-2-2	Topsoil f. to m. SAND	Topsoil	
5-10'				24/18	5-7	28-16-11-14		fine to medium sand, some coarse sand and fine gravel, little silt, little clay, trace cobble (till)	
10-15'				12/1	10-11	51-64		Decomposed rock, trace medium sand	
15-20'		50/43	0%					Run #1 13.5' to 18.5' gneiss boulder (erratic) 13.5' to 14.3', soil seam 14.3' to 15.7', bedrock (fractured gray schist) 15.7' to 18.5'	1
20-25'							Fractured Bedrock	Bedrock: fractured gray schist	
25-30'		51/51	0%				(SCHIST)	Run #2 18.5'-22.8' gray schist	2
30-35'		50/60	0%					Run #3 22.8'-27.8' fractured gray schist	3
		50/60	75%					Run #4 27.8'-32.8' slightly fractured gray schist	
		51/51	75%					Run #5 32.8'-37' gray schist	5

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	v LOOSE	< 2	v SOFT
4-10	LOOSE	2-4	SOFT
10-30	m DENSE	4-8	m STIFF
30-50	DENSE	8-15	v STIFF
> 50	v DENSE	> 30	HARD

REMARKS:

- 1) WW-1 at 13'6"
- 2) WW-2 at 19'6"
- 3) WW-3 at 24'
- 4) WW-4 at 30'
- 5) WW-5 at 35'



PROJECT: Tinkham's Garage
 TOO No: FI-8407-08
 SHEET: 1 of 2
 HOLE No: FW-150
 LOCATION: adjacent to FW-15 east of Buildings K & L
 ANGLE FROM HORIZ: Vertical

BEGIN: 11/2/84
 COMPLETED: 11/7/84
 DRILLER: Lakes Region Artesian Wells
 DRILL MAKE & MODEL: Chicago Pneumatic (CPW) Air Hammer
 HOLE DIA: 6"
 OVERBURDEN (ft): 14
 ROCK (ft): 191
 TOTAL DEPTH: 205

CORE RECOVERY (%): N/A
 CORE BKS.: N/A
 SAMPLES: 18
 EL. TOP of CASING: 286.08
 GROUND EL.: 284.39
 DEPTH to GW/TIME: [blank]
 DEPTH to TOP of ROCK: 14'

SAMPLE HAMMER WEIGHT/FALL: N/A
 CASING LEFT in HOLE = DIA/LENGTH: 6"/20'
 M/S INSPECTOR: B. Buckley / R. DeLuca

DEPTH	SAMPLE NO.	ROCK		SOIL			Bedrock Cuttings Samples	DETAILED DESCRIPTION size of cuttings # / lithology	NOTES
		COR/REC (in.)	NO	PER/REC (in.)	DEPTH INTERVAL (ft)	BLOWS/6"			
								Overburden - see log for FW-15 for description	
25								Bedrock	
								1 - fine to medium / weathered schist	
								2 - fine to medium / schist	
50								3 - fine to medium / schist - some foliated binary granite with iron staining	
								4 - fine to medium / foliated binary granite, some iron staining	
								5 - fine to medium / foliated binary granite, some iron staining	
75								6 - fracture - fine to medium / foliated binary granite, minor garnet	
								7 - fracture - water gain - fine to coarse / foliated binary granite, minor garnet	
								8 - fine to medium / schist, some foliated binary granite	
100								9 - fracture - medium to coarse / weathered schist, some foliated binary granite	
								10 - fine to medium / schist	
125								11 - fine to medium / schist, minor foliated binary granite	
								12 - fine to medium / schist	
150								13 - fine to medium / schist	
								14 - fine to medium / schist	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	v LOOSE	< 2	v SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	v DENSE	> 15	v HARD

REMARKS:
 + size of cuttings generated by air hammer drilling



PROJECT Tinkham's Garage TDD No. P1-8407-08 SHEET 2 of 2 HOLE No. FW-50

LOCATION adjacent to FW-15 east of buildings K&L

DEPTH	SAMPLE NO.	ROCK		SOIL		Bedrock Cuttings Samples	DETAILED DESCRIPTION size of cuttings* / lithology	NOTES
		CORNER (in.)	NO.	POU/REC (in.)	DEPTH (in.)			
							-15	fine to coarse / schist - some weathering
							-16	fine to coarse / schist, minor foliated binary granite, minor garnets
200							-17	fine to medium / schist
							-18	fine to medium / schist, some foliated binary granite
								Bottom of borehole @ 205' depth
225								

REMARKS:

*size of cuttings generated by air hammer drilling



PROJECT Tinkham's Garage		TOD No 3211-11	SHEET 1 of 1	MOLE No FW-15
LOCATION Adjacent to ERT-36 on Capitol Hill Drive			ANGLE FROM HORIZ 90°	

BEGUN 5-3-83	COMPLETED 6-6-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile B47	HOLE DIA. 3"	OVERBURDEN (ft) 3'	ROCK (ft) 20'	TOTAL DEPTH 29'
CORE RECOVERY (ft) 19.5'		CORE BXS. 3	SAMPLES 2	EL. TOP of CASING 254.79'	GROUND EL. 252.79'	DEPTH to GW/TIME 2.0'/6-6-83	DEPTH to TOP of ROCK 8'
SAMPLE HAMMER WEIGHT/FALL 140#/30"		CASING LEFT in HOLE = DIA / LENGTH 1.5"/30"		NUS INSPECTOR J. Plunkett			

DEPTH SAMPLE	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
	CORE/REC (in.)	ROD	PEN/REC (in.)	DEPTH INTERVAL (ft)	BLOWS/6"			
5'-11"			13/4	0-1.5	2-4-100	FILL	3" of topsoil 1" fine to medium brown sand	
5'-2"			24/16	5-7	35-47-31-51		4" fine to medium brown sand 2" schist cobble 8" f. to m. sand, some coarse sand, little silt, little cobble, little fine gravel 2" lightly brown-gray silt, slightly comp.	1 2
10'	50/58	30%				Fractured Bedrock (SCHIST)	Run #1 8'-13' fractured gray schist	3
15'	50/60	30%					Run #2 13'-18' fractured gray schist	4
20'	50/60	40%				Fractured Bedrock (SCHIST)	Run #3 18'-23' fractured gray schist	5
25'	50/56	36%					Run #4 25.5'-28' fractured gray schist with quartz vein	6
30'							Bottom of Boring @ 28' Installed: -Screen from 28' to 4' -6' riser -Ottawa sand backfill from 28' to 2'6" -Bentonite from 2'6" to 0' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	v LOOSE	< 2	v SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
>50	v DENSE	>30	HARD

REMARKS:

- 1) May be either fill or disturbed soil in this sample
- 2) SS-2 indicated volatile organic contamination on OVA (small, early peak)
- 3) WW-1 at 9.6'
- 4) WW-2 at 15.6'
- 5) WW-3 at 22'
- 6) WW-4 at 27'



PROJECT: **Timothy's Garage** TCD No: **607401** SHEET: **1 of 2** HOLE No: **607401**

LOCATION: **South of lower end of Cabot Hill Drive** ANGLE FROM HPR 2: **91°**

BEGUN: **6-6-83** COMPLETED: **6-7-83** DRILLER: **New England Drilling Contractors Inc.** DRILL MAKE & MODEL: **Mudlog 347** HOLE DIA. OVERBURDEN: **3"** (ft) ROCK (ft): **11.5'** TOTAL DEPTH: **27.0'**

CORE RECOVERY (ft): **30.8'** CORE BOXES: **5** SAMPLES: **2** EL TOP OF CASING: **233.04'** GROUND EL. DEPTH to GW/TIME: **5.0'** DEPTH to TOP of ROCK: **11.5'**

SAMPLE HAMMER WEIGHT/FALL: **140#/30"** CASING LEFT IN HOLE = DIA/LENGTH: **1.5"/44.5'** NUS INSPECTOR: **J. J. Street**

DEPTH	SAMPLE	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		LOG REC	FCO	PEN/REC	DEPTH			
0-11.5'				25/4	0-2	1-1-5-10	Topsoil and brown, fine-coarse sand and fine gravel, occasional cobbles, trace pits, poorly sorted	
11.5-20.4'				28/18	5-7	20-16-21-48	brown fine-coarse sand, fine gravel, occasional cobble	
20.4-22.0'				33/12	10-11	35-47-61	compacted silt	
22.0-25.1'	60/55		69%				Run #1 11.5'-16.5' decomposed and heavily weathered schist with quartzite vein, soil seam at 14'	
25.1-26.4'	45/46		54%				Run #2 16.5'-20.4' fractured schist with quartzite veins	
26.4-28.7'	60/58		35%				Run #3 20.4'-25.4' fractured gray schist	
28.7-30.4'	60/59		52%				Run #4 25.1'-30.4' gray schist with quartzite vein	
30.4-32.7'	28/28		100%				Run #5 20.4'-22.0' fractured gray schist with quartzite vein	
32.7-37.0'	60/60		70%				Run #6 22.0'-27.0' fractured gray schist and quartzite	

CONTINUAL SOIL LOG-SEE LOG-10 REMARKS

214 11/1/83
 215 11/1/83
 216 11/1/83
 217 11/1/83
 218 11/1/83
 219 11/1/83
 220 11/1/83



PROJECT Tinkham's Garage	TOD No 3011-11	SHEET 2 of 2	HOLE No CG-11
LOCATION South of lower end of Capital Hill Drive			

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CONC. REC (in)	#RD	PEN/REC (in)	DEPTH INTERNAL (ft)			
		50/60	55%			Fractured Bedrock (SCHIST)	Run #7 37.7'-42.7' gray schist and quartzite	5
40'								
45'							Bottom of Boring @ 42.7' Installed: -Screen from 42.7' to 5.2' -7' riser -Ottawa sand from 42.7' to 3.7' -Bentonite from 3.7' to 1.7' -Cased, cemented, and locked	

REMARKS 6) WW-6 at 38'



PROJECT: Tankham's Garage
 LOCATION: Northeast side of Constitution Drive across from buildings E and F

BEGUN: 6-2-93 COMPLETED: 6-2-93 DRILLER: New England Boring Contractors, Inc. DRILL MAKE & MODEL: Model 6007 HOLE DIA: 15" OVERBURDEN (ft): 4 ROCK (ft): 18" TOTAL DEPTH: 22' CORE RECOVERY (ft): N/A CORE BXS: N/A SAMPLES: 4 EL TOP OF CASING: 253.61' GROUND EL: 251.81' DEPTH TO GW/T.M.E.: 6-21-93-93 DEPTH TO TOP OF ROCK: N/A SAMPLE HAMMER WEIGHT/FALL: 140# 30" CASING LEFT IN HOLE: 0 DIA/LENGTH: 1.5" 100' NUS INSPECTOR: J. Travers

DEPTH	SAMPLE No	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (ft)	ADD	PER REC (ft)	TEST DEPTH (ft)			
0-5'	ss-1			0-2	0-2	f. to c. sand	5' of casing light brown, fine-medium sand, little fine gravel	
5-10'	ss-2			04/24	5-7		light brown medium-coarse sand, some fine gravel, trace silt	
10-15'	ss-3			04/12	10-12	TILL	fine sand, some silt (iron-stained) 11.6'-12' gray clay, little silt	
15-20'	ss-4			04/10	15-17		silt and clay, some fine sand, little fine-coarse gravel (compacted clay till)	
20'-22'						Possible Bedrock	Bottom of Boring ? 19' (Refusal) Backfilled with Bentonite from 19' to 12' Installed: -Screen from 12' to 4' -6" riser -Ottawa sand backfill from 12' to 3' -Bentonite from 3' to 1' -Cased, cemented, and locked	

UNUSUAL SOILS: NONE OBSERVED SOIL REMARKS: [Faint handwritten notes]



PROJECT Tinkham's Garage		TDD No 3211-11	SHEET 1 of 1	HOLE No P-113
LOCATION Southwest side of Constitution Drive, South of building E			ANGLE FROM HORIZ 90°	

BEGUN 5-8-83	COMPLETED 5-8-83	DRILLER New England Boring Contractors Inc.	DRILL MAKE & MODEL Mobile 947	HOLE DIA 3"	OVERBURDEN (ft) 15.5'	ROCK (ft) N/A	TOTAL DEPTH 16.5'
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CORE RECOVERY (ft) N/A	CORE BXS. N/A	SAMPLES 4	EL. TOP of CASING 249.06'	GROUND EL. 247.26'	DEPTH to GW/TIME 3.7' / 6-8-83	DEPTH to TOP of ROCK N/A
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SAMPLE HAMMER WEIGHT/FALL 140#/30"	CASING LEFT in HOLE = DIA./LENGTH 1.5" / 13.5'	NUS INSPECTOR L. Plattett
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DEPTH	SAMPLE	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REC (ft)	QDD	PEN/REC (ft)	DEPTH INTERVAL (ft)			
	SS-1			24/8	0-2	1-3-7-3	8" of topsoil	
5'							Topsoil	
	SS-2			24/4	5-7	16-13-12-17	brown fine sand, some silt, some medium sand, little clay, little fine gravel (till)	1
10'							TILL	
	SS-3			24/12	10-12	16-17-24-26	till	
15'								
	SS-4			24/12	15-17	21-20-49-61	till and decomposed rock	
20'							Possible Bedrock	2
							Bottom of Boring @ 17.5' (Refusal) Backfilled with Bentonite from 17.5' to 16.5' Installed: -Screen from 16.5' to 4' -6' riser -Ottawa sand backfill from 16.5' to 3' -Bentonite from 3' to 1' -Cased, cemented, and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
>50	V DENSE	> 30	HARD

REMARKS:

- SS-2: 25 ppb methane equivalent on OVA
- Drilled to refusal @ 17.5'
Backfilled with Bentonite from 17.5' to 16.5'



PROJECT: **Trinami's Garage**
 LOCATION: **300 ft. Southeast of garage**
 TCD No: **001-101**
 SHEET: **1 of 2**
 HOLE No: **TR-00**
 ANGLE FROM HUA Z: **90°**

BEGUN: **5-10-83** COMPLETED: **5-14-83** DRILLER: **New England Spring Contractors Inc.**
 DRILL MAKE & MODEL: **Mobile 347** HOLE DIA: **3"** OVERBURDEN (ft): **05.2'** ROCK (ft): **20'** TOTAL DEPTH: **48'**
 CORE RECOVERY (ft): **20'** CORE BXS: **3** SAMPLES: **6** EL TOP OF CASING: **281.10'** GROUND EL: **278.30'** DEPTH to GW/TIME: **01:16:14-83** DEPTH to TOP of ROCK: **05.2'**
 SAMPLE HAMMER WEIGHT: **FALL** CASING LEFT in HOLE = DIA / LENGTH: **1.5" / 180'** NUS INSPECTOR: **J. Gilchrist**

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	Status
		RECORDED (ft)	ADD	RECORDED (ft)	DEPTH (ft)			
0-1'	SS-1			24/10	0-2	1104"	Topsoil	dark brown silty and organic material
1-5'	SS-2			24/16	5-7	25-16-18-19	TILL	brown medium-coarse sand, some silt, little fine gravel, trace clay, trace cobbles (soil)
5-10'	SS-3			24/10	10-12	11-12-15-17		till
10-15'	SS-4			24/16	15-17	20-29-34-59		gray silt and clay, trace fine sand, trace cobbles (compacted till)
15-20'	SS-5			24/16	20-22	30-39-43-51	Fractured Bedrock	gray compacted till (clay)
20-25'								
25-30'	SS-6			9/8	25-25.9	40-100/3"	(SC157)	bedrocked quartzite (vein)
30-35'								Run #1 20'-30'
35-40'								heavily fractured gray schist with quartzite veins
40-45'								Run #2 20'-40'
45-48'								fractured gray schist with quartzite veins

FRAMER: **EDWIN GARDNER** NUS
 REMARKS:
 1. 48' depth
 2. 3" dia
 3. 1.5" casing left in hole
 4. 1.5" casing left in hole
 5. 1.5" casing left in hole
 6. 1.5" casing left in hole
 7. 1.5" casing left in hole
 8. 1.5" casing left in hole
 9. 1.5" casing left in hole
 10. 1.5" casing left in hole

DATE: **5-14-83**
 TIME: **10:00 AM**



PROJECT: Tinkham's Garage
 LOCATION: 900 ft. Southeast of garage
 TDD No: 3211-11
 SHEET: 2 of 2
 HOLE No: FW-22

DEPTH	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE REC (in)	ROD	PEN/REC (in)	DEPTH INTERVAL (ft)	BLOWS/6"			
40'		50/60	0%				Fractured Bedrock (SCHIST)	Run #3 38'-43' fractured gray schist with quartz veins	3
								Run #4 43'-48' fractured gray schist with quartz veins	4
45'		60/60	0%				Bottom of Boring @ 48' Installed: -Screen from 48' to 8' -10' riser -Ottawa sand backfill from 48' to 6' -Bentonite from 6' to 2' -Cased, cemented, and locked		
50'									

REMARKS:
 3) WW-3 at 38'
 4) WW-4 at 43'



PROJECT Tinkham's Garage	TDD NO. FJ-8407-08	SHEET 1 of 1	HOLE NO. FW-2!
LOCATION At end of seismic line 5 off NW leg of Capital Hill Drive		ANGLE FROM HORIZ. Vertical	

BEGIN 10/5/84	COMPLETED 12/11/84	DRILLER New England Boring Contractors	DRILL MAKE & MODEL Mobile B-47	HOLE DIA. 3"	OVERBURDEN 6'2"	ROCK (H) 15'	TOTAL DEPTH 21'2"
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CORE RECOVERY (M) 14'11"	CORE BOXES 2	SAMPLES SS 3 UN 2	EL. TOP OF CASING 258.43	GROUND EL. 256.56	DEPTH to GW/TIME 4'5" 10/5/84	DEPTH to TOP of ROCK 6'2"
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SAMPLE NUMBER 140 lb/30"	WEIGHT/FALL 140 lb/30"	CASING LEFT IN HOLE - DIA./LENGTH 1.5" slotted PVC 15' 1.5" PVC riser 7'	NUS INSPECTOR B. Buckley
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DEPTH	ROCK			SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
	LOG #	COR/REC (1/2)	ROD	PEN/REC (1/2)	DEPTH INTERVAL (10)			
5	ES1			24/18	0-2'	4/6/12/20	Surficial sand top soil - 6" thin brown fine SAND some medium to coarse sand, trace gravel, trace silt	1
5	SS2			12/12	5-6'	2/25/50R	very dense gray-brown SILTY SAND, some gravel, rock fragments	2
10		60/60	92				Bedrock Run #1 6'2" - 11'2" - schist - few fractures and little weathering Run #2 11'2" - 16'2" - schist with some foliated binary granite intrusive zones several heavily weathered fractures with clay and silt infilling Run #3 16'2" - 21'2" - schist with some minor foliated binary granite intrusive zones, some weathered fractures	
10								
15		60/60	90					
15								
15								
20								
20								
25							Bottom of boring @ 21'2" Installed: Ottawa sand backfill from 21'2" - 19'2" in core hole Screen from 19'2" - 4'2" Filter Ottawa sand backfill to 3'2" Bentonite from 3'2" - 1'2" Cased, cemented and locked.	
25								
25								

GRANULAR SOILS		COHESIVE SOILS	
BLWS/FT	DENSITY	BLWS/FT	DENSITY
0-6	v LOOSE	< 2	v SOFT
6-10	LOOSE	2-6	SOFT
10-30	M. DENSE	6-8	M. STIFF
30-50	DENSE	8-18	STIFF
> 50	v DENSE	> 30	HARD

REMARKS: SS = split spoon soil sample
 UU = bedrock core washwater sample
 R = split spoon refusal (zero advance)
 1. Lab grain size analysis sample 0-2'
 2. Lab grain size analysis sample 0-6'



PROJECT: Tinkham's Garage
 LOCATION: Adjacent to FW-21
 TCO No: F1-8407-08
 SHEET: 1 of 2
 HOLE No: FW-210
 ANGLE FROM HORIZ: Vertical

BEGIN: 10/21/84
 COMPLETED: 10/21/84
 DRILLER: Lakes Region Artesian Wells
 DRILL MAKE & MODEL: Chicago Pneumatic GSDW Air Hammer
 HOLE DIA: 6"
 OVERBURDEN (ft): 7
 ROCK (ft): 198
 TOTAL DEPTH: 205
 CORE RECOVERY (%): N/A
 CORE BXS: N/A
 SAMPLES: 28
 EL. TOP of CASING: 257.44
 GROUND EL: 256.27
 DEPTH to GW/TIME: 7'
 DEPTH to TOP of ROCK: 7'

SAMPLE NUMBER WEIGHT/FALL: N/A
 CASING LEFT in HOLE - DIA./LENGTH: 6"/15'
 MUS INSPECTOR: B. Buckley / R. DeLuca / R. Ross

DEPTH	SAMPLE #	ROCK		SOIL		Bedrock Cuttings Samples	SIZE of DETAILED DESCRIPTION	DESCRIPTION	NOTES
		CORE/REC (in.)	ROD	PER/REC (in.)	DEPTH INTERVAL (ft)				
0									
0-1								Overburden - see log for FW-21 description	
1								large chunks / weathered schist	
2								fine to medium / schist, some foliated binary granite	
3								fine to medium / schist	
4								fracture - fine to very coarse / schist, some foliated binary granite, all weathered	
5								fracture - fine to medium / schist	
6								fracture - fine to very coarse / schist, some foliated binary granite	
7								fracture - medium to very coarse / foliated binary granite - some tan staining	
8								fracture - fine to medium / foliated binary granite	
9								fracture - coarse / schist	
10								fracture - medium to very coarse / weathered schist	
11								fracture - medium to very coarse / schist	
12								fracture - medium to very coarse / schist and foliated binary granite / weathered	
13								fine to coarse / schist, minor foliated binary granite	
14								fine to medium / schist	
15								medium to large chunks / foliated binary granite	
16								fracture - water gain to borehole	
17								fracture - major water gain @ 95' large chunks foliated binary granite and schist	
18								fine to coarse / schist	
19								fine to coarse / schist and foliated binary granite	
20								fine to coarse / schist, minor foliated binary granite	
21								medium to very coarse / schist, some foliated binary granite	
22								fine to very coarse / schist	
23								fine to coarse / schist	
24								medium to very coarse / weathered schist and foliated binary granite	
25								fine to coarse / weathered schist	
26								fine to medium / schist	

GRAMULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M DENSE	4-8	M STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	15-30	V STIFF
		> 30	HAED

REMARKS:
 † size of cuttings generated by air hammer drilling



PROJECT: Tinkham's Garage
 TDO NO: FS-8407-08
 SHEET: 1 of 1
 HOLE NO: FW-22
 LOCATION: East of Buildings C & D in borrow area
 ANGLE FROM HORIZ: vertical

BEGIN: 10/2/84
 COMPLETED: 10/9/84
 DRILLER: New England Boring Contractors
 DRILL MAKE & MODEL: mobile B-47
 HOLE DIA: 3"
 OVERBURDEN: 9'6"
 ROCK (ft): 10'6"
 TOTAL DEPTH: 20'0"

CORE RECOVERY (ft): 10'
 CORE SECS: 1
 SAMPLES: 3
 EL. TOP OF CASING: 253.77
 GROUND EL: 251.33
 DEPTH TO GW/TIME: 2.0' 10/8/84
 DEPTH TO TOP OF ROCK: 9'6"

SAMPLE NUMBER WEIGHT/FALL: 140 lb/30"
 CASING LEFT IN HOLE: DIA/LENGTH: 1.5" slotted PVC 20'0"
 NUS INSPECTOR: R. DeLuca

DEPTH	SAMPLE NO	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES	
		CONC/REC (IN)	RFB	PER/REC (IN)	DEPTH INTERVAL (FT)				BLOWS/6"
0-2'	B51			24/12	0-2'	3/6/10/12	Surficial sand	Brown SANDY SILT, trace clay	1
2-6'	B52			12/12	5-6'	6/40R	Till	Coarse brown SILTY SAND, little gravel	2
6-10'	WU1	60/60	85				Bedrock	Run #1 10'-15' - schist - several fractures, very little weathering	
10-15'	WU2	60/60	85					Run #2 15'-20' - schist - several fractures, very little weathering	
15-20'	WU3								
20'-20'0"	WU4								

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	HARD

REMARKS: SS = split spoon soil sample
 WU = bedrock casing washwater sample
 R = split spoon refusal (zero advance)
 1. Lab grain size analysis sample 0-2'
 2. Lab grain size analysis sample 5-6'



NUS
CORPORATION

PROJECT TinKham's Garage

TDO No. FJ-8407-08

SHEET 1 of 2

SOLE No. FW-220

LOCATION East of Buildings C and D in borrow area

ANGLE FROM HORIZ. Vertical

BEGIN <u>10/21/04</u>	COMPLETED <u>10/16/04</u>	DRILLER <u>Lakes Region Artesian Wells</u>	DRILL MAKE & MODEL <u>Chicago Pneumatic G5W Air Hammer</u>	HOLE DIA. <u>6"</u>	OVERBURDEN (ft) <u>9</u>	ROCK (ft) <u>196</u>	TOTAL DEPTH <u>205'</u>
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CORE RECOVERY (%) <u>N/A</u>	CORE BXS. <u>N/A</u>	SAMPLES <u>25</u>	EL. TOP of CASING <u>253.54</u>	GROUND EL. <u>252.09</u>	DEPTH to GW/TIME	DEPTH to TOP of ROCK <u>9'</u>
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SAMPLE HAMMER WEIGHT/FALL <u>N/A</u>	CASING LEFT IN HOLE - DIA./LENGTH <u>6"/20'</u>	MUS INSPECTOR <u>R. Ross</u>
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DEPTH	THUMB #	ROCK		SOIL		Bedrock Outtings Samples	DETAILED DESCRIPTION Size of Outtings / Lithology	NOTES
		CORE/REC (in)	ROD	PER/REC (in)	DEPTH INTERVAL (ft)			
							Overburden - see log for FW-22 for description	
25							1 - fine to coarse/schist - some foliated binary granite	
							2 - fine to medium/schist	
							3 - fine to medium/schist	
50							4 - fine to medium/schist, minor foliated binary granite	
							5 - fine to coarse/schist	
75							6 - fine to medium/schist	
							7 - fine to medium/schist, minor foliated binary granite	
							8 - fine to coarse/schist	
100							9 - fine to coarse/schist, some iron stain	
							10 - fine to medium/schist	
							11 - fine to coarse/schist - some weathering	
							12 - fine to medium/foliated binary granite and schist	
125							13 - fine to medium/schist	
							14 - fine to coarse/schist	
							15 - fine to medium/schist	
150							16 - fine to medium/schist	
							17 - fine to medium/foliated binary granite	
							18 - minor schist	
							19 - fine to medium/schist	
							picked up water **	
175							20 - schist **	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	V. STIFF
>50	V. DENSE	>30	HARD

REMARKS:

** Size of cuttings generated by air rotary drilling

**

description based on field logs - cuttings sample jars broken



PROJECT: Tinkham's Garage
 TDO No: P3-8407-08
 SHEET: 1 of 1
 HOLE No: FW-23

LOCATION: Behind tennis court above borrow area
 ANGLE FROM HORIZ: Vertical

BEGIN: 10/9/84
 COMPLETED: 10/11/84
 DRILLER: New England Boring Contractors
 DRILL MAKE & MODEL: mobile B-47
 HOLE DIA: 3"
 OVERBURDEN (ft): 10'11"
 ROCK (ft): 15'
 TOTAL DEPTH: 26'3"

CORE RECOVERY (ft): 14'11"
 CORE BKS: 2
 SAMPLES: SS: 3, WW: 4
 EL. TOP OF CASING: 270.22
 GROUND EL: 268.55
 DEPTH to GW/TIME: 16'1" 10/9/84
 DEPTH to TOP of ROCK: 10'11"

SAMPLE HAMMER WEIGHT/FALL: 40lb/30"
 CASING LEFT in HOLE = DIA/LENGTH: 1.5" dotted PVC 20', 1.5" PVC riser
 MUS INSPECTOR: R. Ross

DEPTH (ft)	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REC (in.)	RSD	PER/REC (in.)	DEPTH (ft)	BLWS/6"			
5	551			24/12	0-2'	1/3/6/7	Surficial sand	Topsoil - dark brown sandy loam - and brown fine to medium SAND	
	552			24/16	5-7'	10/12/16/24		Light brown fine to coarse SAND, trace silt, trace gravel	
10	553			11/7	10-10'	59/100e	Till	very dense light brown SILTY SAND, some gravel, trace clay	
	554	66/62	65					Bedrock	Run # 1 11'-16'6" - schist - several weathered fractures
15	555	20/60	81				Run # 2 16'6" - 21'6" - schist - several weathered fractures, upper 8 inches of run shattered, some vertical fracturing noted		
	556	57/57	97				Run # 3 21'6" - 26'3" - schist - very few fractures		
20	557						Bottom of boring @ 26'3" Installed screen from 26'3" - 6'3" 8' of riser Ottawa sand backfill to 5'3" Natural backfill 5'3" - 1'3" Bentonite 1'3" - 0' Cased, cemented and locked		
	558								
25									

GRANULAR SOILS		COHESIVE SOILS	
BLWS/FT	DENSITY	BLWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	15-30	V STIFF
		> 30	HARD

REMARKS: SS = split spoon soil sample
 WW = bedrock coring washwater sample
 R = split spoon refusal (sgr advance)



PROJECT **Tinkham's Garage** TDD NO **FJ-8407-08** SHEET **1 of 2** HOLE NO **FW-23C**
 LOCATION **Approx. 100 feet south of tennis court** ANGLE FROM HORIZ. **Vertical**

BEGIN **10/10/84** COMPLETED **10/11/84** DRILLER **Lakes Region Artesian Wells** DRILL MAKE & MODEL **Chicago Pneumatic GSOW Air Hammer** HOLE DIA. **6"** OVERBURDEN (ft) **8'** ROCK (ft) **197** TOTAL DEPTH **205'**

CORE RECOVERY (%) **N/A** CORE EXS. **N/A** SAMPLES **22** EL. TOP OF CASING **260.73** GROUND EL. **259.75** DEPTH TO GW/TIME DEPTH TO TOP OF ROCK **8'**

SAMPLE HAMMER WEIGHT/FALL **N/A** CASING LEFT IN HOLE - DIA./LENGTH **6"/20'** NUS INSPECTOR **R. DeLuca / R. Ross**

DEPTH	SAMPLE #	ROCK		SOIL		Bedrock Cuttings Samples	DETAILED DESCRIPTION size of cuttings & lithology	NOTES
		COR/REC (in.)	ROD	PEN/REC (in.)	DEPTH INTERVAL (ft)			
							Overburden - see log for FW-23 for description	
						1	fine to coarse/ weathered schist	
						2	fine to larger chunks of schist, some foliated binary granite (fracture)	
						3	fine to coarse/ weathered schist	
						4	fine to coarse/ schist - some weathering and iron staining	
50						5	fine to coarse/ schist	
						6	fine to coarse/ schist	
						7	fine to coarse/ schist	
						8	fine to coarse/ schist	
						9	fine to medium/ schist	
100						9a	chunks of foliated binary granite with iron staining	
						10	fine to medium/ schist with some iron staining	
						11		
						12	fine to medium/ schist, minor foliated binary granite	
						13	fine to medium/ schist, some foliated binary granite	
						14	fine to medium/ schist	
150						15	fine to medium/ schist, some iron staining	
						16	fine to medium/ schist	
						17	fine to medium/ schist, some iron staining	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-20	V STIFF
> 50	V DENSE	> 20	HARD

REMARKS:
 + size of cuttings generated by air hammer drilling



PROJECT: Lindstrom's Garage
 LOCATION: Adjacent to ERT-03
 TDD No: FJ-8407-08
 SHEET: 1 of 1
 HOLE No: FW-24
 ANGLE FROM HORIZ: Vertical

BEGIN: 10/10/84
 COMPLETED: 10/11/84
 DRILLER: New England Boring Contractors
 DRILL MAKE & MODEL: Mobile 8-47
 HOLE DIA: 3"
 OVERBURDEN: 8'6"
 ROCK (ft): 20'
 TOTAL DEPTH: 28'6"

CORE RECOVERY (%): 20'
 CORE BKS: 2
 SAMPLES: 20' 2, LW: 3
 EL. TOP OF CASING: 257.09
 GROUND EL: 255.34
 DEPTH to GW/TIME: less than 6" 10/10/84
 DEPTH to TOP of ROCK: 8'6"

SAMPLE HAMMER WEIGHT/FALL: 140lb/30"
 CASING LEFT IN HOLE - DIA./LENGTH: 1.5" slotted PVC 20', 1.5" PVC Bore 10'
 NUS INSPECTOR: B. Buckley

DEPTH	RUN #	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REE (in.)	REQ	PEN/REE (in.)	DEPTH INTERVAL (ft)			
0-5	851			24/14	0-2'	1/1/1/1	Surficial Sand	Brown fine to coarse SAND, trace silt
5-10	852			24/10	5-7'	9/7/11/14	Bedrock	Iron-stained brown fine sand, trace silt, fragments of weathered schist bedrock
10-15	851	60/60	85				Run #1 8'6" - 13'6" - schist - several weathered fractures including shattered zone in top feet of run	
15-20	852	60/60	90				Run #2 13'6" - 18'6" - schist several weathered fractures	
20-25	853	60/60	94				Run #3 18'6" - 23'6" - schist - one fracture - remainder solid	
25-30	854	60/60	77				Run #4 23'6" - 28'6" - schist with several weathered fractures	
30-33							Bottom of boring @ 28'6" Installed Ottawa sand backfill from 28'6" to 27' screen from 27' - 7' 10' of riser Ottawa sand backfill to 6' Natural backfill to 1' concrete 1' to 0' cased, cemented and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLWS/FT	DENSITY	BLWS/FT	DENSITY
0-4	V. LOOSE	< 2	V. SOFT
4-10	LOOSE	2-6	SOFT
10-30	M. DENSE	6-8	M. STIFF
30-50	DENSE	8-20	V. STIFF
> 50	V. DENSE	> 20	HARD

REMARKS: SS = split spoon soil samples
 LW = bedrock coring washwater samples
 R = split spoon refusal (see advance)



PROJECT **Tinkham's Garage** TDD No. **FJ-8407-08** SHEET **1 of 2** HOLE No. **FW-240**

LOCATION **Adjacent to ERT-03** ANGLE FROM HORIZ. **Vertical**

BEGIN **11/1/84** COMPLETED **11/2/84** DRILLER **Lakes Region Artesian Wells** DRILL MAKE & MODEL **Chicago Pneumatic GEOW Air Hammer** HOLE DIA. **6"** OVERBURDEN (ft) **12** ROCK (ft) **193** TOTAL DEPTH **205'**

CORE RECOVERY (%) **N/A** CORE EXS. **N/A** SAMPLES **13** EL. TOP of CASING **258.29** GROUND EL. **257.08** DEPTH to GW/TIME DEPTH to TOP of ROCK **12'**

SAMPLE HAMMER WEIGHT/FALL **N/A** CASING LEFT in HOLE - DIA./LENGTH **6"/14'** NUS INSPECTOR **B. Buckley / R. DeLuca**

DEPTH	SAMPLE NO.	ROCK		SOIL		Barbuck Cuttings Samples	DETAILED DESCRIPTION Size of cuttings & lithology	NOTES
		CORE/REC (in.)	ROD	PEN/REC (in.)	DEPTH INTERVAL (ft)			
							Overburden - see log for FW-24 for Description	
25						1	Silty unconsolidated material with weathered schist fragments	
						2	fine to coarse/schist, somewhat weathered	
						3	fine to coarse/schist	
						4	fine to medium/schist, minor foliated binary granite	
50						5	fine to medium/schist and foliated binary granite	
75						6	fine to medium/schist	
100						7	fine to medium/schist	
125						8	fine to medium/schist, minor foliated binary granite	
						9	fine to medium/schist	
150						10	fine to medium/schist, some foliated binary granite	
175						11	fine to medium/schist, minor foliated binary granite	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	< 2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	> 15	HARD

REMARKS:
* size of cuttings generated by air hammer drilling



PROJECT: **Fincham's Garage** TCO NO: **FI-8407-08** SHEET: **1 of 2** HOLE NO: **FW-25**

LOCATION: **Off curve of Ross Drive in Woods** ANGLE FROM HORIZ: **Vertical**

BEGIN: **10/11/04** COMPLETED: **10/12/04** DRILLER: **New England Boring Contractors** DRILL MAKE & MODEL: **Mobile B-47** HOLE DIA: **3"** OVERBURDEN (ft): **36'0"** ROCK (ft): **10'0"** TOTAL DEPTH: **46'0"**

CORE RECOVERY (%): **9'4"** CORE EXS.: **1** SAMPLES: **25' 8** EL. TOP of CASING: **285.33** GROUND EL.: **282.8** DEPTH to GW/TIME: **6'0" 10/17/04** DEPTH to TOP of ROCK: **36'0"**

SAMPLE HAMMER WEIGHT/FALL: **140 lb/30"** CASING LEFT in HOLE - DIA/LENGTH: **1.5" slotted PVC 20'**
1.5" PVC riser 20' MUS INSPECTOR: **B. Buckley**

DEPTH (ft)	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CORE/REC (in.)	REQ	PER/REC (in.)	DEPTH INTERVAL (ft)	BLOWS/6"			
5	351			24/14	0-2'	1/3/3/4	Upper till	0-3" - topsoil - dark brown loam with fresh litter	
	352			24/21	5-7'	24/20/29/25		dense light brown fine SAND, little medium to coarse sand, little silt	
10	353			24/24	10-12'	18/25/33/50	Lower till	very dense fine gray SAND some silt	
15	354			18/14	15-16'	40/00/50R		very dense fine gray SAND little silt trace gravel and cobbles	
20	355			18/C	20-21'	50/02/90L		very dense material - no recovery in split spoon due to a cobble	
25	356			12/12	23-24'	50/105L		very dense SILTY SAND little clay trace gravel	1
30	357			10/12	30-31'	00/06/92		very dense SILTY SAND little clay trace gravel and cobbles	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	< 2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-20	V. STIFF
> 50	V. DENSE	> 20	HARD

REMARKS: **SS = split spoon soil samples**
WW = bedrock coring washwater samples
R = split spoon refusal
1. permeability test conducted in 24-26 foot interval; sample taken for lab grain size analysis



PROJECT
Tinkham's Garage

TOD NO.
F3-0407-00

SHEET
2 of 2

PILE NO.
FW-25

LOCATION
Of Curve in Ross Drive in woods

DEPTH	SAMPLE NO.	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION
		CORE/REC (in)	NO.	PCV/REC (%)	DEPTH INTERVAL (ft)		
38	SSB			7/5	35-37	SS/COLE	very dense gray SILTY SAND with clay
	60/58	93					Run #1 36'-41' - foliated binary granite - very few fractures
40	WBU						
	60/54	81					Run #2 41'-46' - foliated binary granite - increasingly weathered and fractured with depth
45	WR						
50							Bottom of boring @ 46'0"
							Installed Ottawa sand backfill from 46'-30'
							Screen from 30'-18'
							20' of riser
							Ottawa sand backfill to 16'
							Natural backfill to 3'
							Bentonite from 2' to 0'
							Cased, cemented and locked

REMARKS:



PROJECT: Tinkham's Garage
 LOCATION: Off Ross Drive in woods SE of Tinkham's Garage
 TDD NO: P1-8407-08
 SHEET: 1 of 2
 HOLE NO: FW-250
 ANGLE FROM HORIZ: Vertical

BEGUN: 11/21/04 COMPLETED: 11/23/04
 DRILLER: Lakes Region Artesian Wells
 DRILL MAKE & MODEL: Chicago Pneumatic GSDW Air Hammer
 HOLE DIA: 6" OVERBURDEN: 44'
 ROCK (#): 161 TOTAL DEPTH: 205'

CORE RECOVERY (%): N/A CORE BXS: N/A
 SAMPLES: 14 EL. TOP OF CASING: 282.44 GROUND EL.: 281.6
 DEPTH TO GW/TIME: DEPTH TO TOP OF ROCK: 44'

SAMPLE HAMMER WEIGHT/FALL: N/A
 CASING LEFT IN HOLE - DIA./LENGTH: 6/70'
 MUS INSPECTOR: B. Buckley

DEPTH	SAMPLE #	ROCK		SOIL		Bedrock Cuttings Samples	DETAILED DESCRIPTION size of cuttings/lithology	NOTES
		CON/REC (in.)	ROB	PER/REC (in.)	DEPTH INTERVAL (ft)			
0-25							Overburden - see log for FW-25 for description	
25-50								
50-55						1	fine to medium/foliated binary granite	
55-75								
75-80						2	fine to medium/foliated binary granite and some medium to coarse schist	
80-85								
85-90						3	fine to coarse/foliated binary granite minor schist	
90-95						4	fine to medium/foliated binary granite and schist - large chunk of weathered schist	
95-100								
100-105						5	fine to coarse/foliated binary granite with large chunks of schist	
105-110						6	fine to coarse/foliated binary granite - weathered with iron staining	
110-115								
115-120						8	fine to coarse/foliated binary granite	
120-125								
125-130						9	fine to coarse/foliated binary granite	
130-135								
135-140								
140-145								
145-150								
150-155								
155-160								
160-165								
165-170								
170-175						10	fine to medium/foliated binary granite	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 8	V. SOFT
4-10	LOOSE	8-15	SOFT
10-30	M. DENSE	15-30	M. STIFF
30-50	DENSE	30-50	V. STIFF
> 50	V. DENSE	> 50	HARD

REMARKS:
 * size of cuttings generated by air hammer drilling



PROJECT

Tinkham's Garage

TDO No.

F2-0407-08

SHEET

1 of 1

HOLE No.

FW-26

LOCATION Rear corner of Orchard off
Gilcrest Road

ANGLE FROM HORIZ.
Vertical

BEGIN 10/15/04	COMPLETED 10/16/04	DRILLER New England Boring Contractors	DRILL MAKE & MODEL Mobile B-47	HOLE DIA. 3"	OVERBURDEN 14'6"	ROCK (ft) 10'	TOTAL DEPTH 24'6"
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CORE RECOVERY (ft) 9'11"	CORE EXS. 1	SAMPLES SS: 3 WW: 3	EL. TOP @ CASING 285.40	GRIND-EL 283.81	DEPTH TO GW/TIME 7' 10/15/04	DEPTH TO TOP OF ROCK 14'6"
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SAMPLE HAMMER WEIGHT/FALL 140lb/30"	CASING LEFT IN HOLE - DIA./LENGTH 1.5" slotted PVC 15' 1.5" PVC rebar 10'	MUS INSPECTOR R. DeLuca
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DEPTH	SAMPLE NO.	ROCK		SOIL			STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		COR/REC (in.)	ROD	PEN/REC (in.)	DEPTH INTERVAL (ft)	BLOWS/6"			
	SS1			24/16	0-2'	1/2/3/4	Topsoil Surface sand	Topsoil - yellow-brown sandy loam loose brown fine sand and silt, some medium to coarse sand	
5	SS2			24/6	5-7'	9/12/14/18	Till	dense light brown fine SAND little med- ium to coarse sand, little silt, trace cobbles	
10	SS3			24/10	10-2'	16/18/11/8		dense gray-brown fine sand, little silt, little gravel	
15	60/59 37						bedrock	Rm #1 14'6" - 19'6" - schist - mod- erately fractured	
20	60/60 51							Rm # 2 19'6" - 24'6" - schist - mod- erately fractured	
25	WW12							Bottom of boring @ 24'6" Installed Ottawa sand backfill from 24'6" - 22'4" Screen from 22'4" - 7'4" 10' of rebar Ottawa sand backfill to 6'4" Natural backfill to 1'6" Bentonite 1'6" - 0' Cased, cemented and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	V STIFF
> 50	V DENSE	> 30	HAED

REMARKS: SS = split spoon soil sample
WW = bedrock casing washwater sample
R = split spoon refusal



PROJECT: Tinkham's Garage
 TDO NO: F1-8407-08
 SHEET: 1 of 1
 HOLE NO: FW-26C

LOCATION: In Woodmont Orchard off Gilcrest Road
 ANGLE FROM HORIZ: Vertical

BEGIN: 11/28/84
 COMPLETED: 11/29/84
 DRILLER: Lakes Region Artesian Wells
 DRILL MAKE & MODEL: Chicago Pneumatic 650W Air Hammer
 HOLE DIA: 6"
 OVERBURDEN (ft): 16
 ROCK (ft): 119
 TOTAL DEPTH: 135'

CORE RECOVERY (ft): N/A
 CORE EXS: N/A
 SAMPLES: 7
 EL. TOP OF CASING: 291.76
 GROUND EL.: 291.1
 DEPTH TO GW/TIME: [blank]
 DEPTH TO TOP OF ROCK: 16'

SAMPLE HAMMER WEIGHT/FALL: N/A
 CASING LEFT IN HOLE - DIA/LENGTH: 6"/20'
 NUS INSPECTOR: R. DeLuca

DEPTH	SAMPLE NO.	ROCK		SOIL		Bedrock Cuttings Samples	DETAILED DESCRIPTION size of cuttings* / lithology	NOTES
		CORE/REC (in.)	ROD	PER/REC (in.)	DEPTH INTERVAL (ft)			
							Overburden - see log for FW-26 for description	
25							fine to coarse/schist	
50							fine to medium/schist	
75							fine to medium/schist	
100							fine to medium/foliated binary granite	
							medium to coarse/schist	
125							fine to medium/schist - some iron staining	
							fine to medium/schist	
150							bottom of borehole @ 135' depth	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	< 2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V. DENSE	15-30	V. STIFF
		> 30	HARD

REMARKS:
 * size of cuttings generated by air hammer drilling



PROJECT: **Tinham's Garage**
 LOCATION: **In field behind garage NW of FW-11 and FW-11D**
 TDO No: **F1-840708**
 SHEET: **1 of 1**
 HOLE No: **FW-27**
 ANGLE FROM HORIZ: **Vertical**

BEGIN: **10/17/84** COMPLETED: **10/17/84**
 DRILLER: **New England Boring Contractors**
 DRILL MAKE & MODEL: **Mobile B-47**
 HOLE DIA: **3"** OVERBURDEN (ft): **20'2"** ROCK (ft): **6'6"** TOTAL DEPTH: **26'8"**

CORE RECOVERY (ft): **6'** CORE BKS.: **1** SAMPLES: **SS: 2, WW: 2**
 EL. TOP OF CASING: **286.33** GROUND-EL.: **284.34** DEPTH TO GW/TIME: **2' 10/17/84** DEPTH TO TOP OF ROCK: **20'2"**

SAMPLE NUMBER WEIGHT/FALL: **140lb/30"** CASING LEFT IN HOLE - DIA./LENGTH: **1.5" slotted PVC 10', 1.5" PVC riser 20'** NUS INSPECTOR: **R. DeLuca**

DEPTH	CORRECTION	ROCK		SOIL		STRATUM DESCRIPTION	DETAILED DESCRIPTION	NOTES
		CON/REC (in)	ROD	PER/REC (in)	DEPTH INTERVAL (ft)			
0-2				24/12	0-2'	1/1/1/2	Topsoil Loose brown SILTY SAND, trace gravel, trace clay	1
2-10							Till Dense grey SILTY SAND, trace gravel, trace clay	2
10-18				24/14	8-10'	17/13/16/11		
18-20							Very dense ^{gr} SILTY SAND, some gravel and rock fragments, trace clay	3
20-25		60/60	7				Bedrock Run #1 20'2" - 25'2" - foliated binary granite - highly fractured - weathered fractures contain secondary quartz infilling, some iron staining	
25-30		18/2	0				Run #2 25'2" - 26'8" - foliated binary granite - highly fractured - weathered fractures contain quartz infilling, some iron stain	
30-33							Bottom of boring @ 26'8" Installed Ottawa sand backfill from 26'8" to 26'3" Screen from 25'3" - 15'3" 20' of riser Ottawa sand backfill to 14'3" Natural backfill to 2' Bentonite 2'-0" Cased, cemented and locked	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V. LOOSE	0-2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>30	HARD

REMARKS: **SS = split spoon soil sample**
WW = bedrock casing washwater sample
 1. Lab grain size analysis sample 0-2' in situ
 2. Lab grain size analysis sample and permeability test 8-10'
 3. Lab grain size analysis sample and in-situ permeability test 18-20'



PROJECT: Tinkham's Garage
 TCO No: F1-8407-08
 SHEET: 1 of 2
 HOLE No: FW-280

LOCATION: Approx. 100 feet south of FW-12 and FW-13 in woods behind Garage
 ANGLE FROM HORIZ: Vertical

BEGIN: 11/26/84
 COMPLETED: 11/27/84
 DRILLER: Lakes Region Artisan Wells
 DRILL MAKE & MODEL: Chicago Pneumatic GSDV Air Hammer
 HOLE DIA: 6"
 OVERBURDEN (ft): 33
 ROCK (ft): 172
 TOTAL DEPTH: 205'

CORE RECOVERY (%): N/A
 CORE BKS: N/A
 SAMPLES: 10
 EL. TOP of CASING: 272.32
 GROUND EL.: 271.3
 DEPTH to GW/TIME: [blank]
 DEPTH to TOP of ROCK: 33'

SAMPLE HAMMER WEIGHT/FALL: N/A
 CASING LEFT in HOLE = DIA./LENGTH: 6"/77'
 NUS INSPECTOR: R. DeLuca

DEPTH	SAMPLE NO.	ROCK		SOIL		Backlog Cuttings Samples	DETAILED DESCRIPTION Size of cuttings # / lithology	NOTES
		CORE/REC (in.)	RBB	PEN/REC (in.)	DEPTH INTERVAL (ft)			
0								
25							Overburden - see log for FW-12 for description	
50								
75								
100							1 fine to medium / weathered foliated binary granite, iron staining 2 fine to medium / foliated binary granite, some iron staining 3 fine to medium / foliated binary granite	
125							4 medium to coarse / schist 5 medium to coarse / schist	
150							6 fine to coarse / schist	
175							7 fine to coarse / schist, minor foliated binary granite	
200								
205								

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	V LOOSE	< 2	V SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
> 50	V DENSE	> 15	HARD

REMARKS:
 * size of cuttings generated by air hammer drilling



PROJECT Tinkham's Garage ID# No F1-8407-08 SHEET 2 of 2 HOLE No. FW-280

LOCATION Approx 100 feet south of FW-12 and FW-13 in woods behind Garage

DEPTH	SAMPLE No.	ROCK		SOIL		Block Cuttings Samples	DETAILED DESCRIPTION Size of Cuttings #/lithology	NOTES
		CORE REC (No.)	ROD	FDW REC (No.)	DEPTH INTERVAL			
200						8	fine to very coarse/schist and foliated binary granite with iron staining - noted rapid drilling advance	
						9	fine to medium/foliated binary granite	
225						10	fine to medium/foliated binary granite	
							bottom of borehole @ 205' depth	

REMARKS:

+ size of cuttings generated by air hammer drilling

ERT USEPA - OHM	PROJECT Londonderry Green Apts. Londonderry, N.H.	REPORT OF BORING NO. SHEET <u>1</u> OF <u>1</u> DATE <u>1/22/87</u> FILE <u> </u>
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BORING CO <u>NEPCO</u>	BORING LOCATION <u> </u>
FOREMAN <u>ART / Daniels</u>	GROUND ELEV. <u>285'</u>
ENGINEER <u>MEUSE</u>	DATE START <u>3/15</u> DATE END <u>3/16</u>

CASING	SAMPLER	GROUNDWATER READINGS				
SIZE: <u>6"</u>	TYPE: <u> </u>	OTHER: <u> </u>	DATE	DEPTH	CASING AT	STABILIZATION
HAMMER: <u> </u>	HAMMER: <u> </u>	FALL: <u> </u>				

DEPTH	CAS BL / FT.	SAMPLE			STRA CHG and GEN. DESC.	SAMPLE DESCRIPTION
		NO.	PEN/REC.	DEPTH		
10					0-10'	Humus cover, coarse brown sand
16					10-16'	Boulder encountered-bored through
18					16-18'	water entering into bore hole at the bedrock strata interface
18.5					18.5'	Bedrock encountered - Granite
20.6					20.6'	Casing set into bedrock 2'
26					26'	Unconforming layer encountered producing approx. flow of 2 gpm.
175					175'	Consolidated bedrock with no significant fractures or flows detected.
300					300' Completed	Consistent granite formation with measurable flow of approx. 5 gpm.

REMARKS: Well ERT-01 is a free flowing artesian rising to a static head of 3' above ground elev. * Determined by rigs reaction to penetration and rate of advance.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

ERT USEPA - OHM	PROJECT Londonderry Green Apps Londonderry, N.H.	REPORT OF BORING NO. <u>4</u> SHEET <u>1</u> OF <u> </u> DATE <u> </u> FILE <u> </u>
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BORING CO <u>VERCO</u>	BORING LOCATION <u>EDT-06</u>
FOREMAN <u>Art /Daniels</u>	GROUND ELEV. <u>245'</u>
ENGINEER <u>Heuse</u>	DATE START <u>3/17/83</u> DATE END <u>3/19/83</u>

CASING		SAMPLER		GROUNDWATER READINGS			
SIZE: <u>6"</u>	TYPE: <u> </u>	OTHER: <u> </u>	DATE	DEPTH	CASING AT	STABILIZATION T	
HAMMER: <u> </u> lb.	HAMMER: <u> </u> lb.						
FALL: <u> </u>	FALL: <u> </u>						

DEPTH	CAS. BL /FT.	SAMPLE			STRTA CHG and GEN. DESC.	SAMPLE DESCRIPTION
		NO.	PEN./REC.	DEPTH		
14					0-14'	Coarse brown sand
					14'	Bedrock encountered-granite
21'					17-21'	Feldspar layer, water inflow less than 1 gpm.
38'					38'	Consolidated granite formation No measurable flow recorded.
60'					60'	Granite - well completed.
						Completed well delivers approx. 3.5 gpm. Casing set 4' into rock.

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE SMALL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

ERT USEPA - OHM	PROJECT <u>Londonderry Green Apts</u> <u>Londonderry, N.H.</u>	REPORT OF BORING NO. _____ SHEET <u>1</u> OF _____ DATE <u>1/29/83</u> FILE _____
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BORING CO. <u>NEPCO</u>	BORING LOCATION <u>ERT- 02 (Burghart, Mercury)</u>
FOREMAN <u>ART / Daniels</u>	GROUND ELEV. <u>280'</u>
ENGINEER <u>MEUSE</u>	DATE START <u>1/17/83</u> DATE END <u>3/17/83</u>

CASING	SAMPLER	GROUNDWATER READINGS			
SIZE: <u>6"</u> TYPE: _____ OTHER: _____	HAMMER: <u>IB</u> HAMMER: <u>IB</u>	DATE	DEPTH	CASING AT	STABILIZATION TIME
FALL: _____	FALL: _____				

DEPTH	CAS. BL / FT.	SAMPLE				START CHG and GEN. DESC.	SAMPLE DESCRIPTION	NOTE
		NO.	PEN./REC.	DEPTH	BLOWS/6"			
10'						0-10'	6" soil, coarse brown sand with seepage flow present.	
17'						10-17'	Fractured Schist, water yielding layer approx. 2gpm.	*
60'						17-60'	Consolidated granite.	
						60' Completed	Completed well delivers approx. 5 gpm Improper union of casing into rock would not allow free passage of pump/packer into well. Casing was reset 4.5 feet into rock.	

REMARKS: * No rock samples were obtained due to the air-rotary drilling methods, rock I.D was determined by inspecting drilling spoils.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

ERT USEPA - ORM	PROJECT Londonderry Green Apts Londonderry, N.H.	REPORT OF BORING NO. _____ SHEET <u>1</u> OF <u>1</u> DATE <u>3/22</u> FILE _____
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BORING CO <u>NEPCO</u>	BORING LOCATION <u>ERT-03 behind maint. shed</u>
FOREMAN <u>Art/T. Daniels</u>	GROUND ELEV. <u>260'</u>
ENGINEER <u>Meuse</u>	DATE START <u>3/22/83</u> DATE END <u>3/22/83</u>

<u>CASING</u>	<u>SAMPLER</u>	<u>GROUNDWATER READINGS</u>			
SIZE: <u>6"</u>	TYPE: _____ OTHER: _____	DATE	DEPTH	CASING AT	STABILIZATION TIME
HAMMER: _____ <u>IB</u>	HAMMER: _____ <u>IB</u>				
FALL: _____	FALL: _____				

DEPTH	CAS BL /FT.	SAMPLE				STRATA CHG. and GEN. DESC.	SAMPLE DESCRIPTION	NOTE
		NO.	PEN./REC.	DEPTH	BLOWS/6"			
11						0-11'	Coarse brown sands, saturated.	
22						11-22'	Schist	
60						22-60'	Consolidated granite	
							Nearby exposed bedrock displayed vertical fractures. No flow was evident in well Dry hole. Casing set 4' into rock.	

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

USEPA	ERT	OHM	PROJECT Londonderry Green Apts. Londonderry, N.H.	REPORT OF BORING NO. _____ SHEET <u>1</u> OF <u>1</u> DATE <u>3/23/93</u> FILE _____
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BORING CO. <u>NEPCO</u>	BORING LOCATION <u>327-04 Capital Hill Road</u>
FOREMAN <u>Art / Daniels</u>	GROUND ELEV. <u>252'</u>
ENGINEER <u>Mause</u>	DATE START <u>3/19</u> DATE END <u>3/20</u>

CASING		SAMPLER		GROUNDWATER READINGS			
SIZE: <u>5"</u>	TYPE: _____	OTHER: _____	DATE	DEPTH	CASING AT	STABILIZATION TIME	
HAMMER: _____	HAMMER: _____	FALL: _____					

DEPTH	CAS BL / FT.	SAMPLE			START CHG. and GEN. DESC.	SAMPLE DESCRIPTION	NOTE
		NO.	PEN/REC.	DEPTH			
17'					0-17'	Coarse brown sand, some infiltration flow.	
55'					17-55'	Feldspar	
58'					55-58'	Granite	
60'					58-60'	Feldspar	
					60'	Well completed at 60', flow approx. 5 gpm. Casing set 3' into rock.	

REMARKS: The granite intrusion is not varified.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

NEW ENGLAND BORING CONTRACTOR OF CT, INC.
 109 COMMERCE STREET
 GLASTONBURY CT 06033
 (203) 633-4649 — (413) 733-1232

CLIENT Malcolm Pirnie
 PROJECT NAME Tinkhams's Garage
 LOCATION Londonderry, NH

BORING NUMBER MPI-1-S
 SHEET No 1 of 1

DRILLER M. St. John ARCHITECT ENGINEER

INSPECTOR K. Cichon

DATE START 11/23/87

DATE FINISH 11/23/87

FILE NO _____

SURFACE ELEV _____

LINE & STATION _____

OFFSET _____

Casing TYPE NW Sampler SS Core Barrel _____

SIZE I.D. 3" 1-3/8"

HAMMER WT Spin 140

HAMMER FALL _____ 30"

DEPTH	SAMPLE						COL A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER			REC.			
			0-6	6-12	12-18				
5'	S1	5.0-7.0	3	6				.2 Topsoil	
				7	12	18"			
10'	S2	10.0-12.0	4	6				Light Br. Fine-Crs. Sand, Some Fine Gravel, Little Silt	
				9	17	20"			
15'	S3	15.0-17.0	12	22					
				24	26	20"			
20'							20.0	Bottom of Boring 20.0 Water @ 17.0 Monitor Well Set @ 20.0 Materials: 5'-2" PVC Screen, 15'-2" PVC Riser, 1/2 Bag Ottawa Sand, 1/2 Bucket Bentonite Pellets, 1/2 Bag Portland Cement, 1 Roadway Box	

NOTES 1) The stratification lines represent the approximate boundary between soil types. Transitions may be gradual.
 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.

SAMPLE PENETRATION RESISTANCE
 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50+	Very Dense	16-30	V-Stiff
		31+	Hard

PROPORTIONS
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

REMARKS:
 COL. A _____

NEW ENGLAND BORING CONTRACTOR OF CT, INC.
 109 COMMERCE STREET
 GLASTONBURY CT 06033
 2031 533-4649 — (413) 733-1232

CLIENT Malcolm Pirnie
 PROJECT NAME Tinkhams's Garage
 LOCATION Londonderry, NH

BORING NUMBER LOT-2-S
 SHEET No 1 of 1

DRILLER M. St. John
 INSPECTOR K. Cichon
 DATE START 11/23/87
 DATE FINISH 11/23/87

ARCHITECT ENGINEER
 TYPE _____
 SIZE 'D' 3"
 HAMMER WT Spin
 HAMMER FALL _____

Casing NW
 Sampler _____
 Core Barrel _____

FILE NO _____
 SURFACE ELEV _____
 LINE & STATION _____
 OFFSET _____

DEPTH	SAMPLE					COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS	
	NO	DEPTH RANGE	BLOWS PER 6" ON SAMPLER						REC
			0-6	6-12	12-18				
5'							No Samples Required Material Same As I-2-D		
10'							Bottom of Boring 20.0 Water @ 16.5 Monitor Well Set @ 20.0 Materials: 5'-2" PVC Screen, 15'-2" PVC Riser, 1/2 Bag Ottawa Sand, 1/2 Bucket Bentonite Pellets, 1 Roadway Box		
15'							Bottom of Boring 20.0 Water @ 16.5 Monitor Well Set @ 20.0 Materials: 5'-2" PVC Screen, 15'-2" PVC Riser, 1/2 Bag Ottawa Sand, 1/2 Bucket Bentonite Pellets, 1 Roadway Box		
20'						20.0	Bottom of Boring 20.0 Water @ 16.5 Monitor Well Set @ 20.0 Materials: 5'-2" PVC Screen, 15'-2" PVC Riser, 1/2 Bag Ottawa Sand, 1/2 Bucket Bentonite Pellets, 1 Roadway Box		

NOTES 1) The stratification lines represent the approximate boundary between soil types. Variations may be gradual.
 2) Water level readings have been made in the drive holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.

SAMPLE PENETRATION RESISTANCE
 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

PROPORTIONS
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

REMARKS:
 COL. A _____

NEW ENGLAND BORING CONTRACTOR OF CT. INC.
 109 COMMERCE STREET
 GLASTONBURY, CT 06033
 (203) 633-4649 — (413) 733-1232

CLIENT Malcolm Pirnie
 PROJECT NAME Tinkhams's Garage
 LOCATION Londonderry, NH

BORING NUMBER
API-2-D
 SHEET
 No. 1
 of 2

DRILLER M. St. John
 INSPECTOR K. Cichon
 DATE START 11/19/87
 DATE FINISH 11/23/87

ARCHITECT ENGINEER
 TYPE _____
 SIZE I.D. 3"
 HAMMER WT. Spin
 HAMMER FALL _____
 Casing NW
 Sampler SS
 Core Barrel NXD4
1-3/8"
140
30"

FILE NO. _____
 SURFACE ELEV. _____
 LINE & STATION _____
 OFFSET _____

DEPTH	SAMPLE						COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER			REC.			
			0-6	6-12	12-18				
								.2 Topsoil	
5'	S1	5.0-7.0	7	10					
				10	12	19"			
10'	S2	10.0-12.0	7	6				Light Br. Fine-Crs. Sand, Little Silt, Few Cobbles	
				8	10	22"			
15'	S3	15.0-17.0	13	13					
				19	21	24"			
20'							20.0		
	R1	20.0-25.0	Cored			53"		Run # 1 - Cored 20.0-25.0 Rec. 53"	
25'							25.0		
	R2	25.0-30.0	Cored			57"		Run # 2 - Cored 25.0-30.0 Rec. 57"	
30'							30.0		
	R3	30.0-35.0	Cored			60"		Run # 3 - Cored 30.0-35.0 Rec. 60"	
35'							35.0		
	R4	35.0-40.0	Cored			60"		Run # 4 - Cored 35.0-40.0 Rec. 60"	
40'									

NOTES: 1) The stratification lines represent the approximate boundary between soil types. Transitions may be gradual.
 2) Water level readings have been made in the first holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.

SAMPLE PENETRATION RESISTANCE
 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cone/penetration Density	Cohesive Consistency
0-4 Very Loose	0-2 Very Soft
5-9 Loose	3-4 Soft
10-29 Med. Dense	5-8 M/Stiff
30-49 Dense	9-13 Stiff
50+ Very Dense	14-30 V-Stiff
	31+ Hard

PROPORTIONS

trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

REMARKS:
 COL. A _____

NEW ENGLAND BORING CONTRACTOR OF CT, INC. 109 COMMERCE STREET GLASTONBURY CT 06033 (203) 633-4849 - (413) 733-1232	CLIENT <u>Malcolm Pirnie</u> PROJECT NAME <u>Tinkhams's Garage</u> LOCATION <u>Londonderry, NH</u>	BORING NUMBER <u>MPI-1-D</u> SHEET No <u>2</u> of <u>2</u>
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DRILLER <u>M. St. John</u>	ARCHITECT ENGINEER	FILE NO. _____
INSPECTOR <u>K. Cichon</u>	Casing <u>NW</u> Sampler <u>SS</u> Core Barrel <u>NXD4</u> TYPE SIZE I.D. <u>3"</u> <u>1-3/8"</u> <u>2-1/8"</u> HAMMER WT. <u>Spin</u> <u>140</u> HAMMER FALL <u>30"</u>	SURFACE ELEV. _____
DATE START <u>11/19/87</u>		LINE & STATION _____
DATE FINISH <u>11/23/87</u>		OFFSET _____

DEPTH	SAMPLE						COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS	
	NO	DEPTH	RANGE	BLOWS PER 6" ON SAMPLER						REC.
				0-6	6-12	12-18				
								Bottom of Boring @ 40.0 Water @ 16.5 Materials: 23'-2" PVC Riser, No PVC Screen Installed, 1/4 Bucket Bentonite Pellets, 1 Bag Portland Cement, 1 Roadway Box		

NOTES 1) The stratification lines represent the approximate boundary between soil types; transitions may be gradual. 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.	SAMPLE PENETRATION RESISTANCE 140 lb. Wt. falling 30" on 2" O.D. Sampler <table style="width:100%; border-collapse: collapse;"> <tr> <th style="border-bottom: 1px solid black;">Cohesionless Density</th> <th style="border-bottom: 1px solid black;">Cohesive Consistency</th> </tr> <tr> <td>0-4 Very Loose</td> <td>0-2 Very Soft</td> </tr> <tr> <td>5-9 Loose</td> <td>3-6 Soft</td> </tr> <tr> <td>10-29 Med. Dense</td> <td>7-8 M/Stiff</td> </tr> <tr> <td>30-49 Dense</td> <td>9-15 Stiff</td> </tr> <tr> <td>50+ Very Dense</td> <td>16-30 V-Stiff</td> </tr> <tr> <td></td> <td>31+ Hard</td> </tr> </table>	Cohesionless Density	Cohesive Consistency	0-4 Very Loose	0-2 Very Soft	5-9 Loose	3-6 Soft	10-29 Med. Dense	7-8 M/Stiff	30-49 Dense	9-15 Stiff	50+ Very Dense	16-30 V-Stiff		31+ Hard	PROPORTIONS trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	REMARKS: COL. A _____
Cohesionless Density	Cohesive Consistency																
0-4 Very Loose	0-2 Very Soft																
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50+ Very Dense	16-30 V-Stiff																
	31+ Hard																

NEW ENGLAND BORING CONTRACTOR OF CT. INC. 109 COMMERCE STREET GLASTONBURY, CT 06033 (203) 633-4649 — (413) 733-1232	CLIENT <u>Malcolm Pirnie</u> PROJECT NAME <u>Tinkhams's Garage</u> LOCATION <u>Londonderry, NH</u>	BORING NUMBER <u>MOI-3-S</u> SHEET No. <u>1</u> of <u>1</u>
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DRILLER <u>J. Yarrow</u> INSPECTOR <u>T. Mortaugh</u> DATE START <u>11/24/87</u> DATE FINISH <u>11/24/87</u>	ARCHITECT ENGINEER TYPE <u>NW</u> SIZE I.D. <u>3"</u> HAMMER WT <u>Spin</u> HAMMER FALL <u>30"</u>	Casing <u>NW</u> Sampler <u>SS</u> Core Barrel <u>NXD4</u> SIZE I.D. <u>1-3/8"</u> HAMMER WT <u>140</u> HAMMER FALL <u>30"</u>	FILE NO _____ SURFACE ELEV _____ LINE & STATION _____ OFFSET _____
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DEPTH	SAMPLE						COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER			REC.			
			0-6	6-12	12-18				
5'	S1	5.0-7.0	8	9				Light Br. Fine-Med. Sand, Some Fine-Crs. Gravel	
			9	10	0"				
	R1	8.0-13.0	Cored			56"	8.0		
10'								Run # 1 - Cored 8.0-13.0 Rec. 56"	
	R2	13.0-18.0	Cored			59"	13.0		
15'								Run # 2 - Cored 13.0-18.0 Rec. 59"	
	R3	18.0-23.0	Cored			57"	18.0		
20'								Run # 3 - Cored 18.0-23.0 Rec. 57"	
	R4	23.0-28.0	Cored			60"	23.0		
25'								Run # 4 - Cored 23.0-28.0 Rec. 60"	
							28.0		
30'								Bottom of Boring 28.0 Water @ 7.0 Monitor Well Set @ 12.0 Materials: 14'-2" PVC Riser, No PVC Screen Installed, 1 Bucket Bentonite Pellets, 1 Bag Portland Cement, 1 Locking Protector Pipe	

NOTES 1) The stratification lines represent the approximate boundary between soil types; transitions may be gradual. 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.	SAMPLE PENETRATION RESISTANCE 140 lb. Wt. falling 30" on 2" O.D. Sampler <table style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Cohesionless Density</th> <th colspan="2">Cohesive Consistency</th> </tr> <tr> <td>0-4</td> <td>Very Loose</td> <td>0-2</td> <td>Very Soft</td> </tr> <tr> <td>5-9</td> <td>Loose</td> <td>3-4</td> <td>Soft</td> </tr> <tr> <td>10-29</td> <td>Med. Dense</td> <td>5-8</td> <td>M/Stiff</td> </tr> <tr> <td>30-49</td> <td>Dense</td> <td>9-15</td> <td>Stiff</td> </tr> <tr> <td>50 +</td> <td>Very Dense</td> <td>16-30</td> <td>V-Stiff</td> </tr> <tr> <td></td> <td></td> <td>31 +</td> <td>Hard</td> </tr> </table>	Cohesionless Density		Cohesive Consistency		0-4	Very Loose	0-2	Very Soft	5-9	Loose	3-4	Soft	10-29	Med. Dense	5-8	M/Stiff	30-49	Dense	9-15	Stiff	50 +	Very Dense	16-30	V-Stiff			31 +	Hard	PROPORTIONS trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	REMARKS: COL. A _____
Cohesionless Density		Cohesive Consistency																													
0-4	Very Loose	0-2	Very Soft																												
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		31 +	Hard																												

NEW ENGLAND BORING CONTRACTOR OF CT. INC. 109 COMMERCE STREET GLASTONBURY, CT 06033 (203) 533-4649 — (413) 733-1232	CLIENT <u>Malcolm Pirnie</u> PROJECT NAME <u>Tinkhams's Garage</u> LOCATION <u>Londonderry, NH</u>	BORING NUMBER <u>MPI-2-D</u> SHEET No <u>1</u> of <u>1</u>
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DRILLER <u>M. St. John</u> INSPECTOR <u>K. Cichon</u> DATE START <u>11/18/87</u> DATE FINISH <u>11/19/87</u>	ARCHITECT ENGINEER TYPE <u>NW</u> SIZE I D <u>3"</u> HAMMER WT <u>Spin</u> HAMMER FALL <u>30"</u>	FILE NO. _____ SURFACE ELEV _____ LINE & STATION _____ OFFSET _____
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DEPTH	SAMPLE						COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	NO	DEPTH RANGE	BLOWS PER 6" ON SAMPLER			REC.			
			0-6	6-12	12-18				
								.2 Topsoil	
5'	S1	5.0-7.0	11	11				Dark Br. Fine-Crs. Sand and Gravel, Some Silt	
				12	15	22"			
10'	R1	9.0-14.0	Cored			52"		9.0	Run # 1 - Cored 9.0-14.0 Rec. 52" Fractured Schist
15'	R2	14.0-19.0	Cored			50"		14.0	Run # 2 - Cored 14.0-19.0 Rec. 50"
20'	R3	19.0-24.0	Cored			53"		19.0	Run # 3 - Cored 19.0-24.0 Rec. 53"
25'	R4	24.0-29.0	Cored			60"		24.0	Run # 4 - Cored 24.0-29.0 Rec. 60"
30'								29.0	Bottom of Boring 29.0 Water @ 6.0 Monitor Well Set @ 21.0 Materials: 10'-2" PVC Screen, 11'-2" PVC Riser, 1/2 Bag Ottawa Sand, 1/4 Bucket Bentonite Pellets 1 Bag Portland Cement, 1 Roadway Box

NOTES: 1) The stratification was representative of the approximate boundary between soil types. Transitions may be gradual. 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.	SAMPLE PENETRATION RESISTANCE 140 lb. Wt. falling 30" on 2" O.D. Sampler <table style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Cohesiveness Density</th> <th colspan="2">Cohesive Consistency</th> </tr> <tr> <td>0-4</td> <td>Very Loose</td> <td>0-2</td> <td>Very Soft</td> </tr> <tr> <td>5-9</td> <td>Loose</td> <td>3-4</td> <td>Soft</td> </tr> <tr> <td>10-29</td> <td>Med. Dense</td> <td>5-8</td> <td>M/Stiff</td> </tr> <tr> <td>30-49</td> <td>Dense</td> <td>9-15</td> <td>Stiff</td> </tr> <tr> <td>50 +</td> <td>Very Dense</td> <td>16-30</td> <td>V-Stiff</td> </tr> <tr> <td></td> <td></td> <td>31 +</td> <td>Hard</td> </tr> </table>	Cohesiveness Density		Cohesive Consistency		0-4	Very Loose	0-2	Very Soft	5-9	Loose	3-4	Soft	10-29	Med. Dense	5-8	M/Stiff	30-49	Dense	9-15	Stiff	50 +	Very Dense	16-30	V-Stiff			31 +	Hard	PROPORTIONS trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	REMARKS: COL. A _____
Cohesiveness Density		Cohesive Consistency																													
0-4	Very Loose	0-2	Very Soft																												
5-9	Loose	3-4	Soft																												
10-29	Med. Dense	5-8	M/Stiff																												
30-49	Dense	9-15	Stiff																												
50 +	Very Dense	16-30	V-Stiff																												
		31 +	Hard																												

NEW ENGLAND BORING CONTRACTOR OF CT, INC
 109 COMMERCE STREET
 GLASTONBURY CT 06033
 2031 633-4649 — 4131 733-1232

CLIENT Malcolm Pirnie
 PROJECT NAME Tinkhams's Garage
 LOCATION Londonderry, NH

BORING NUMBER
MPL-3-S
 SHEET

DRILLER J. Yarrow ARCHITECT ENGINEER
 INSPECTOR I. Mortaugh
 DATE START 11/24/87
 DATE FINISH 11/25/87

Casing NW Sampler _____ Core Barrel NXD4
 TYPE _____ SIZE I.D. 3" _____
 HAMMER WT Spin _____
 HAMMER FALL _____

FILE NO _____
 SURFACE ELEV _____
 LINE & STATION _____
 OFFSET _____

No. 1
 of 1

DEPTH	SAMPLE					COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS	
	NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER						REC.
			0-6	6-12	12-18				
5'							4.5	Light Br. Fine-Crs. Sand and Gravel	
	R1	4.5-9.5	Cored			57"		Run # 1 - Cored 4.5-9.5 Rec. 57"	
10'							9.5		
	R2	9.5-14.5	Cored			60"		Run # 2 - Cored 9.5-14.5 Rec. 60"	
15'							14.5		
	R3	14.5-19.5	Cored			60"		Run # 3 - Cored 14.5-19.5 Rec. 60"	
20'							19.5		
	R4	19.5-24.5	Cored			60"		Run # 4 - Cored 19.5-24.5 Rec. 60"	
25'							24.5		
								Bottom of Boring 24.5 Water @ 5.0	
								Materials: 8'-2" PVC Riser, Bottom of Riser @ 6.0, 2' Stickup, 1/2 Bucket Bentonite Pellets, 1 Locking Protector Pipe	

NOTES 1) The stratigraphic lines represent the approximate boundary between soil types. Transitions may be gradual.
 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of groundwater may occur due to other factors than those present at the time measurements were made.

SAMPLE PENETRATION RESISTANCE
 140 lb. Wt. falling 30" on 2" O.D. Sampler

Coneless Density		Cone Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

PROPORTIONS
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

REMARKS:
 COL. A _____

BORING LOCATION See Figure 7
 GROUND ELEVATION (Ft.) 295.29
 GROUND WATER EL. (Ft.) _____ DATE _____
 DATE START-FINISH 5-18-92 - 5-19-92
 DRILLED BY Geo Logic, Inc.
 LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 69.2
 GEI-10
 PG. 1 OF 3

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	3-5 6-5	2	1.4	S1A - TOPSOIL AND SUBSOIL 1.1' S1B - SAND - Narrowly-graded. Mostly fine to medium sand, 5% non-plastic fines, 5-10% fine gravel. Tan (SP)	Topsoil Sand		5
	S2	6-10 11-15	2	1.6	S2 - Similar to above (SP)			
	S3	9-26 32-41	2	1.1	S3A - Similar to above (SP) 4.4'			
10	S4	26-35 45-67	2	1.4	S3B - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 10% non-plastic fines, 10% fine gravel. Grey (SM-SP)	Glacial Till		10
	S5	36-50 52-61	2	-	S4 - Similar to above S5 - No Sample Recovery			
	S6	37-47 64-62	2	1.6	S6 - Similar to S3B			
	S7	29-31 44-55	2	1.1	S7 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 10% coarse sand, 10-15% non-plastic fines, 5-10% fine gravel. Grey (SM)			
15	S8	52-53 62-63	2	1.5	S8 - Similar to S7 with 3/4" lenses of tan/brown medium sand.			15
	S9	27-61 60-84	2	1.2	S9 - Similar to S7 with lenses of narrowly-graded medium sand, 25% fine gravel.			
	S10	20-41 75/2"	1.2	0.3	S10 - Similar to S7 with large % of silty material at 19'. 19.2'			
20	R1	2-3-3-3-3	5	4.7	R1 - BEDROCK - Fine-grained metasedimentary rock with biotite and quartz-rich veins. Joint spacing 1"-12", joints 10, 30 and 50 degrees and near vertical. Top 1.2' highly fractured. Highly weathered joints at 1.2'. RQD = 68%	Bedrock		20
25	R2		5	4.9	R2 - As Above with fracture spacing at 3.5"-17" Highly weathered, iron-bearing, near horizontal fracture at 28'. In general, weathered fractures dipping 10, 30 and 50 degrees. RQD = 90%			25

REMARKS: 1) Permeability test at 6'.
 2) Packer test at 21.5' to 29.7'.

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-10-92 Project 92113

GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-18-92 - 5-19-92 GEI-10
 GROUND ELEVATION (Ft.) 295.29 DATUM NGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 69.2 PG. 2 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
	R3		5	4.9	R3 - As above with slightly weathered fractures. Joint spacing 4.5"-15". Joints dipping 10 and 70 degrees. RQD = 98%			
35	R4		5	5.1	R4 - Moderately weathered joint dipping 25 degrees at 35.5'. Moderately weathered joint dipping 70 degrees at 35.9'. Highly weathered joints dipping 15 and 20 degrees at 37.8'. Remainder of rock has slightly weathered joints spaced 2"-15" and dipping 20 and 70 degrees. RQD = 78%			35
40	R5		5	5	R5 - Moderately weathered fractures at 42.5', dipping at 10 degrees. In general, slightly weathered, joint spacing 2"-18" and dipping 50 and 70 degrees. RQD = 100%			40
45	R6		5	5	R6 - Slightly weathered fractures with spacing 2"-22" and dipping 50 and 70 degrees. Moderately weathered joint at 48.8' dipping at 20 degrees. RQD = 92%			45
50	R7		5	5	R7 - Slightly weathered fractures with spacing 1"-14" and dipping 40, 60 and 25 degrees. RQD = 76%			50
55	R8		5	5	R8 - Two moderately weathered joints at 54', dipping 60 degrees and nearly horizontal. Iron staining at 46'. RQD = 74%			55

REMARKS: 1)

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH
 Date 8-10-92 Project 92113
 † GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG ✓ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

BORING LOCATION See Figure 2 DATE START-FINISH 5-18-92 - 5-19-92 GEI-10
 GROUND ELEVATION (Ft.) 295.29 DATUM NGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 69.2 PG. 3 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
65	R9		5	5	R9 - Slightly weathered joints with spacing at 3.5"-15" and dipping 10 and 90 degrees. ROD = 64%			65
	R10		5	5	R10 - Slightly weathered joints with spacing at 1"-12" and dipping 10, 40 and 60 degrees. ROD = 82%			
70					Bottom of Boring at 69.2'.			70

REMARK : 1) Packer tests at: 21.5' to 69.2'
 31.5' to 69.2'

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-10-92 Project 92113
 † GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-18-92 - 5-18-92 GEI-1S
 GROUND ELEVATION (Ft.) 295.29 DATUM NGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 20.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5					Auger to 20.0'. No split-spoon samples. Install monitoring well.			5
10								10
15								15
20								20
25								25

REMARKS: 1) BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG <u>Y</u> GROUND WATER BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.	Tinkham Garage Site Infiltration System Evaluation Londonderry, NH Date <u>8-12-92</u> Project <u>92113</u> ♦ GEI CONSULTANTS, INC.
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BORING LOCATION See Figure 2 DATE START-FINISH 5-28-92 - 6-2-92
 GROUND ELEVATION (Ft.) 284.32 DATUM NGVD DRILLED BY M. Poland, Con-Tec.
 GROUND WATER EL. (Ft.) DATE LOGGED BY JTM & WJH TOTAL DEPTH (Ft.) 72.5

GEI-20

PG. 1 OF 3

DEPTH FT.	SAMPLE			SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN REC FT. FT.				
	S1	2-2 3-11	2 1	S1A - TOPSOIL 0.3'	Topsoil		
		S2	13-18 22-23	2 1.5	S1B - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 15% silt, 15% fine subangular gravel. Grey(SM)		
S3	13-12 13-13		2 1.6	S2 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 15% silt, 20% fine subangular gravel, 4" varved grey/tan fine sand at 4'. (SM)			
	5	S4	14-12 11-10	2 1.5	S3 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 10% silt, trace fine subangular gravel. Tan/grey, (SM)		
S5			6-8 14-13	2 1.3	S4 - Similar to S3, grey.		
	10	S6	14-13 14-16	2 1.7	S5 - Similar to S3, with 15% subangular gravel and one 1/8" lense of medium sand.(SM)		
S7			12-14 16-20	2 1.3	S6 - Similar to S3, grey/tan. (SM)		
	15	S8	16-17 19-27	2 1.8	S7 - Similar to S3. (SM)		
20			S9	14-22 39-84	2 1.5		
	25	S10		48-37 33-78	2 1.5		
						S10 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 35-40% slightly plastic fines, 15% gravel. Grey (SM) 27.5'	Bedrock

REMARKS: 1) Permeability test at 14'.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

Date 8-11-92 Project 92113

GEI CONSULTANTS, INC.

BORING LOCATION <u>See Figure 2</u>		DATE START-FINISH <u>5-28-92 - 6-2-92</u>		GEI-20	
GROUND ELEVATION (Ft.)	<u>284.32</u>	DATUM	<u>MGVD</u>	DRILLED BY	<u>M. Poland, Con-Tec</u>
GROUND WATER EL. (Ft.)		DATE		LOGGED BY	<u>JTM & WJH</u>
				TOTAL DEPTH (Ft.)	<u>72.5</u>
				PG. <u>2</u> OF <u>3</u>	

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
35 40 45 50 55	R1		5	4.7	R1 - BEDROCK - Fine-grained metasedimentary rock with biotite. Slightly to moderately weathered joints spaced 1"-4", iron staining, friable, dipping 15 and 50 degrees. RQD = 0			35 40 45 50 55
	R2		5	5	R2 - Similar to R1. RQD = 7%			
	R3		5	5	R3 - Similar to R1 with slightly to highly weathered joints. RQD = 7%			
	R4		5	5	R4 - Similar to R1 with slightly to highly weathered joints spaced 1/2"-8", dipping 15 and 50 degrees. Iron staining, friable. RQD = 34%			
	R5		5	5	R5 - Moderately weathered joints spaced 1"-11" and dipping 15 and 50 degrees. Iron staining. RQD = 60%			
	R6		5	5	R6 - Slightly to moderately weathered joints spaced 2"-13" and dipping 15 and 50 degrees. Iron staining. RQD = 58%			

REMARKS: 1) Packer Test at 28' to 36.7'.	Tinkham Garage Site Infiltration System Evaluation Londonderry, NH
BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG y GROUND WATER BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.	Date <u>8-11-92</u> Project <u>92113</u> * GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-28-92 - 6-2-92
 GROUND ELEVATION (Ft.) 284.32 DATUM NGVD DRILLED BY M. Poland, Con-Tec
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY JTM & WJH TOTAL DEPTH (Ft.) 72.5 PG. 3 OF 3
 GEI-2D

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
	R7		5	5	R7 - Slightly to highly weathered joints spaced 2"-13", dipping 15 and 50 degrees. Iron staining. RQD = 76%			
65	R8		5	5	R8 - Slightly to moderately weathered joints spaced 1"-11", dipping 15 and 50 degrees. Some iron staining. RQD = 54%			65
70	R9		5	5	R9 - Slightly to moderately weathered joints spaced 2"-15", dipping 15 and 50 degrees. RQD = 66%			70
75					Bottom of Boring at 73'.			75

REMARKS: 1) Packer Tests at: 28' to 31'
 38' to 73'

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-11-92 Project 92113
 * GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-28-92 - 5-28-92 GEI-2S
 GROUND ELEVATION (Ft.) 284.24 DATUM NGVD DRILLED BY M. Poland, Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY J. McLaughlin TOTAL DEPTH (Ft.) 10.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5					Auger to 10'. No split-spoon samples. Install monitoring well.			5
10								10
15								15
20								20
25								25

REMARKS: 1)

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-12-92 Project 92113
 * GEI CONSULTANTS, INC.

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	2-3 6-8	2	1.5	S1A - TOPSOIL AND SUBSOIL 1.1' S1B - SILTY SAND WITH GRAVEL - Narrowly graded Mostly fine to medium sand, 15% coarse sand and fine gravel, 25% non-plastic fines, organics (SM)	Topsoil		
	S2	23-25 23-19	2	1.6	S2 - Similar to S1B	Glacial Till		
10	S3	17-19 20-30	2	1.4	S3 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 15% non-plastic fines, 10% coarse sand, 15% fine gravel. Olive grey (SM)			5
	S4	38-41 61-67	2	1.6	S4A - Similar to S3 with mostly fine to medium sand, 10-15% non-plastic fines, 10% coarse sand/fine gravel, decomposed gravel. (SM)			
15	S5	40-65 98-140/2"	1.6	1.5	S4B - Widely-graded sand with gravel S5 - Similar to S4A with one 1/2" lense of fine sand, 10% fines, boulder at 10'. (SM)			10
	S6	120/.1' 300 lb. hammer	2	1.2	S6A - weathered boulder S6B - similar to S5 with mostly fine to medium sand, 5% non-plastic fines, one 1.5" sand lense (SM)			15
20	S7	26-36 47-70	2	1.0	S7 - Similar to S6, narrowly-graded silty sand, mostly fine to medium sand, 10-15% coarse sand and fine gravel, 10% non-plastic fines, one 5/8" lense silty fine sand. (SM)			
	S8	86-130 300 lb. hammer	2	1.6	S8 - Similar to S7 with 1" lense of fine sand, 1" lense of fine to medium sand and 20% fine gravel.			15
25	S9	49-29 68/300 lb.	1.5	1.2	S9A - Mostly fine to medium sand, 10% coarse S9B - SILTY SAND WITH GRAVEL. Narrowly-graded fine to medium silty sand, 10% coarse sand, 15% non-plastic fines, 10% coarse angular sand Grey (SM)			
	S10	120- 300 lb. 41 32-36	2	1.2	S10A - SILTY SAND WITH GRAVEL - Widely-graded. Mostly fine to coarse sand, 15% non-plastic fines, 30% fine to coarse angular gravel. Grey (SM)			20
28.3'	S11	67-112 300 lb. 34-76	2	1.4	S11 - SILTY SAND WITH GRAVEL - Narrowly- graded. Mostly fine to medium sand, 25% slightly plastic fines, 30% fine to coarse angular gravel, 2" fine to medium sand lense at 27.5'			25
	S12	300 lb. 51-75/.35'	1.8	1.6				
						Bedrock		

REMARKS: 1) Permeability tests at 8', 16' and 25.9'.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-11-92 Project 92113
 † GEI CONSULTANTS, INC.

BORING LOCATION <u>See Figure 2</u>	DATE START-FINISH <u>5-28-92</u> - <u>6-1-92</u>	GEI-30
GROUND ELEVATION (Ft.) <u>287.67</u>	DATUM <u>NGVD</u>	DRILLED BY <u>Geo Logic, Inc.</u>
GROUND WATER EL. (Ft.) _____	DATE _____	LOGGED BY <u>W. Haswell</u> TOTAL DEPTH (Ft.) <u>78.1'</u>
		PG. <u>2</u> OF <u>3</u>

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
35 40 45 50 55	R1		4	3.2	R1 - BEDROCK - Fine-grained metasedimentary rock. Moderately weathers fractures 1/2"-5", dipping 5, 30 and 80 degrees. Iron staining. RQD = 21%			35 40 45 50 55
	R2		5	4.9	R2 - Slightly to moderately weathered fractures at 1"-8", dipping 10, 30, 65 and 80 degrees. Iron staining. RQD = 38%			
	R3		5	5.2	R3 - Slightly to moderately weathered fractures spaced 1"-4", dipping 10, 40 and 85 degrees. Iron staining. RQD = 14%			
	R4		5	5.1	R4 - Slightly to highly weathered fractures spaced 1"-3", dipping 10 and 50 degrees. RQD = 0			
	R5		5	4.2	R5 - Slightly to highly weathered fractures spaced 2"-12", dipping 10 and 25 degrees. RQD = 74%			
	R6		5	5	R6 - Slightly weathered fractures spaced 1"-10", dipping 10 and 85 degrees. RQD = 36%			

REMARK : 1) Packer test at 31.4' to 37.5'	Tinkham Garage Site Infiltration System Evaluation Londonderry, NH
BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG <input checked="" type="checkbox"/> GROUND WATER BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.	Date <u>8-11-92</u> Project <u>92113</u>
	GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-28-92 - 6-1-92 GEI-30
GROUND ELEVATION (Ft.) 287.67 DATUM NGVD DRILLED BY Geo Logic, Inc.
GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 78.1' PG. 3 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
	R7		5	4.9	R7 - Slightly to moderately weathered fractures spaced 2"-11", dipping 10 and 50 degrees. RQD = 68%			
65	R8		5	4.7	R8 - Slightly to highly weathered fractures spaced 2"-12", dipping 15 and 40 degrees. Bottom 0.7' is quartz vein. RQD = 38%			65
70	R9		5	5.1	R9 - Quartz - Slightly to highly weathered fractures spaced 2"-12", dipping 10 and 60 degrees. RQD = 82%			70
75	R10		5	5	R10 - 1.4' of quartz, then slightly weathered fractures in metasedimentary rock, fractures spaced 2"-12", dipping 15 and 70 degrees. Interface between rock types is highly weathered and iron stained. RQD = 56%			75
80					Bottom of Boring at 78.1'.			80

REMARKS: 1) Packer tests at: 31.4' to 73.1'
39.4' to 73.1'
45.6' to 73.1'

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y GROUND WATER
BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

Date 8-11-92 Project 92113

◆ GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-27-92 - 5-29-92
 GROUND ELEVATION (Ft.) 287.48 DATUM MGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 10.0' PG. 1 OF 1
 GEI-3S

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5					Auger to 10'. No split-spoon samples. Install monitoring well.			5
10								10
15								15
20								20
25								25

REMARKS: 1)

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH
 Date 8-12-92 Project 92113
 GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RGD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG ✓ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
	S1	1-2	2	0.9	S1A - TOPSOIL 0.3'	Topsoil		
		2-3			S1B - SILTY SAND - Narrowly-graded. Mostly fine sand, trace silt, trace fine gravel. Tan (SP)	Glacial Till		
5	S2	7-12	2	1.4	S2A - Similar to S1B			
		14-14			S2B - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine to medium sand, 15% non-plastic fines, 15% fine to coarse gravel. Tan (SM)			
5	S3	9-19	2	1.8	S3 - Similar to S2B with 1/2"-3" lenses of fine silty sand. (SM)			5
		33-50						
10	S4	62-42	2	1.5	S4 - SILTY SAND WITH GRAVEL - Narrowly graded. Mostly fine to medium sand, 20% non-plastic fines, 15% fine-coarse subangular gravel (SM)			
		45-50						
10	S5	26-37	2	1.3	S5 - Similar to S4. (SM)			
		44-39						
15	S6	38-41	2	1.4	S6 - Similar to S4. (SM)			10
		42-50						
15	S7	60-53	2	1.5	S7 - Similar to S4. (SM)			
		43-58						
15	S8	36-43	2	1.5	S8 - Similar to S4. (SM)			15
		51-58						
20	S9	37-38	2	1.1	S9 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine sand, 20% non-plastic fines, 15% fine-medium subangular gravel. Grey (SM)			
		67-125						
20	S10	68-111	1	0.8	S10 - Similar to S9. (SM)			20
25	S11	59-100/2"	0.7	0.5	S11 - cobble			
25	S12	70-128	1	0.8	S12 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, 50-70% angular gravel. (SM)			
25	S13	68-77	2	1.4	S13 - Similar to S12 with 20% gravel.			25
		87-119						
25	S14	81-100/4"	0.8	0.7	S14 - Similar to S12 with 10% gravel.			
	S15	100-100/2"	0.7	0.5	S15 - Similar to S12 with 20% gravel.			

REMARKS: 1) Permeability tests at 6' and 19.7'.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

Date 8-11-92 Project 92113

* GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RGD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG √ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

BORING LOCATION See Figure 2 DATE START-FINISH 5-20-92 - 5-26-92
 GROUND ELEVATION (Ft.) 284.00 DATUM NGVD DRILLED BY M. Weaver, Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY JTM & WJH TOTAL DEPTH (Ft.) 69.9' GEI-40
PG. 2 OF 3

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
	S16	88-100/7"	0.9	0.6	S16 - Similar to S12 with 10% gravel. 31.5'			
	S17	51-55 112	1.5	1.0	S17 - WEATHERED ROCK - 95% grey, weathered rock with narrowly-graded fine silty sand.	Bedrock		
35	S18 R1	100/4"	0.3 5	0.3 4.7	S18 - Similar to S17. R1 - BEDROCK - Fine-grained metasedimentary rock. RQD = 50%			35
40	R2		4.7	4.4	R2 - Slightly weathered, fracture spacing 1"-5" dipping 10, 40, 60 and 85 degrees. RQD = 8%			40
45	R3		5	4.8	R3 - Slightly weathered, fractures 1"-8", dipping 10 and 45 degrees. RQD = 50%			45
50	R4		5	5	R4 - Slightly weathered, fracture spacing 1"-18", dipping 10 and 50 degrees. RQD = 92%			50
55	R5		5	5	R5 - Slightly weathered, fracture spacing 1"-12", dipping 10 and 45 degrees. RQD = 72%			55

REMARKS: 1) Packer tests at: 41.4' to 50.1'

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V - GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-11-92 Project 92113
 † GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-20-92 - 5-26-92 GEI-40
 GROUND ELEVATION (Ft.) 284.00 DATUM NGVD DRILLED BY M. Weaver, Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY JTM & WJH TOTAL DEPTH (Ft.) 69.9' PG. 3 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
65	R6		5	4.7	R6 - Slightly weathered, fracture spacing 4"-10", dipping 10 and 70 degrees. RQD = 94%			65
	R7		5	4.3	R7 - Slightly weathered, fracture spacing 1"-20", dipping 10 and 45 degrees.			
70					Bottom of Boring at 69.9'.			70
75								75

REMARKS: 1) Packer tests at: 41.4' to 69.9'
 51.4' to 69.9'

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG ✓ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

Date 8-11-92 Project 92113

⚡ GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 5-20-92 - 5-20-92 GEI-4S
 GROUND ELEVATION (Ft.) 284.32 DATUM NGVD DRILLED BY Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY J. McLaughlin TOTAL DEPTH (Ft.) 15.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5					Auger to 15'. No split-spoon samples. Install monitoring well.			5
10								10
15								15
20								20
25								25

REMARKS: 1)

 BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

 Date 8-12-92 Project 92113
 GEI CONSULTANTS, INC.

DEPTH FT.	SAMPLE			SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN REC FT. FT.				
	S1	2-3	2	1.6	S1A - TOPSOIL 0.7'	Topsoil	
		4-6			S1B - SILTY SAND WITH GRAVEL - Narrowly-graded Mostly fine-medium sand, 20% non-plastic fines, trace fine gravel. Tan (SM)	Glacial Till	
	S2	8-18	2	1.3	S2 - Similar to S1B with 15% non-plastic fines, 10% coarse sand and fine gravel and decomposed rock. Tan (SM)		
		29-21					
5	S3	24-40	2	1.7	S3 - Similar to S2.		5
		52-55					
	S4	37-39	2	1.2	S4 - Similar to S2 with 1/4" lenses of silty fine sand, mostly fine sand with 40% non-plastic fines, and 3/8" lense of medium sand. (SM)		
		40-33					
	S5	18-22	2	1.3	S5 - Similar to S2. (SM)		
		34-41					
10	S6	34-58	2	1.6	S6 - Similar to S2, grey. (SM)		10
		46-50					
	S7	22-47	2	1.2	S7 - Similar to S6. (SM)		
		68-74					
15	S8	60-91	2	1.4	S8 - Similar to S6, with lenses of fine-medium sand. Some mottling. (SM)		15
		90-82					
	S9	37-52	2	1.3	S9 - Similar to S6 (SM)		
		76-107					
20	S10	34-58	1.9	1.7	S10 - SILTY SAND WITH GRAVEL - Narrowly-graded Mostly fine-medium sand, 15% non-plastic fines, 10% fine gravel, lenses of medium sand and of fine sand. Grey (SM)		20
		85-120/5"					
	S11	112-48	1.2	1.0	S11 - SILTY SAND - Narrowly-graded, mostly fine-medium sand, 15% non-plastic fines, trace fine gravel. Grey (SM)		
		300 lb. hammer					
	S12	160	1.5	1.3	S12 - Similar to S11		
		300 lb. 45-72					
25	S13	109	1.5	1.1	S13A - Similar to S11 (SM) S13B - Similar to S11 with layers of fine silty sand, mostly fine sand, 40% non-plastic fines and posciets of fine-medium sand. (SM)		25
		300 lb. 34-53					
	S14	300 lb.	1.5	1.1	S14 - Similar to S11		
		35-53 62					
	S15	300 lb.	2	1.5	S15A - Similar to S11 (top 1' of spoon) S15B - Similar to S11 with 1/8" layers of silty fine sand with 40% fines.		
		32-37 41-64					

REMARKS: 1) Permeability tests at 8' and 22'.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

Date 8-11-92 Project 92113

♣ GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

BORING LOCATION See Figure 2 DATE START-FINISH 5-21-92 - 5-27-92 GEI-50
 GROUND ELEVATION (Ft.) 280.91 DATUM MGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 71.5 PG. 2 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
35	S16	19-20 100/4" *	1.3	0.9	S16A - Top .3' similar to S15B. S16B - Similar to S15B with 1/4" layers of silt and sand with fine rounded gravel, slightly plastic fines. (SM)	Bedrock		;fs
	S17	28-90 100/5" *	1.4	1	S17 - SILTY SAND - Narrowly-graded. Mostly fine to medium sand, 15% non-plastic fines, 15% coarse sand and fine gravel. Grey (SM)			
40	S18	20-21 21-19 *	2	1.4	S18 - Similar to S17.			
	S19	15-30 25-36 *	2	1.5	S19 - Similar to S17.			
	S20	10-11 11-14 *	2	1.8	S20A - SAND - Narrowly-graded. Mostly fine to medium sand, trace fines S20B - SILT WITH SAND - Silt w/40% fine sand. S21 - SILTY SAND WITH GRAVEL - Widely-graded.			
40	S21	32-37 100/0 *	1	0.7	Mostly fine-coarse sand, 15% non-plastic fines, 40% fine to coarse gravel.(SM) 41.0'			
45	R1		5	4.8	R1 - BEDROCK - Fine-grained metasedimentary rock, slightly weathered, fractures spaced 1"-5", dipping 10, 40 and 70 degrees. RQD = 40%			
	R2		5	5	R2 - Slightly weathered, fractures spaced 1/2"-12", dipping 10, 25 and 50 degrees. RQD = 90%			
50	R3 and R4		5.5	5	R3 and R4 - Slightly to moderately weathered, fractures spaced 1"-9", dipping 15, 50 and 70 degrees. RQD = 34%			
	R5		5	4.8	R5 - Slightly weathered, fractures spaced 1"-12", dipping 30 and 50 degrees. RQD = 88%			

REMARKS: 1) * spoon driven with 300 lb. hammer.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

Date 8-12-92 Project 92113

♦ GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG √ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

BORING LOCATION See Figure 2 DATE START-FINISH 5-21-92 - 5-27-92 GEI-50
 GROUND ELEVATION (Ft.) 280.91 DATUM NGVD DRILLED BY Geo Logic, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 71.5 PG. 3 OF 3

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
65	R6		5	4.8	R6 - Slightly weathered, fractures spaced 2"-18", dipping 10 and 50 degrees. RQD = 90%			65
70	R7		5	5	R7 - Slightly weathered, fractures spaced 1"-24", dipping 10, 45 and 70 degrees. RQD = 4%			70
75					Bottom of Boring 71.5'.			75
80								80

REMARKS: 1) Packer tests at: 44.8' to 71.5'
 45.9' to 71.5'
 52.7' to 71.5'

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH
 Date 8-12-92 Project 92113
 † GEI CONSULTANTS, INC.

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V - GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

BORING LOCATION <u>See Figure 2</u>		DATE START-FINISH <u>5-21-92</u> - <u>5-21-92</u>		GEI-5S	
GROUND ELEVATION (Ft.) <u>280.67</u>		DATUM <u>MGVD</u>		DRILLED BY <u>Geo Logic, Inc.</u>	
GROUND WATER EL. (Ft.) _____		DATE _____		LOGGED BY <u>W. Haswell</u> TOTAL DEPTH (Ft.) <u>10.0'</u>	
PG. <u>1</u> OF <u>1</u>					

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5					Auger to 10'. No split-spoon samples. Install monitoring well.			5
10								10
15								15
20								20
25								25

REMARKS: 1)		Tinkham Garage Site Infiltration System Evaluation Londonderry, NH	
BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V - GROUND WATER BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.		Date <u>8-12-92</u> Project <u>92113</u> ♦ GEI CONSULTANTS, INC.	

BORING LOCATION See Figure 2 DATE START-FINISH 6-3-92 - 6-3-92 GEI-6
 GROUND ELEVATION (Ft.) 267.15 DATUM NGVD DRILLED BY Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 10.0' PG. 1 OF 1

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	1/12" 1-5	2	1	S1A - TOPSOIL AND SUBSOIL 1.0' S1B - SILTY SAND - Narrowly-graded. Mostly fine-medium sand, 30% organic silt. Tan (SM)	Topsoil		5
	S2	5-9 12-20	2	1	S2 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines 15% subangular gravel, 10% coarse sand. Tan (SM)	Glacial Till		
	S3	15-37 30-41	2	1.6	S3 - Similar to S2, tan/grey (SM)			
	S4	37-33 36-47	2	1.6	S4 - Similar to S2, olive-grey, with one 1/4" lense fine sand and one 3/8" lense medium sand (SM)			
	S5	15-17 16-21	2	1.7	S5 - Similar to S2, with two 1" lenses of silty fine sand. (SM)			
10	Bottom of Boring at 10'.							
15								
20								
25								

REMARKS: 1) BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG γ GROUND WATER BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.	Tinkham Garage Site Infiltration System Evaluation Londonderry, NH Date <u>8-12-92</u> Project <u>92113</u> * GEI CONSULTANTS, INC.
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BORING LOCATION See Figure 2 DATE START-FINISH 6-4-92 - 6-4-92 GEI-7
 GROUND ELEVATION (Ft.) 270.63 DATUM NGVD DRILLED BY Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY V. Haswell TOTAL DEPTH (Ft.) 10.0' PG. 1 OF 1

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	1-2 3-5	2	1.5	S1A - TOPSOIL AND SUBSOIL 1.0' S1B - SAND - Narrowly-graded. Mostly fine sand, 10% medium-coarse sand, Trace non-plastic fines. Tan (SP)	Topsoil Sand		5
	S2	5-7 13-40	2	1.6	S2 - SAND - Narrowly-graded. Mostly fine-medium sand, trace coarse sand, trace fine gravel. Grey/tan (SP)			
	S3	11-19 33-33	2	1.4	S3A - Top 1' similar to S2 5.2' S3B - SILTY SAND WITH GRAVEL - Narrowly-graded Mostly fine-medium sand, 15% non-plastic fines, 15% coarse sand/fine gravel. Tan (SM)	Glacial Till		
	S4	27-81 28-26	2	0.9	S4 - Similar to S3B			
	S5	11-12 18-24	2	1.6	S5 - Similar to S3B			
10					Bottom of Boring at 10'.			10
15								15
20								20
25								25

REMARKS: 1)

 BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG ✓ GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Tinkham Garage Site
 Infiltration System
 Evaluation
 Londonderry, NH

 Date 8-12-92 Project 92113
 ♦ GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 6-3-92 - 6-3-92 GEI-8
 GROUND ELEVATION (Ft.) 273.82 DATUM NGVD DRILLED BY M. Poland, Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 10.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	1-1 2-3	2	1.2	S1A - TOPSOIL 0.4' S1B - SILTY SAND - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, 10% fine angular gravel. Tan (SM)	Topsoil Sand		
	S2	6-11 16-21	2	1.4	S2A - Similar to S1B. S2B - SAND - Narrowly-graded. Mostly fine to medium sand, 10% non-plastic fines, 10% rounded gravel. White/grey (SP)			
	S3	12-15 17-26	2	1.3	S3A&B-Top 1.1' similar to S2B, 20% gravel, tan S3C - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine-medium sand, 10% non-plastic fines, 20% subangular gravel. Olive grey (SM)	Glacial Till		5
	S4	22-21 20-25	2	1.3	S4 - Similar to S3B with two 1/8" lenses of medium sand.			
	S5	24-32 25-32	2	1.5	S5 - Similar to S3C.			
10					Bottom of Boring at 10'.			10
15								15
20								20
25								25

REMARKS: 1)

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RGD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UD - OSTERBERG \checkmark GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-12-92 Project 92113
 ♦ GEI CONSULTANTS, INC.

BORING LOCATION See Figure 2 DATE START-FINISH 6-4-92 - 6-4-92 GEI-9
 GROUND ELEVATION (Ft.) 263.21 DATUM NGVD DRILLED BY Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Maswell TOTAL DEPTH (Ft.) 14.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	1-2 3-5	2	1.3	S1A - TOPSOIL AND SUBSOIL 0.7' S1B - SAND - Narrowly-graded. Mostly fine to medium sand, 10% non-plastic fines. Tan/brown (SP)	Topsoil Sand		
	S2	4-5 7-7	2	1.6	S2 - SAND - Narrowly-graded. Mostly fine sand, 10% non-plastic fines. Tan (SP)			
	S3	29-22 21-32	2	1.4	S3 - SILTY SAND - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, trace coarse sand/fine gravel. Tan(SM)			5
	S4	17-15 15-25	2	1.2	S4 - SILTY SAND - Narrowly-graded. Mostly fine-medium sand, Trace non-plastic fines, 3/4" layer fine sand w/10% non-plastic fines. 7.9'			
10	S5	14-20 24-43	2	1.1	S5A - Top 0.6' SILTY SAND. Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, 10% angular fine gravel. Tan (SM)	Glacial Till		
	S6	14-16 14-15	2	1.5	S5B - SILTY SAND - Narrowly graded, varved fine sand and silt layers. Tan/olive S6 - SILTY SAND AND GRAVEL - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, 10% fine angular gravel. Tan/brown (SM)			10
	S7	20-25 28-46	2	1.4	S7A - SAND - Narrowly-graded. Mostly fine-medium sand, 10% non-plastic fines, 10% coarse sand. Tan. S7B - Bottom 0.3', layers of fine sand and silt Bottom of Boring at 14'.			
15							15	
20							20	
25							25	

REMARKS: 1)

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UP - FIXED PISTON UO - OSTERBERG Y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-12-92 Project 92113
 † GEI CONSULTANTS, INC.

BORING LOCATION See Figure Z DATE START-FINISH 6-5-92 - 6-5-92 GEI-10
 GROUND ELEVATION (Ft.) 268.42 DATUM NGVD DRILLED BY M. Poland, Con-Tec, Inc.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY W. Haswell TOTAL DEPTH (Ft.) 8.0' PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS/6 In.	PEN FT.	REC FT.				
5	S1	2-1 3-8	2	1.2	S1A and S1B - TOPSOIL AND SUBSOIL 0.9' S1C- SAND - Narrowly-graded. Mostly fine-medium sand, trace non-plastic fines, 10% fine angular gravel, orange/brown (SP) S2 - Similar to S1C, grey (SP)	Topsoil Sand		5
	S2	4-4 5-9	2	1.4				
	S3	8-14 15	1.5	0.8	S3 - Similar to S2 6.0'			
10	S4	32-49 46-82	2	0.4	S4 - SILTY SAND WITH GRAVEL - Narrowly-graded. Mostly fine-medium sand, 15% non-plastic fines, 10% coarse sand/fine gravel. Grey/tan (SM)	Glacial Till		10
	S5	23-20 24-27	2	1.2	S5 - Similar to S4. (SM)			
	S6	18-22 30-45	2	1.1	S6 - Similar to S4 with 10% non-plastic fines. (SM)			
	S7	15-33 35-48	2	1.1	S7 - Similar to S6. (SM)			
15	S8	26-49 44-52	2	1.4	S8 - Similar to S6 with one 1/2" layer of silt at 15'. (SM)			15
	S9	21-64 90-75/3"	1.7	1	S9 - Similar to S6 with cobbles. (SM)			
20					Bottom of Boring at 18'.			20
25								25

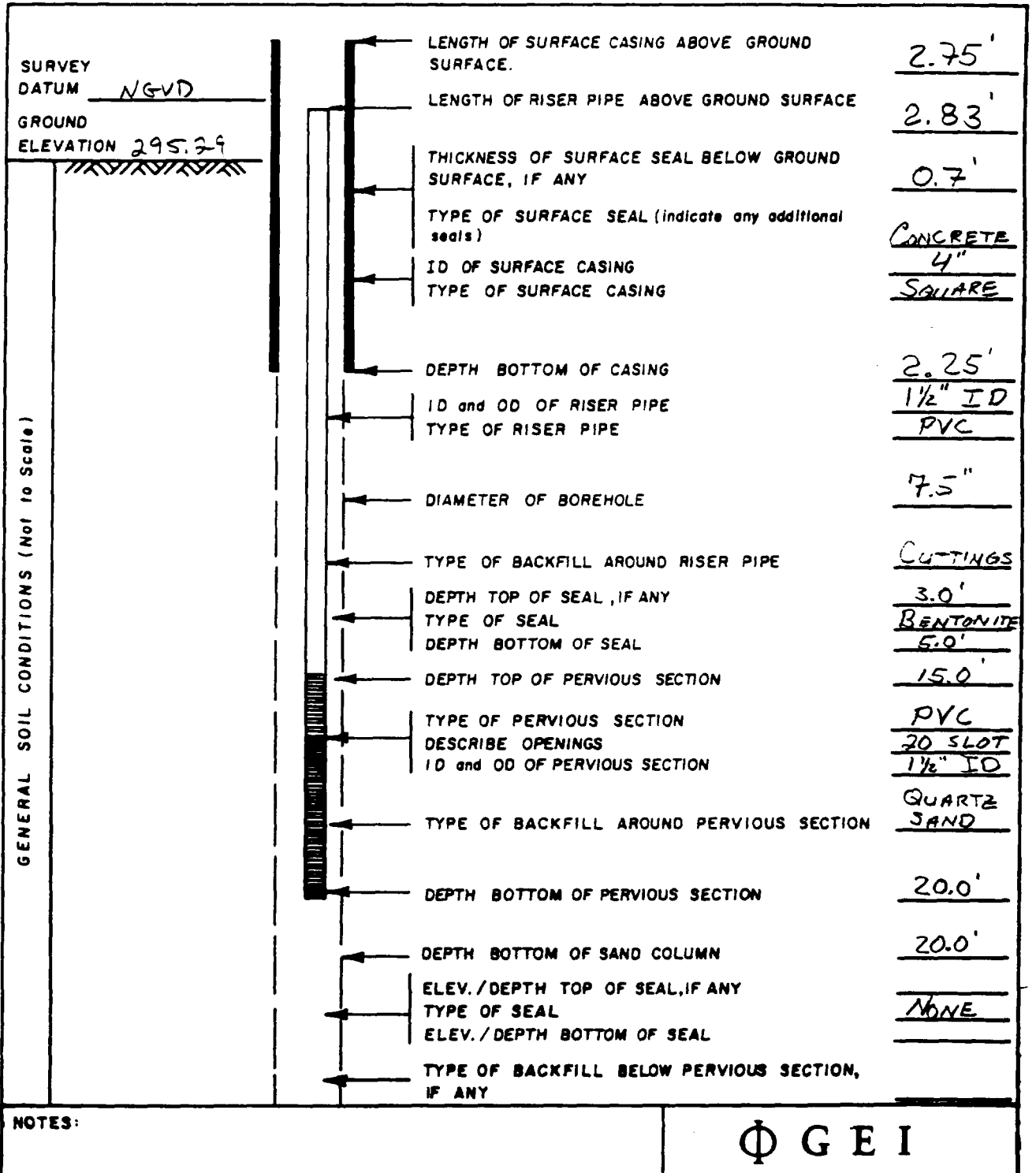
REMARKS: 1) Permeability Test at 6'.

Tinkham Garage Site
Infiltration System
Evaluation
Londonderry, NH

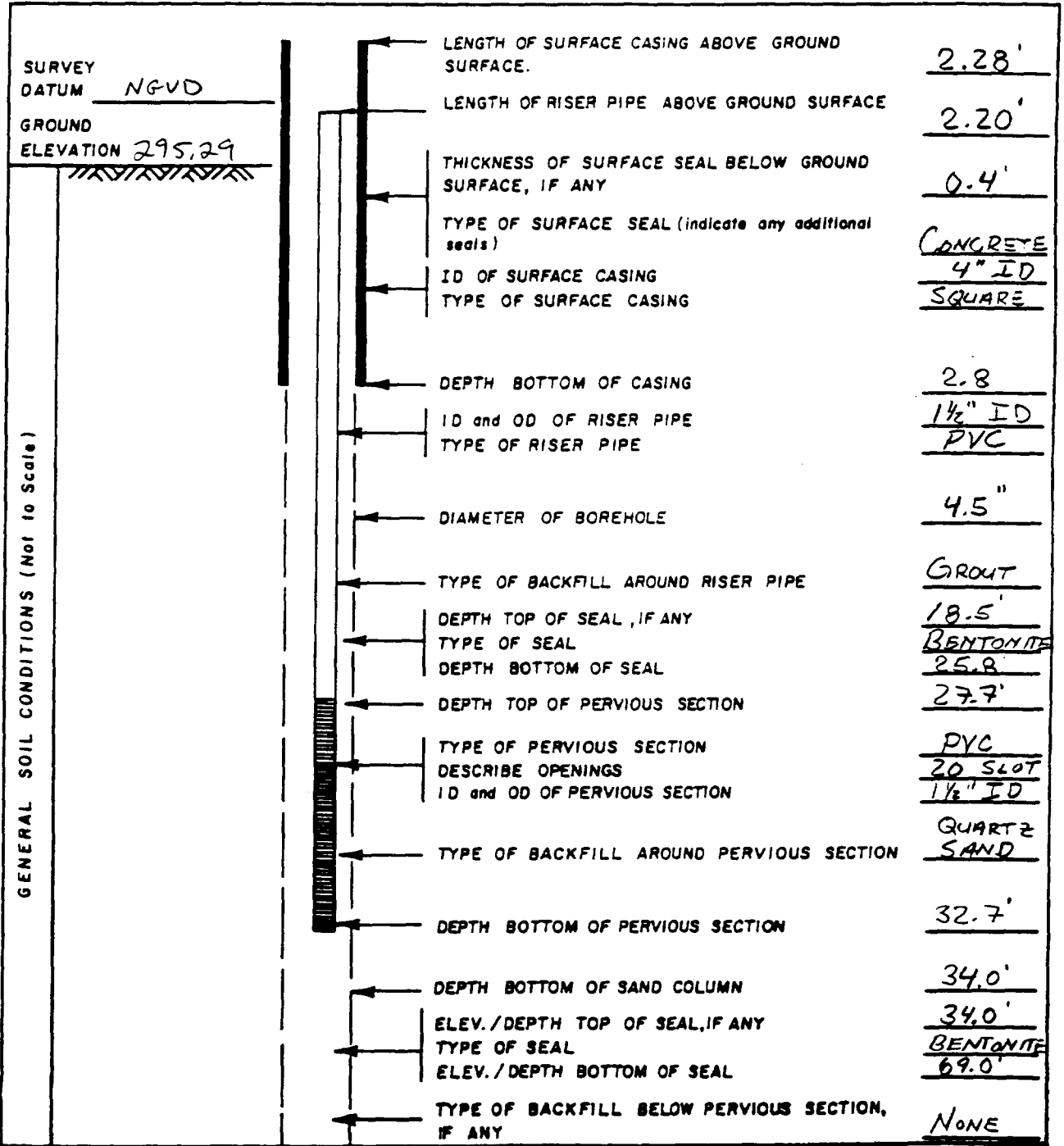
BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 8-12-92 Project 92113
 GEI CONSULTANTS, INC.

GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAN GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES</u>	Boring No. <u>GEE 15</u>
Contractor <u>Geo LOGIC INC.</u> Driller <u>T. PAQUETTE</u>	Location <u>SEE PLAN</u>
Inspected by <u>W. HASWELL</u> Date <u>5-20-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



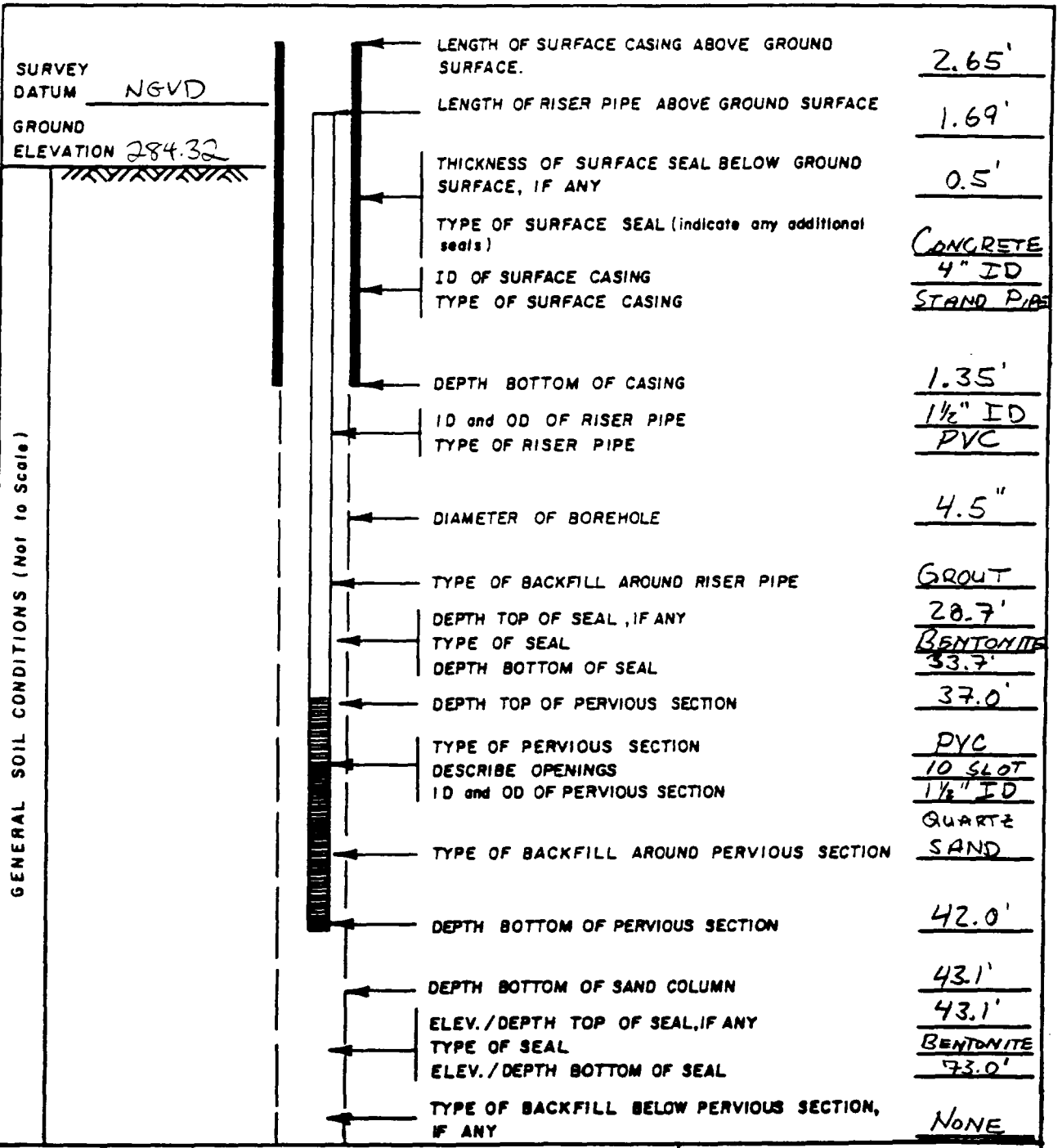
GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GEI 1D</u>
Contractor <u>GEO LOGIC INC.</u> Driller <u>T. PAQUETTE</u>	Location <u>SEE PLAN</u>
Inspected by <u>W. HASWELL</u> Date <u>5-20-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



NOTES:



GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	Boring No. <u>GEI 2D</u>
Client <u>CANNONS SITES GROUP</u>	Location <u>SEE PLAN</u>
Contractor <u>CON TEC INC</u> Driller <u>M. POLLAND</u>	Project No. <u>92113</u>
Inspected by <u>W. HASWELL</u> Date <u>6-3-92</u>	
Checked by _____ Date _____	

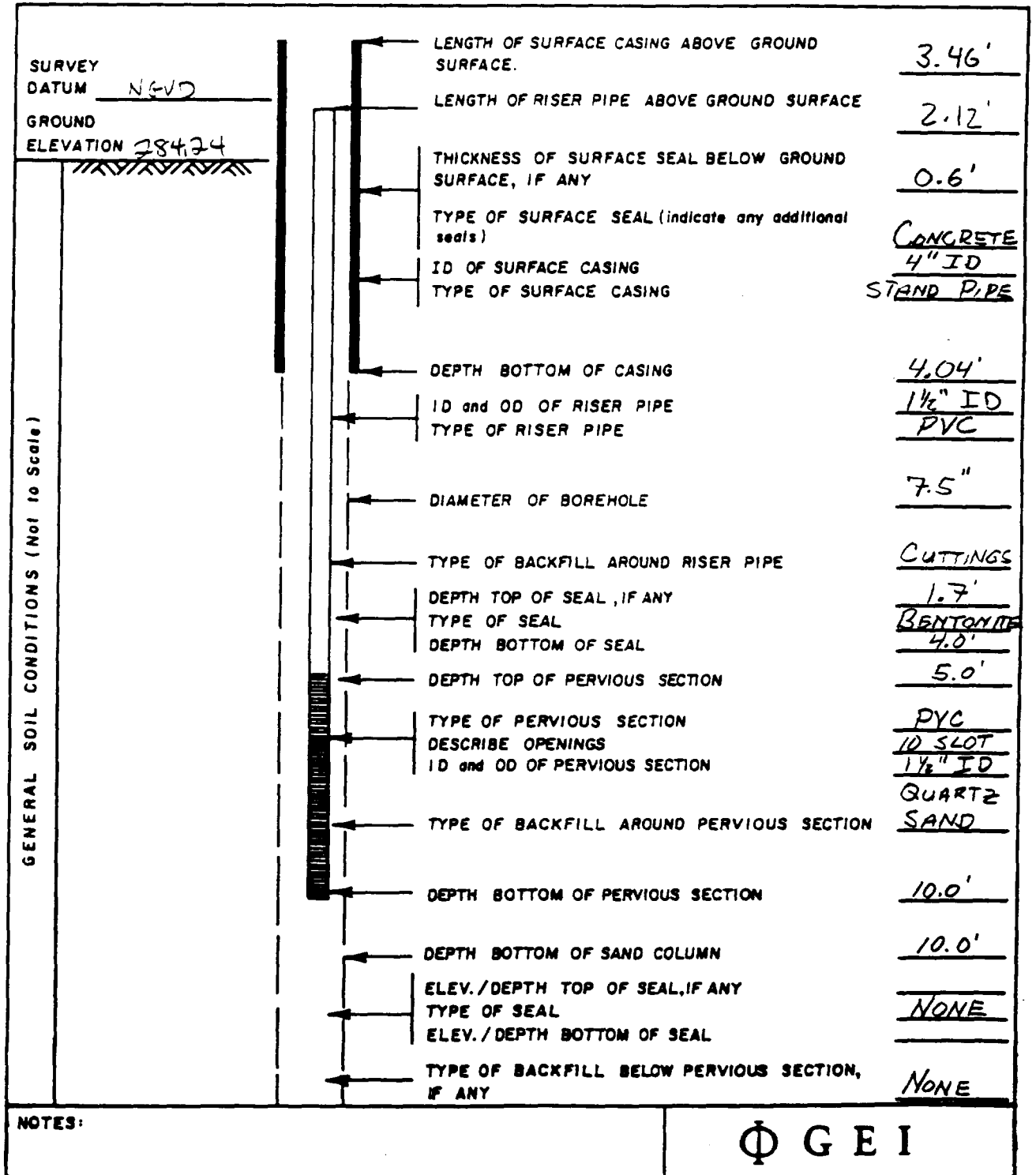


GENERAL SOIL CONDITIONS (Not to Scale)

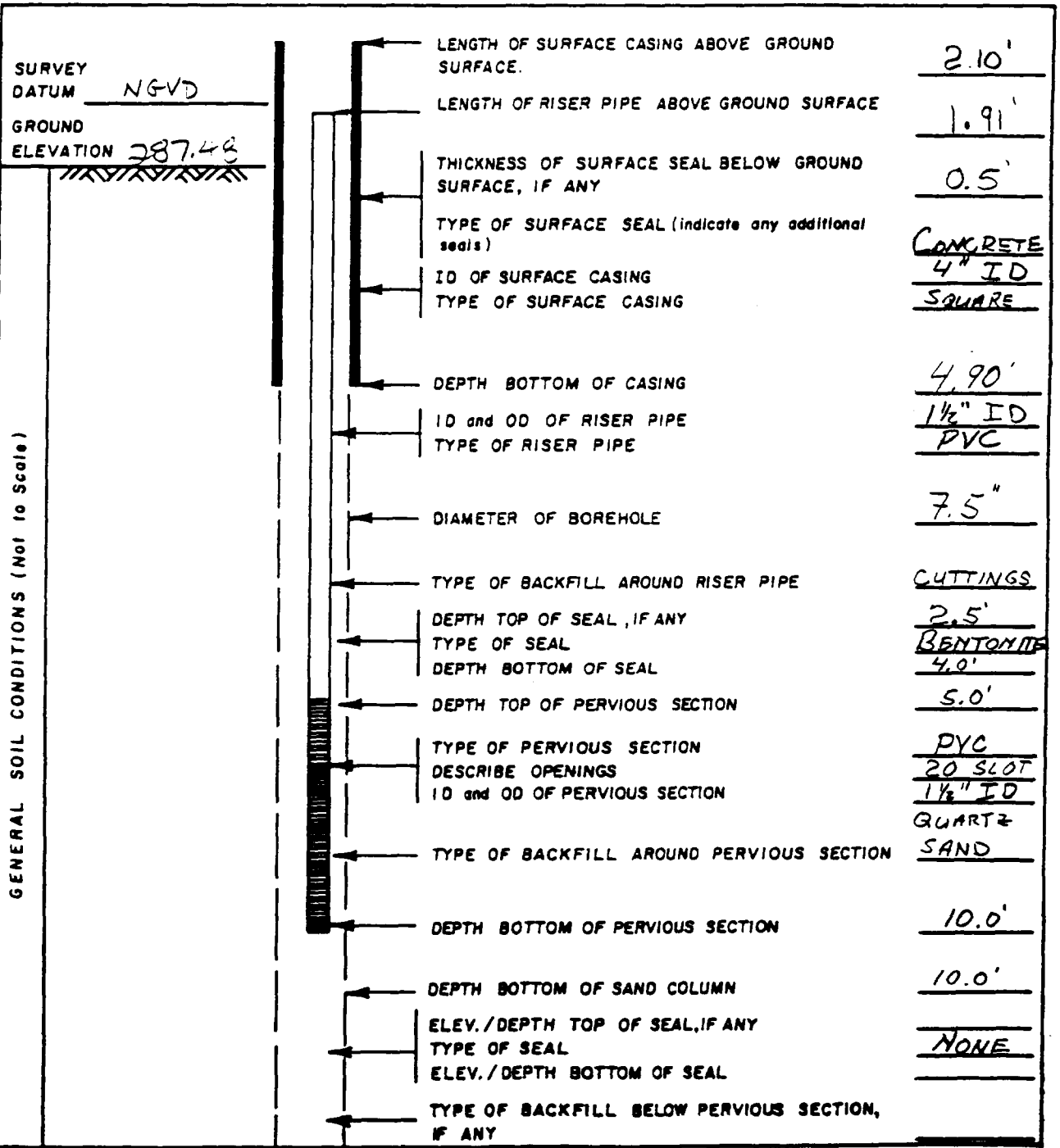
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GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	Boring No. <u>GEI 2S</u>
Client <u>CANNONS SITES GROUP</u>	Location <u>SEE PLAN</u>
Contractor <u>CON-TEC, INC.</u> Driller <u>M. POLLAND</u>	Project No. <u>92113</u>
Inspected by <u>J. Mc LAUGHLIN</u> Date <u>5-28-92</u>	
Checked by _____ Date _____	



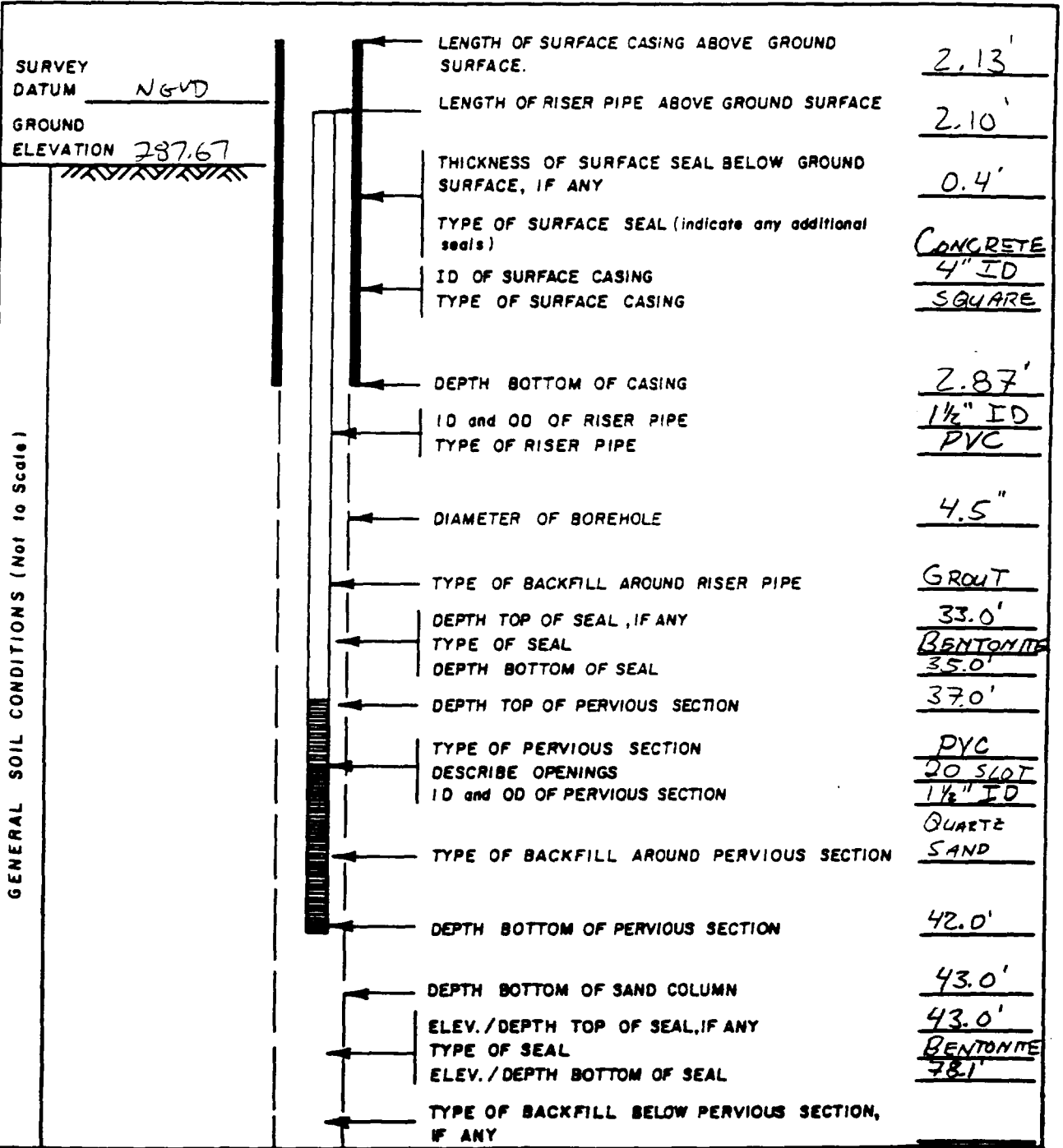
GROUNDWATER OBSERVATION WELL REPORT		
Project <u>TINKHAM GARAGE SITE</u>		PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>		Boring No. <u>GEI 3S</u>
Client <u>CANNONS SITES GROUP</u>		Location <u>SEE PLAN</u>
Contractor <u>GEO-LOGIC</u> Driller <u>T. PARUTTE</u>		Project No. <u>92113</u>
Inspected by <u>W. HASWELL</u> Date <u>5-28-92</u>		
Checked by _____ Date _____		



NOTES:



GROUNDWATER OBSERVATION WELL REPORT		
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>	
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	Boring No. <u>GEI 3D</u>	
Client <u>CANNONS SITES GROUP</u>	Location <u>SEE PLAN</u>	
Contractor <u>GEO-LOGIC</u> Driller <u>T. PAQUETTE</u>	Project No. <u>92113</u>	
Inspected by <u>W. HASWELL</u> Date <u>6-2-92</u>		
Checked by _____ Date _____		



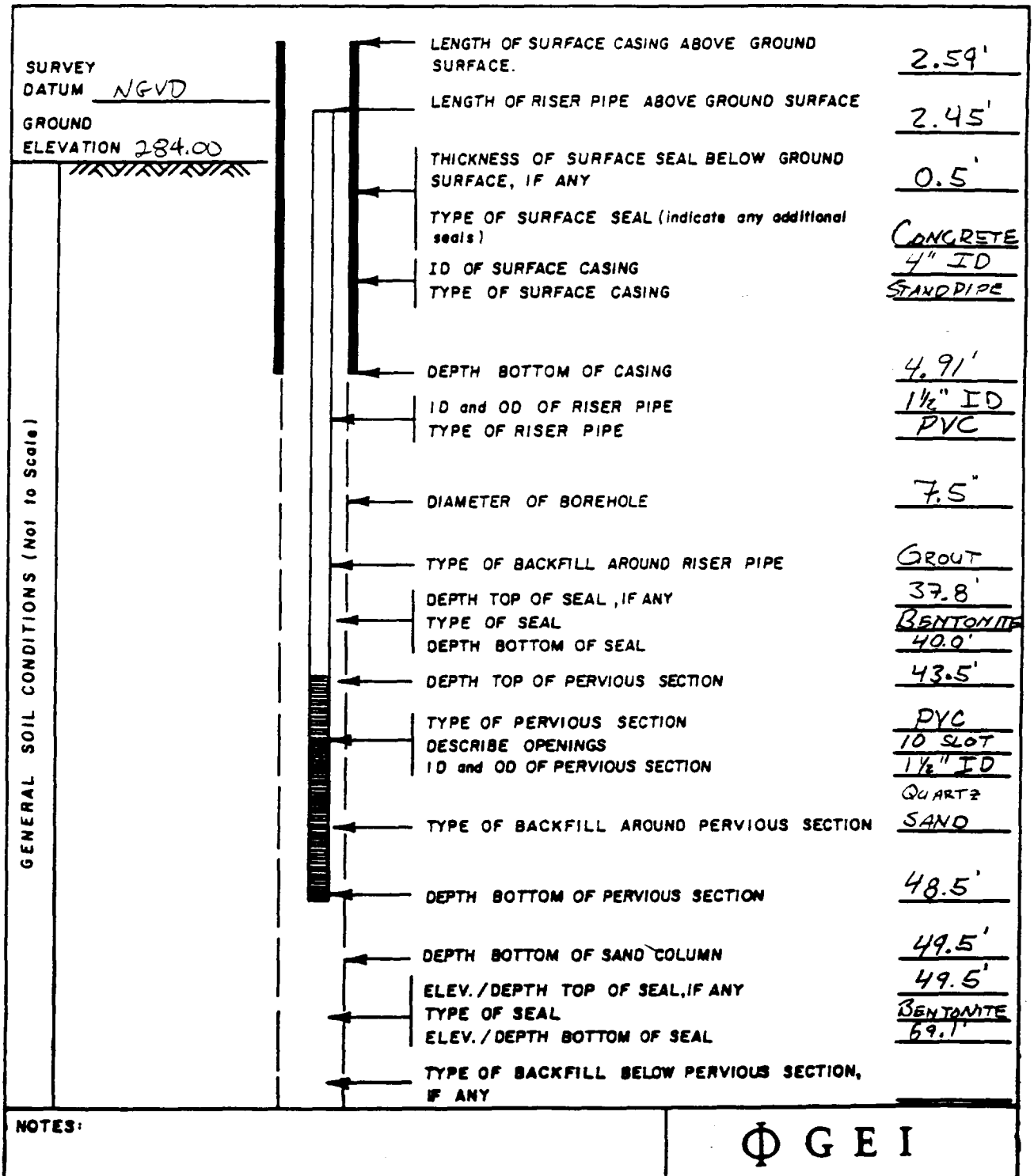
NOTES: _____

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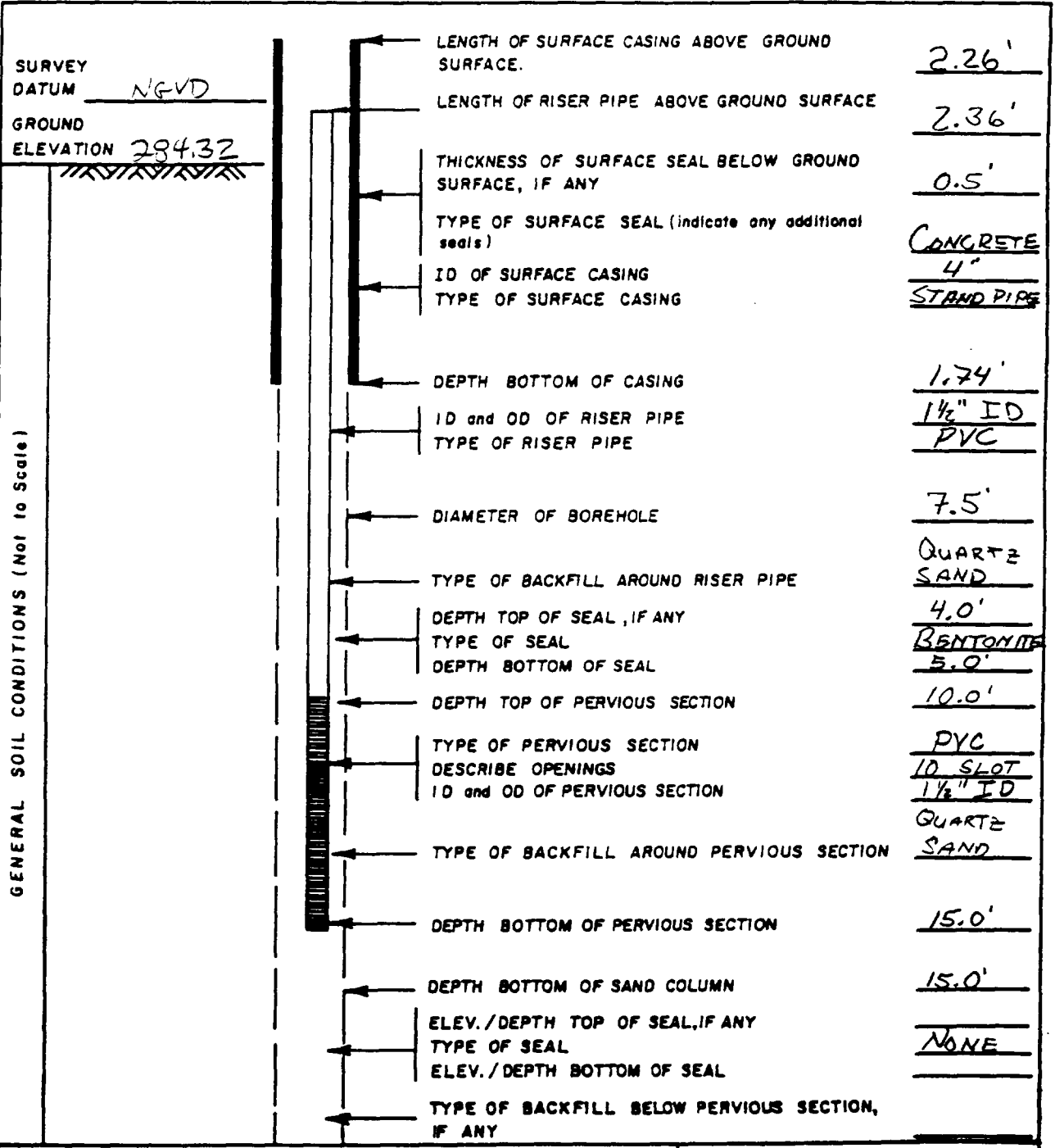
GENERAL SOIL CONDITIONS (Not to Scale)

SURVEY DATUM NGVD
GROUND ELEVATION 287.67

GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GEI 40</u>
Contractor <u>CON TEC INC.</u> Driller <u>M. POLLAND</u>	Location <u>SEE PLAN</u>
Inspected by <u>J. McLAUGHLIN</u> Date <u>5-27-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



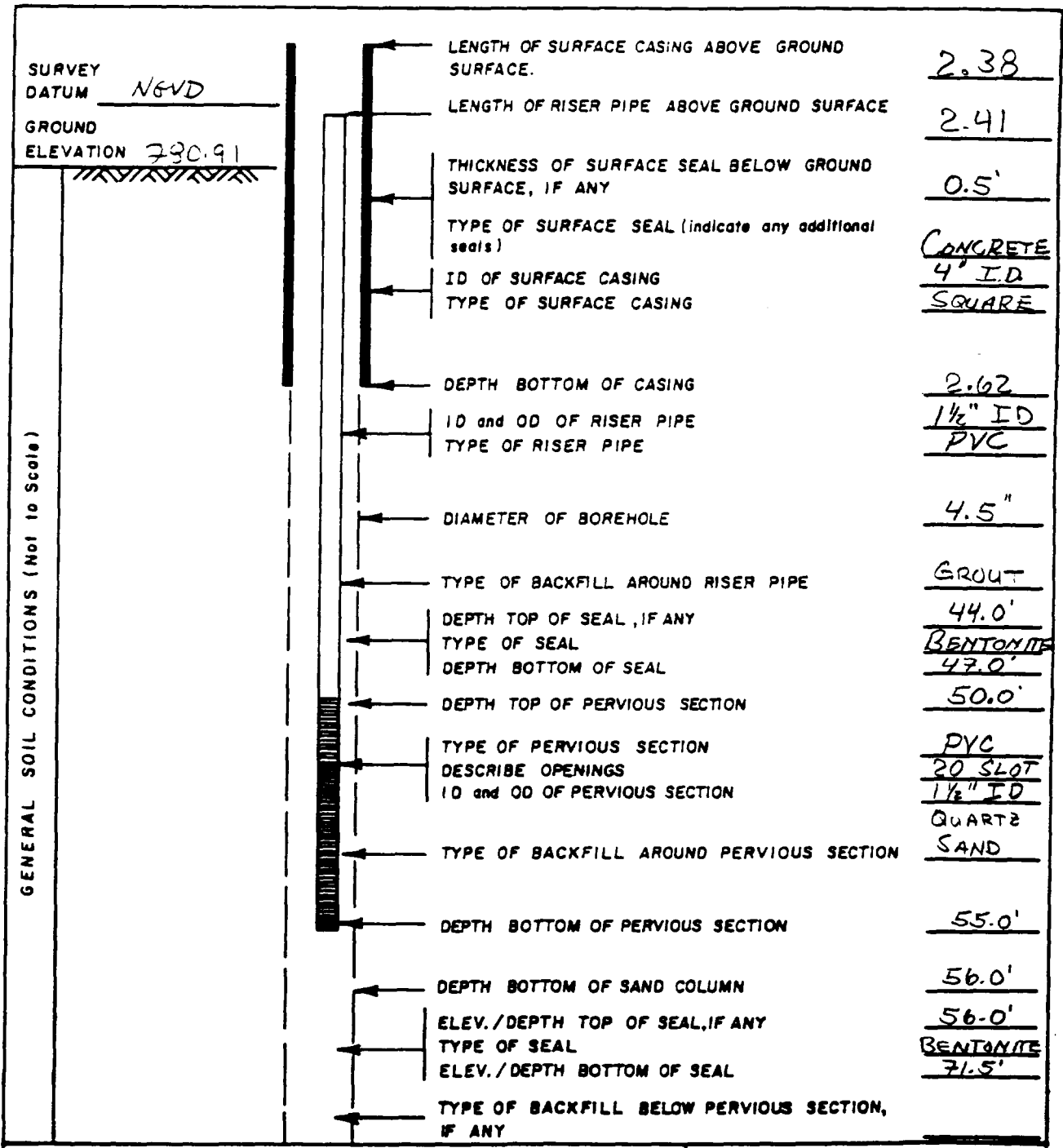
GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GEI 45</u>
Contractor <u>CON TEC INC</u> Driller <u>M. POLLAND</u>	Location <u>SEE PLAN</u>
Inspected by <u>J. Mc LAUGHLIN</u> Date <u>5-20-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



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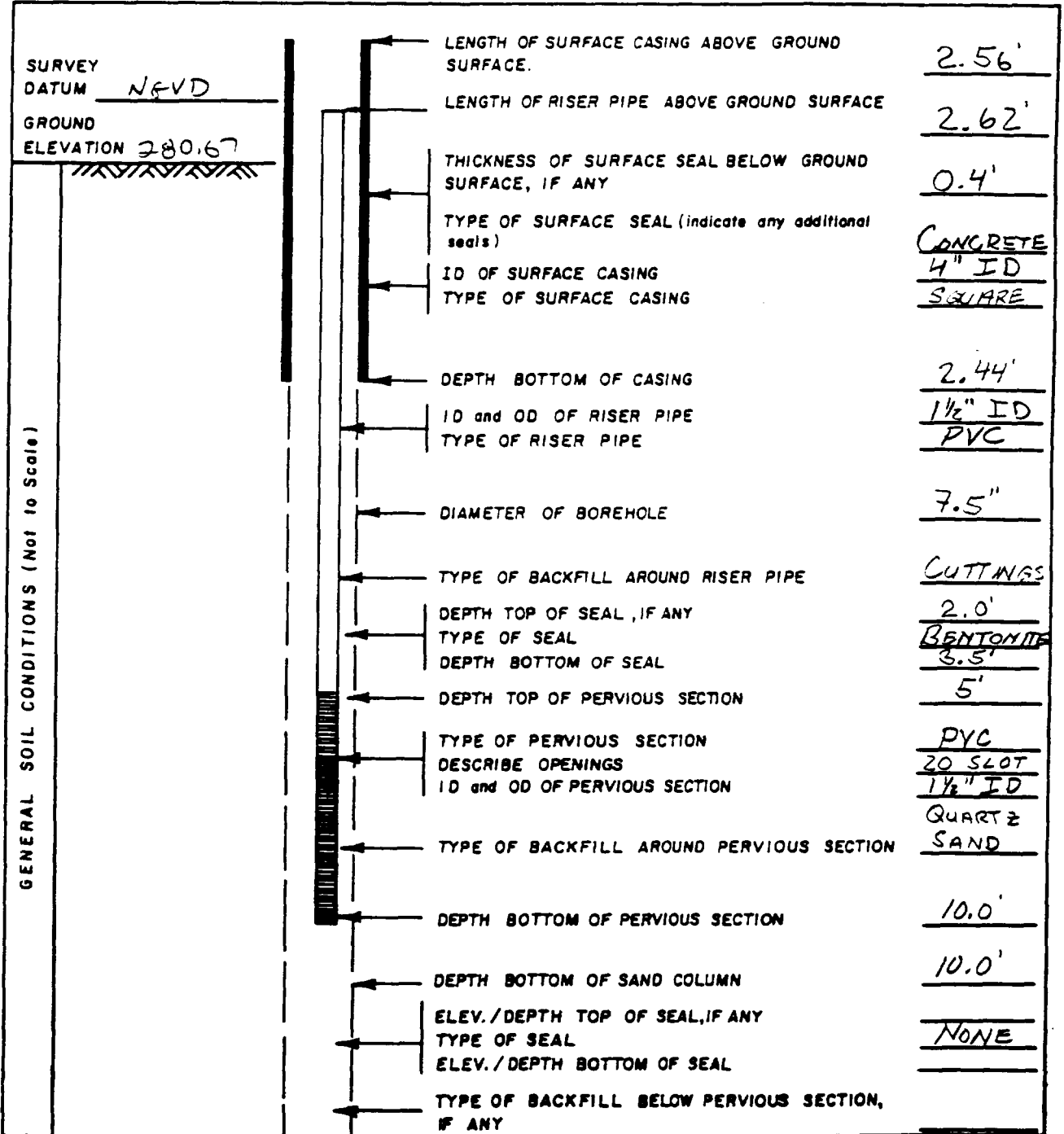
GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GEI 5D</u>
Contractor <u>GEO LOGIC</u> Driller <u>T. PAGUETTE</u>	Location <u>SEE PLAN</u>
Inspected by <u>W. HASWELL</u> Date <u>5-27-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



NOTES:

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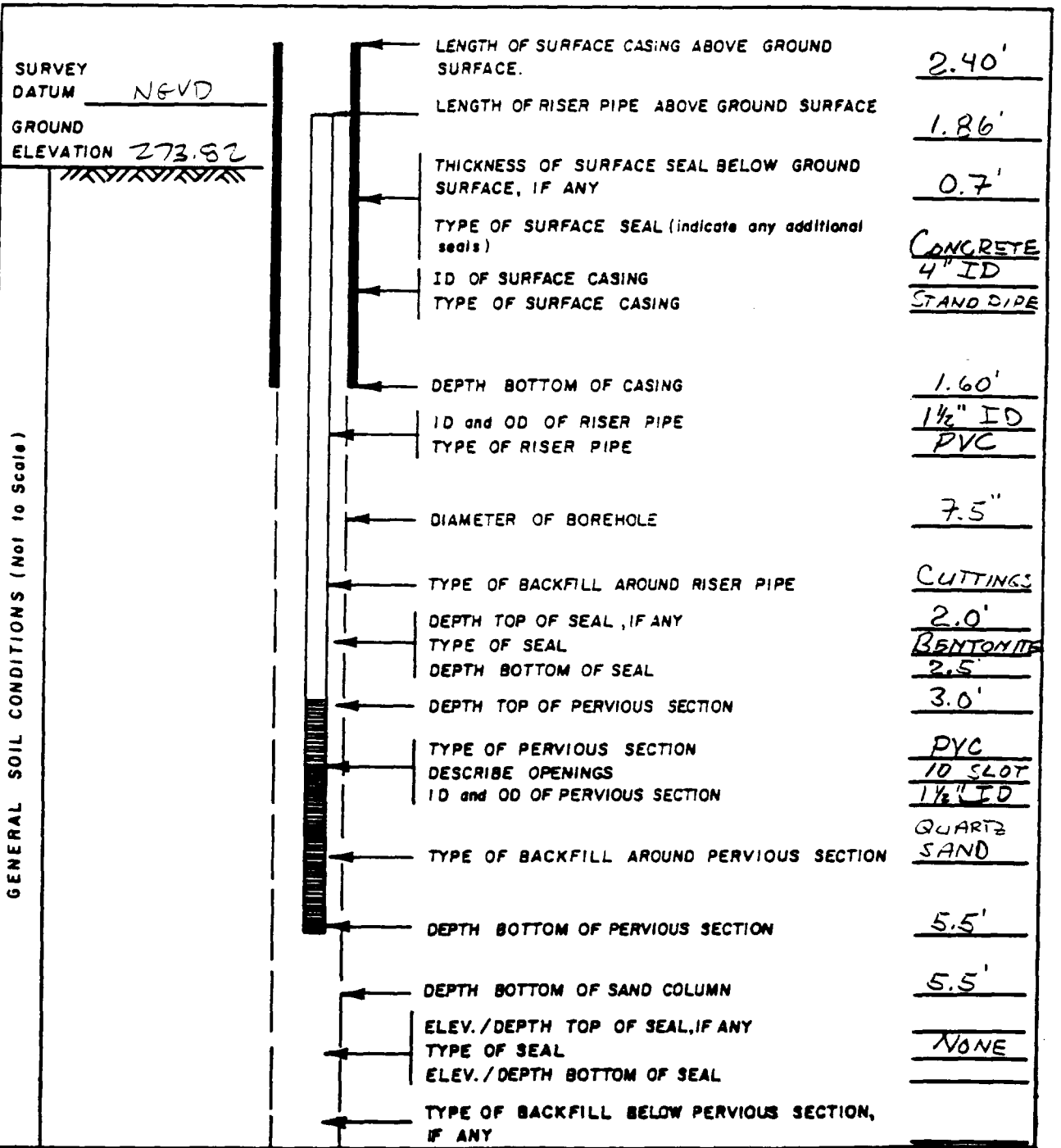
GROUNDWATER OBSERVATION WELL REPORT	
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>	
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GFI 5S</u>
Contractor <u>GEO LOGIC</u> Driller <u>T. PAQUETTE</u>	Location <u>SEE PLAN</u>
Inspected by <u>W. HASWELL</u> Date <u>5-21-92</u>	Project No. <u>92113</u>
Checked by _____ Date _____	



NOTES:

Φ G E I

GROUNDWATER OBSERVATION WELL REPORT		
Project <u>TINKHAM GARAGE SITE</u>	PG. <u>1</u> OF <u>1</u>	
Location <u>LONDONDERRY, NEW HAMPSHIRE</u>		
Client <u>CANNONS SITES GROUP</u>	Boring No. <u>GEI 8</u>	
Contractor <u>CON-TEC INC</u> Driller <u>M. POLLAND</u>	Location <u>SEE PLAN</u>	
Inspected by <u>W. HASWELL</u> Date <u>6-3-92</u>	Project No. <u>92113</u>	
Checked by _____ Date _____		



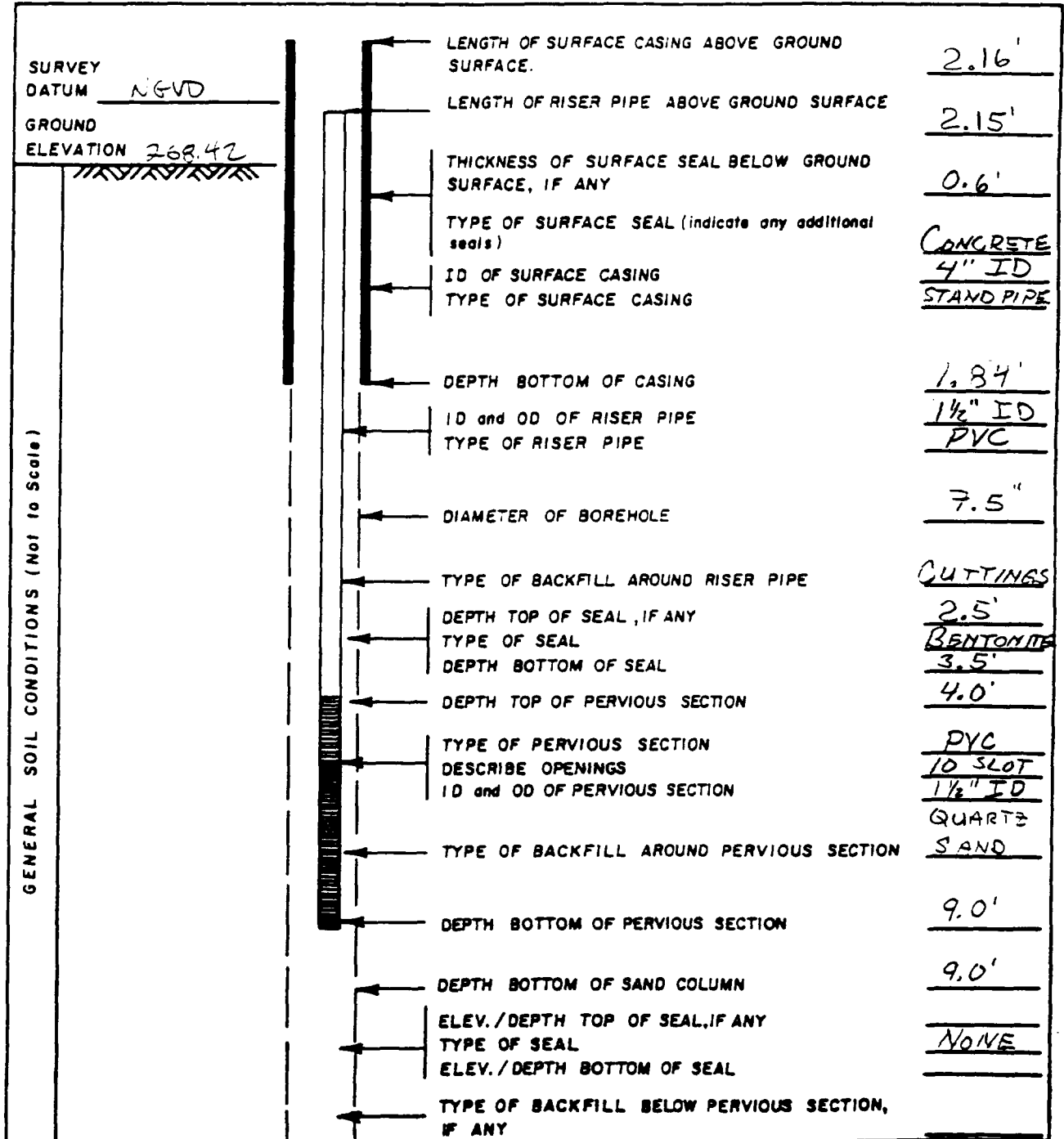
NOTES:



GROUNDWATER OBSERVATION WELL REPORT

Project TINKHAM GARAGE SITE
 Location LONDONDERRY, NEW HAMPSHIRE
 Client CANNONS SITES GROUP
 Contractor CON-TEC INC Driller M. POLLAND
 Inspected by W. HASWELL Date 6-5-92
 Checked by _____ Date _____

PG. 1 OF 1
 Boring No. GEI 10
 Location SEE PLAN
 Project No. 92113



NOTES:

Φ G E I

BORING LOCATION SEE FIGURE 2 DATE START-FINISH 5 OCT 94 - 5 OCT 94
 GROUND ELEVATION (Ft.) 277.91 DATUM NGVD DRILLED BY CAPITAL ENVIRONMENTAL DRILLING CO. INC.
 GROUND WATER EL. (Ft.) 274.29 DATE 7 OCT 94 LOGGED BY D.T. MENDHAM TOTAL DEPTH (Ft.) 12 PG. 1 OF 1

DEPTH FT	SAMPLE			SAMPLE DESCRIPTIONS	FIELD TESTS (ppm)	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.	
	TYPE & No	BLOWS 6 In	PEN IN.						REC IN.
2				NO SAMPLES TAKEN. SEE LOG CW2D FOR SAMPLE DESCRIPTION.			1.37' steel surface casing above ground surface.	2	
4							Concrete seal from 0' to 1.5'.	4	
6							Bentonite seal from 1.5' to 3.0'	6	
8							2" ID PVC well riser installed from 1.73' above ground surface to 3.0'.	8	
10							Filter sand from 2.5' to 11.5'.	10	
12							2" ID PVC 10-slot screen from 3.0' to 11'.	12	
					BOTTOM OF BORING AT 12'.			Bentonite seal from 11.5' to 12'.	

REMARKS: 1) Soil headspace vapors monitored with an RMU Photoionization Detector (PID). Values measured in parts per million (ppm).

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V - GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

TINKHAM GARAGE SITE
 MANAGEMENT OF MIGRATION
 LONDONDERRY, NEW HAMPSHIRE
 Date 10/14/94 Project 92113
 † GEI CONSULTANTS, INC.

BORING LOCATION SEE FIGURE 2 DATE START-FINISH 5 OCT 94 - 5 OCT 94
 GROUND ELEVATION (Ft.) 277.84 DATUM NGVD DRILLED BY CAPITAL ENVIRONMENTAL DRILLING CO. INC.
 GROUND WATER EL. (Ft.) 274.65 DATE 7 OCT 94 LOGGED BY D.T.MENDHAM TOTAL DEPTH (Ft.) 22

OW2D
 PG. 1 OF 1

DEPTH FT	SAMPLE			SAMPLE DESCRIPTIONS	FIELD TESTS (ppm)	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.	
	TYPE & No.	BLOWS 6 In.	PEN REC IN. IN.						
2	S1	1	24	12	S1A- (0"-6") ORGANIC SOIL, moist, black (OL/OH)	0	TOPSOIL	1.93' Steel surface casing above ground surface.	2
		3							
4	S2	4	24	2	S1B- (6"-10") Widely-graded sand with gravel, brown, slightly oxidized (SW). S1C- (10"-12") Narrowly-graded f-m sand, tan (SP). S2- Similar to S1C (SP)	0	SAND	Concrete seal 6" to 2'	4
		8							
6	S3	9	24	18	S3- Widely-graded silty-sand, trace gravel, from 4'4"-4'6" oxidized layer, 1/4" gravel layer at 4'8", grey (SW-SM).	0	v	2" ID PVC well riser from 1.83' above ground surface to 14'.	6
		13							
8	S4	9	24	7	S4- Similar to S3, but with trace rock fragment (SW-SM).	0		Native fill from 2' to 11'.	8
		13							
10	S5	9	24	20	S5- Widely-graded sand with silt, trace coarse sand, trace gravel, oxidized (SW-SM).	0			10
		13							
12	S6	3	24	20	S6- Similar to S5, from 11'1"-11'8" more compact (SW-SM).	0		Bentonite seal from 11' to 13'.	12
		17							
14	S7	16	24	16	S7A- (12'-12'3") Similar to S6 (SW-SM). S7B- (12'3"-13'1") Clayey sand, dry, layered fine sand and silty clay, very compact, low plasticity, trace gravel, grey (SC-CL).	0	DRY CLAYEY - SAND		14
		15							
16	S8	11	24	17	S7C- (13'1"-13'4") Similar to S7A, (SW-SM). S8- Widely-graded sand with gravel and silt, wet, (SW-SM).	0	SAND	Filter sand from 13' to 19.5'.	16
		14							
18	S9	13	24	17	S9- Widely-graded sand with gravel, trace angular rock fragments, trace silt, grey, (SW). S10A- (18'-19'1") Similar to S9 (SW). S10B- (19'1"-19'4") Widely-graded sand with gravel and silt, grey, 1/2" layer of silty clay at 19'1", 1" cobble at 19'3" (SW-SM).	0	TILL	2" ID PVC 10-slot screen from 14' to 19'.	18
		18							
20	S10	27	24	20	S10C- (19'4"-19'8") Similar to S7B, dry/damp (SC). S11- Similar to S10C (SC).	0	TILL? DRY - CLAYEY SAND	Bentonite seal from 19.5' to 22'.	20
		32							
22	S11	22	24	16	S11- Similar to S10C (SC).	0			22
		18							
	S12	100/1	1	1	S12- Weathered rock AUGER REFUSAL ON ROCK AT 22'	0	WEATHERED ROCK		

REMARKS: 1) Soil headspace vapors monitored with an HMu Photoionization Detector (PID). Values measured in parts per million (ppm).

TINKHAM GARAGE SITE
 MANAGEMENT OF MIGRATION
 LONDONDERRY, NEW HAMPSHIRE

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RQD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG v GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 10/13/94 Project 92113
 GEI CONSULTANTS, INC.

BORING LOCATION SEE FIGURE 2 DATE START-FINISH 6 OCT 94 - 6 OCT 94
 GROUND ELEVATION (Ft.) 283.21 DATUM NGVD DRILLED BY CAPITAL ENVIRONMENTAL DRILLING CO., INC
 GROUND WATER EL. (Ft.) 280.76 DATE 7 OCT 94 LOGGED BY D.T. MENDHAM TOTAL DEPTH (Ft.) 7.0 PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	FIELD TESTS (ppm)	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS 6 In.	PEN IN.	REC IN.					
2	S1	2	24	11	S1A-(0"-4") ORGANIC SOIL (OL/OH)	0	TOPSOIL	2.75' steel surface casing above ground surface	2
		1			S1B-(4"-7") Narrowly-graded, mostly fine to medium sand, brown (SP).		SAND		
4	S2	17	14	10	S1C-(7"-11") Widely-graded sand with gravel, brown, moist (SW).	0		Concrete seal 0"-9".	4
		21			S2-Similar to S1C with occasional cobbles (SW).				
6	S3	6	24	16	S3-Widely-graded sand with silt and gravel, very compact, very thin oxidized layers throughout, occasional cobbles, brown, wet (SW-SM).	0	TILL	2" ID PVC well riser installed from 2.67' above ground surface to 2'.	6
		9			S4A-(6'-6'10") Similar to S3, more oxidized at the bottom.	0			
8	S4	13	23	18	S4B-(6'10"-7'6") Widely-graded gravel with silt and sand, broken weathered rock, highly oxidized, rust-brown, (GW-GC).			Bentonite seal from 9" to 1.5'.	8
		68			Auger refusal on rock at 7'6".				
		100/5						Filter sand from 1.5' to 6.5'.	
								2" ID PVC 10 slot screen from 2' to 6'	
								Filter sand from 6' to 6.5'.	
								Bentonite seal from 6.5 TO 7.5'.	

REMARKS: 1) Soil headspace vapors monitored with an HNu Photoionization Detector (PID). Values measured in parts parts per million (ppm).

TINKHAM GARAGE SITE
 MANAGEMENT OF MIGRATION
 LONDONDERRY, NEW HAMPSHIRE

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 RGD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG \checkmark GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 10/13/94 Project 92113

GEI CONSULTANTS, INC

BORING LOCATION SEE FIGURE 2 DATE START-FINISH 6 OCT 94 - 6 OCT 94 OW3
 GROUND ELEVATION (Ft.) 257.76 DATUM NGVD DRILLED BY CAPITAL ENVIRONMENTAL DRILLING CO. INC.
 GROUND WATER EL. (Ft.) 257.51 DATE 7 OCT 94 LOGGED BY D.T.MENDHAM TOTAL DEPTH (Ft.) 12 PG. 1 OF 1

DEPTH FT	SAMPLE				SAMPLE DESCRIPTIONS	FIELD TESTS (ppm)	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No	BLOWS 6 in	PEN IN.	REC IN.					
2	S1	1/24	24	7	S1A- (0"-5") ORGANIC SOIL, black, wet (OL/OH). <u>V</u>	0	TOPSOIL	2.85' Steel surface casing above ground surface.	2
					S1B- (5"-7") Widely graded sand, grey-brown (SW).		SAND		
4	S2	6 6 7 7	24	16	S2A- (2'-2'5") Widely-graded sand, brown, (SW) with 1/2" layers of narrowly-graded fine sand with silt (SP-SM).	0		Concrete seal from 0' to 1.5'.	4
					S2B- (2'5"-3'4") Narrowly-graded fine sand, grey (SP).				
6	S3	1 2 5 6	24	16	S3A- (4'-4'5") Similar to S2B (SP).	0		Bentonite seal from 1.5' to 2.5'.	6
					S3B- (4'5"-5') Widely-graded sand with gravel (SW).				
8	S4	2 8 13 19	24	15	S3C- (5'-5'4") Narrowly-graded fine sand, oxidized, trace coarse sand (SP).	0		2" ID PVC well riser installed from 2.75' above ground surface to 3'.	8
					S4A- (6'-6'4") Widely-graded sand with gravel grey-brown (SW).				
10	S5	19 14 10 12	24	12	S4B- (6'4"-7'3") Narrowly-graded fine sand with gravel and silt, grey-tan, top 2" oxidized, trace cobbles (SP-SM).	0		Filter sand from 2.5' to 12'.	10
					S5A- (8'-8'2") Narrowly-graded med sand, brown (SP).				
12	S6	8 4 3 2	24	10	S4C- (5'-5'4") Narrowly-graded fine sand, oxidized, trace coarse sand (SP).	0	TILL	2" ID PVC 10-slot screen from 3' to 12'.	12
					S6- Narrowly-graded fine-med sand similar to S5B, coarsens downward (SP).				
BOTTOM OF BORING AT 12'.									

REMARKS: 1) Soil headspace vapors monitored with an HNu Photoionization Detector (PID). Values measured in parts per million (ppm).

TINKHAM GARAGE SITE
 MANAGEMENT OF MIGRATION
 LONDONDERRY, NEW HAMPSHIRE

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG V GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

Date 10/14/94 Project 92113
 † GEI CONSULTANTS, INC.

BCRING LOCATION SEE FIGURE 2 DATE START-FINISH 7 OCT 94 - 7 OCT 94
 GROUND ELEVATION (Ft.) _____ DATUM _____ DRILLED BY CAPITAL ENVIRONMENTAL DRILLING CO. INC.
 GROUND WATER EL. (Ft.) _____ DATE _____ LOGGED BY D.T. MENCHAM TOTAL DEPTH (Ft.) 25.5 PG. 1 OF 1

DEPTH FT.	SAMPLE				SAMPLE DESCRIPTIONS	FIELD TESTS (ppm)	STRATUM DESCRIP.	EQUIPMENT INSTALLATION	DEPTH FT.
	TYPE & No.	BLOWS 6 In.	PEN IN.	REC IN.					
4					NO SAMPLES TAKEN. SEE MALCOM PIRNIE MP-1-3S LOG (11/24/87) FOR SAMPLE DESCRIPTION.			2.0' Steel surface casing above ground surface.	4
8								Concrete seal from 1' to 2.5'.	3
12								2" ID PVC well riser installed from 1.64' above ground surface to 3.0'.	12
16					BEDROCK AT 12'. ROLLER-BIT 12' TO 15.5'. CORED 15.5' TO 25.5'.		BEDROCK	Native fill from 2.5' to 11.0'.	16
20								Bentonite seal from 11' to 14'.	20
24								2" ID PVC 10-slot screen from 14.5' to 24.5'.	24
28					BOTTOM OF HOLE AT 25.5'.			Filter sand from 14' to 25'.	28
								Bentonite seal from 25' to 25.5'.	

REMARKS: 1) Soil headspace vapors monitored with an HNu Photoionization Detector (PID). Values measured in parts per million (ppm).

BLOWS PER 6" - 140 LB HAMMER FALLING 30" TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER
 PEN - PENETRATION LENGTH OF SAMPLER OR CORE BARREL REC - RECOVERY LENGTH OF SAMPLE
 ROD - LENGTH OF SOUND CORES > 4" + LENGTH CORED, % S - SPLIT SPOON SAMPLE
 U - UNDISTURBED SAMPLE UF - FIXED PISTON UO - OSTERBERG Y - GROUND WATER
 BOUNDARIES BETWEEN STRATA ARE APPROXIMATE ONLY.

TINKHAM GARAGE SITE
 MANAGEMENT OF MIGRATION
 LONDONDERRY, NEW HAMPSHIRE
 Date 10/14/94 Project 92113
 GEI CONSULTANTS, INC.

APPENDIX B

Health and Safety Plan

**DRAFT INTERIM MANAGEMENT OF MIGRATION WORK PLAN
SAMPLING AND ANALYSIS PLAN - VOLUME I
FIELD SAMPLING PLAN**

**APPENDIX B
HEALTH AND SAFETY PLAN**

**Tinkham Garage Site
Londonderry, New Hampshire**

Prepared for:

THE CANNONS SITES GROUP

Submitted by:

GEI CONSULTANTS, INC.

**53 Regional Drive
Concord, New Hampshire
(603) 224-7979**

**Revision 1
Project 92113
March 8, 1995**

TABLE OF CONTENTS

**TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES**

	Page No.
1. Purpose	1
2. Summary and Personnel	1
3. Site Characterization	2
3.1 Background Information	2
3.2 Hazard Evaluation	2
4. Field Activities	5
5. Personnel Protection Requirements	6
6. Emergency Information	10

**TABLES
FIGURES**

LIST OF TABLES

- 1 - Chemical Contaminants of Concern - Physical Characteristics
- 2 - Chemical Contaminants of Concern - Exposure and First Aid
- 3 - Personnel Training and Medical Monitoring

LIST OF FIGURES

- HS1 - Site Location Map
- HS2 - Approximate Source Area Location
- HS3 - Route to Hospital

HEALTH AND SAFETY PLAN

1. Purpose

The objective of this Site-Specific Health and Safety Plan is to establish the procedures, personnel responsibilities, and training necessary to protect the health and safety of on-site personnel during performance of Management of Migration (MOM) field activities. This plan provides information for routine field activities and for unexpected site emergencies. The information in this HASP has been developed in general accordance with applicable standards and is, to the extent possible, based on previous site studies and information. The HASP will be updated as needed to reflect changes in the scope of work and site conditions.

2. Summary and Personnel

Site Name: Tinkham Garage site (site)

Site Address: Street: Route 102
City: Londonderry
State: New Hampshire

Proposed Site

MOM Activities: Ground water quality sampling;
Water level monitoring;
Monitoring well installation;
Monitoring well rehabilitation; and
Wetland observation well installation.

Proposed Date of Work: March 1994 - August 1996

Client Contact: Ms. Diane Leber, Project Coordinator
The Cannons Sites Group

Site Contact: Ms. Judy Tinkham

GEI Project Manager: Mr. Robert A. Mullin, P.E.

GEI Corporate Health and Safety Officer: Ms. Loretta M. Sanford

GEI Site Safety Officer: assigned by the GEI Project Manager

3. Site Characterization

3.1 Background Information

The site is listed by the U.S. EPA on the National Priorities List (Superfund). The site has undergone numerous investigations since the mid-1980's and consists of 375 acres partially developed for residential single family homes and condominium use. The undeveloped areas of the site consist of wooded areas, open fields, and wetlands. VOCs were discharged to the ground at four locations resulting in contaminated soils and ground water. RI/FS was performed in 1986. This site is currently entering the remedial actions phase. Contaminated soils on-site have been consolidated in a secure area of approximately 1 acre behind the Tinkham Garage.

GEI will be performing the Management of Migration (MOM) scope of work for the site. Tasks will include site-wide quarterly sampling of overburden and bedrock wells, monthly monitoring of water levels in site-wide wells, and possibly oversight for the installation and/or rehabilitation of monitoring wells. Wells to be sampled will include several wells near to but not directly within the consolidated contaminated soils Source Control remedial area (Garage soils area). Monitoring of discharges of ground water from recovery/treatment systems at the site may be performed either by GEI or the Town of Londonderry Board of Sewer Commissioners.

In June of 1994, recent Total VOC concentrations in shallow ground water within the Garage soils area ranged from 150 to 1,854 ug/l. The highest Total VOC level reported in shallow ground water downgradient of the Garage soils area was 9,096 ug/l (FW11; 07/83). The historical Maximum Total VOC level found in site bedrock ground water was approximately 16,000 ug/l (ERT-06; 07/83). VOCs found include BTEX compounds, vinyl chloride, tetrahydrofuran, MIBK, methylene chloride, TCE, PCE, and other chlorinated VOCs.

3.2 Hazard Evaluation

Perimeter Establishment:

Map/Sketch Attached: See Figures HS-1 and HS-2

Perimeter Identified: The site is generally bounded by State Route 102 to the north, Gilcrest Road to the east, Ross Drive to the south, and the Woodland Village Condominium complex to the west. The contaminated soils have been consolidated within a fenced and secure area behind the garage.

Site Status: Inactive

Waste Types: Contaminated ground water; contaminated soil cuttings; and investigation derived wastes.

Refer to Tables 1 and 2 for listing of chemicals of concern.

Known or Suspected Hazardous/Toxic Materials: Volatile organic compounds (VOCs) in soil and ground water.

The primary toxic concern at the Site is exposure to VOCs and their vapors. With the exception of drilling activities, the potential for GEI personnel encountering soil containing VOCs is currently low for the site. To reduce the likelihood of being exposed to VOC-contaminated soils, efforts should be made to avoid disturbing soils unnecessarily. Most of GEI's work will be conducted outside of the "1 ppm source area" near the Tinkham garage.

Exposure to hazards from chemicals during field activities are most likely to occur by one or more of the following:

1. Direct contact with contaminated subsurface soils or ground water;
2. Inhalation of volatile organic compound vapors while performing sampling or subsurface explorations.

Toxic and Pharmacological Effects: Refer to the NIOSH Guide to Chemical Hazard. Acute exposure to VOCs may result in dizziness or nausea. A summary of NIOSH information concerning VOCs present at the site is provided in Tables 1 and 2. The results of chronic exposure may include, but are not limited to, central nervous system depression, liver and

kidney damage, and irritation of skin, eyes, and respiratory passages. Many VOCs are known or suspected carcinogens. Routes of exposure include inhalation, topical, and ingestion.

Heat Stress Guidelines: attached.

Cold Stress Guidelines: attached

POTENTIAL HAZARDS

Potential Site Hazards

The potential hazards including physical, chemical and biological hazards associated with the Site can cause injury or illness of site personnel. The following table identifies the potential hazards and control measures used to reduce the risk of illness or injury.

Potential Hazards	Control Measures
Chemical Hazards	Monitoring/personnel protection equipment
Physical Hazards - Slip/Trip/Fall	Safe Work Practices (see attached guidelines)
Temperature Stress	Acclimatization, work/rest regimes, drinking fluids (see attached guidelines)
Biological Hazards i.e., ticks, bacteria, poison ivy	Proper clothing, inspect repellent, disinfectant solution, barrier solutions.

4. Field Activities

Borings may be advanced and monitoring wells and/or water table observation wells installed during the MOM monitoring program. Existing monitoring wells may be identified for rehabilitation to increase the percent of open well. Water used in advancing borings or rehabilitating wells will consist of potable water. All borings will be performed in areas outside of the identified source area. However, the well installation/rehabilitation may be performed at locations with known concentrations of VOCs in ground water. The number and occasions of drilling operations will be few at this point in the site's remediation. Work plans for drilling and/or rehabilitation operations will address the specific hazards associated with the proposed locations and activities before they are performed by GEI or its subcontractors.

Site-wide sampling and monitoring of ground water will be frequently performed for the MOM remedy. Wells will be opened, developed by pumping or bailing and sampled. Ground water in the wells monitored in the MOM programs will be both free-of and contaminated-with VOCs. GEI sampling teams will be provided with the most recent Total VOC concentration and speciated-VOC results for every well to be sampled prior to beginning each sampling event. GEI sampling teams will frame their field activities as appropriate based on the most recent information for site conditions. GEI sampling teams will be cautioned that prior site conditions or hazard evaluations are not to be expected or assumed in their approach to safe working practices.

The following physical hazards may exist:

- Exposure to ambient on-site conditions (VOC vapors in soil or ground water);
- Dermal contact with contaminated water and soil during boring operations;
- Dermal contact with decontamination materials;
- Exposure to the elements (weather); and
- Fatigue.

Potential Activities Hazards

Activity	Hazards
Surface water sampling	Contaminant contact, Vapor inhalation, Splash hazard, Biological hazards, Engulfment/drowning
Well Development	Splash Hazard, Contaminant contact, Vapor Inhalation
Water Level Measurements	Contaminant contact, Vapor Inhalation
Groundwater Sampling	Contaminant contact, Vapor Inhalation
Drill Rig Operations	Contaminant contact, vapor inhalation, Overhead hazards, Noise

5. Personnel Protection Requirements

Recommended Initial Level(s) of Protection: **Level D**

On-site personnel will use Level D personnel protection during all field activities.

Protective Clothing

Sampling personnel in these areas will wear:

- Hard hat and hearing protection where working within 50 feet of heavy equipment;
- Work boots;
- Work clothes or coveralls;
- Chemical protective gloves when handling soils or in contact with water;
- Safety glasses or eyeglasses for splash protection.

PERSONNEL PROTECTION

Activity	Protective Clothing
Surface water sampling	Chemical resistant gloves and boots, safety glasses (Tyvek optional)
Well development	Chemical resistant gloves and boots, safety glasses (Tyvek optional)
Water level measurements	Chemical resistant gloves, safety glasses
Groundwater Sampling	Chemical resistant gloves and boots, safety glasses, (Tyvek optional)
Drill Rig Operations	Hard hat, hearing protection, safety glasses, chemical resistant gloves and boots (steel-toed), work gloves
Protective equipment for biological hazards shall include disinfectant soap solution, insect/tick repellent, and poison ivy cleanser. Sampling may require the use of hip waders and/or personnel flotation devices (PFDs) when wading in water greater than 1-1/2 deep foot.	

Site Monitoring Equipment:

Total VOC meters with Photoionization Detector (PID). The PID has the ability to detect organic vapor concentrations from 1 part per million (ppm) to 1,000 ppm. All PID monitoring shall be conducted in the general work zone and in the breathing zone. The levels indicated from air monitoring provide basis for the level of respiratory protection required.

Monitoring Frequency:

Monitoring with the PID shall be conducted initially, during any change in conditions, and half-hourly during sampling activities, or as otherwise specified in the MOM planning documents.

Health and Safety Action Levels

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants indicated by air monitoring. If concentration of contaminants indicated on direct reading equipment exceed the action levels identified in the following table then personnel shall upgrade to respiratory protection or evacuate the work area. Respiratory protection shall consist of full-faced air purifying respirators equipped with organic vapor/ acid gas combination cartridges with attached HEPA filter. In addition to action levels an upgrade to respiratory protection is required if:

- Any symptoms occur, described in Chemical Hazard Data Table
- Requested by an individual performing the task.
- Any irritation to eye, nose, throat, or skin occurs.

A work stoppage and evacuation (cease and desist) at the specific work area is required if:

- Activities are conducted in areas of confined or enclosed spaces.
- Odors are detected while wearing air-purifying respirators.
- An individual requests a work stoppage for safety considerations.

MONITORING EQUIPMENT AND ACTION LEVELS			
Contaminant	Equipment	Action Level*	Contingency
Organic Vapors	PID	Greater than 5 ppm	Respirator-APR
Organic Vapors	PID	Greater than 25 ppm	Evacuate Area

*Action levels are based on reading sustained for greater than 2 minutes.

Contingencies:

If site conditions suggest the existence of a situation more hazardous than anticipated, the site personnel shall evacuate the area. The hazard and the level of protection shall then be reevaluated with the assistance and approval of the safety officer and project manager.

Decontamination: Decontamination zones will be established such that personnel and equipment are fully decontaminated prior to leaving the area. Wash gloves, and coveralls, remove coveralls, remove outer gloves, wash inner gloves, remove respirator (if applicable), remove inner gloves. **Wash hands and arms immediately after operations with disinfectant solution.** Wash face and hands with anti-bacterial soap. All decontamination-derived wastes are placed in plastic bags and disposed of at Garage soils area waste management stations.

Site control:

Buddy System: GEI personnel should be in line-of-site or communication contact with another on-site person. The other on-site personnel should be aware of their role as a "buddy" and be able to provide assistance in the event of an emergency.

6. Emergency Information

EMERGENCY INFORMATION	
Important Phone Numbers	Directions to Hospital
Local Police (603)432-1111	East on Rt. 102. Go over Rt. 93 and into downtown Derry. At the third light, turn right onto Birch St. Parkland Medical Center is approximately 1.0 miles down Birch St. on the left. (Figure HS-3)
State Police (800)852-3411	
Fire Department (603)432-1122	
Ambulance (603)432-1122	
Local Hospital (603)432-1500	
Safety Specialist (617)721-4023 work Loretta Sanford (508)433-5368 home	
Project Manager (603)224-7979 Robert Mullin (603)898-9033	
Client Contacts	
Diane Leber (203)791-0234	
Mike Walters (617)386-0875	
Nearest Telephone Location: Route 102 businesses	

All personnel working at this site have received OSHA required health and safety training. Personnel are enrolled in a medical monitoring program. A summary of completed training and dates of medical monitoring is presented in Table 3.

TABLE 1 - CHEMICAL CONTAMINANTS OF CONCERN -
 PHYSICAL CHARACTERISTICS
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	TLV PEL	IDLH	Physical Characteristics	Incompatibles
Vinyl Chloride	1	Ca	colorless gas	copper oxidizing mater
Chloroethane	1,000	20,000	colorless liquid or gas with pungent, ether-like odor	chemically active met Na, K, Ca, powdered A
1,1 Dichloro- ethane	100	4,000	colorless liquid with chloroform-like odor	strong oxidizers and caustics
1,2 Dichloro- ethylene	200	4,000	colorless liquid with an ether-like slightly acid odor, like chloroform	strong oxidizers
Benzene	10	Ca	colorless liquid with an aromatic odor	strong oxidizers, Cl, with Fe
Toluene	200	2,000	colorless liquid with an aromatic odor like benzene	strong oxidizers
Ethyl benzene	100	2,000	colorless liquid with an aromatic odor	strong oxidizers

TABLE 1 - CHEMICAL CONTAMINANTS OF CONCERN -
 PHYSICAL CHARACTERISTICS
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	TLV PEL	IDLH	Physical Characteristics	Incompatibles
Vinyl Chloride	1	Ca	colorless gas	copper oxidizing materials
Chloroethane	1,000	20,000	colorless liquid or gas with pungent, ether-like odor	chemically active metals, Na, K, Ca, powdered Al
1,1 Dichloro- ethane	100	4,000	colorless liquid with chloroform-like odor	strong oxidizers and caustics
1,2 Dichloro- ethylene	200	4,000	colorless liquid with an ether-like slightly acid odor, like chloroform	strong oxidizers
Benzene	10	Ca	colorless liquid with an aromatic odor	strong oxidizers, Cl, Br with Fe
Toluene	200	2,000	colorless liquid with an aromatic odor like benzene	strong oxidizers
Ethyl benzene	100	2,000	colorless liquid with an aromatic odor	strong oxidizers

TABLE 1 - CHEMICAL CONTAMINANTS OF CONCERN -
 PHYSICAL CHARACTERISTICS
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	TLV PEL	IDLH	Physical Characteristics	Incompatibles
Tetrahydrofuran (THF)	200	20,000	colorless liquid with an ether-like odor	strong oxidizers
Methyl Isobutyl Ketone (MIBK) (4-methyl 2-pentanone)	100	3,000	colorless liquid with a pleasant odor	strong oxidizers
Xylenes	100	1,000	colorless liquids with aromatic odors	strong oxidizers
Acetone	1,000	20,000	colorless liquid with a fragrant, mint-like odor	oxidizing materials, acids
Chloroform	50	Ca	colorless liquid with a pleasant, sweet odor	strong caustics, chemically active metals
Tetrachloroethylene	100	Ca	colorless liquid with an odor like ether or chloroform	strong oxidizers, chemically active metals, e.g., Ba, Li, Be

TABLE 1 - CHEMICAL CONTAMINANTS OF CONCERN -
 PHYSICAL CHARACTERISTICS
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	TLV PEL	IDLH	Physical Characteristics	Incompatibles
1,1,1-Trichloro-ethane	350	1,000	colorless liquid with a mild, chloroform-like odor	strong caustics, strong oxidizers, chemically active metals
Trichloroethylene	100	Ca	colorless liquid, unless dyed, with a sweet odor like chloroform	strong caustics and oxidizers, chemically active metals
Styrene	100	5,000	colorless liquid with a sweet, aromatic odor at lower concentrations, sharp disagreeable odor at higher concentrations	oxidizers, catalysts for vinyl polymers, peroxides, strong acids, aluminum chloride
Methylene Chloride	500	Ca	colorless liquid with a chloroform-like odor	strong oxidizers and caustics, chemically active metals, e.g., Al, Mg powders, Na, K
Methyl Ethyl Ketone (MEK) (2-Butanone)	200	3,000	clear, colorless liquid a fragrant, mint-like moderately sharp odor	very strong oxidizers

TABLE 1 - CHEMICAL CONTAMINANTS OF CONCERN -
PHYSICAL CHARACTERISTICS
Tinkham Garage Site
Londonderry, New Hampshire

Page 4 of 4

Notes:

Information compiled from "NIOSH Pocket Guide to Chemical Hazards," Department of Health and Human Services, February 1987.

- Ca - known or potential human carcinogen.
- TLV - threshold limit value.
- PEL - permissible exposure limit.
- IDLH - immediately dangerous to life or health.

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TABLE 2 - CHEMICAL CONTAMINANTS OF CONCERN -
 EXPOSURE AND FIRST AID
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	Route of Exposure	Symptoms of Acute Exposure	First Aid
1,2 Dichloro-ethylene	Inh Ing Con	irrit eyes, resp sys, CNS depression	eye: irr immed skin: soap wash promptly breath: art resp swallow: medical attention immed
Benzene	Inh Abs Ing Con	irrit eyes, nose, resp sys; giddy; head; nau; staggered gait; ftg; anor, lass; dermat; bone marrow depres; abdom pain	eye: irr immed skin: soap wash promptly breath: art resp swallow: medical attention immed
Trichloroethylene	Inh Ing Con	head, vertigo, vis dist tremors, somnolence, nau, vomit, irrit eyes, dermat; card arrhy; pares; [carc]	eye: irr immed skin: soap wash promptly breath: art resp swallow: medical attention immed
1,1,1-trichloro-ethane	Inh Ing Con	head, lass, CNS depress, poor equi, irrit eyes, dermat, card arrhy	eye: irr immed skin: soap wash promptly breath: art resp swallow: medical attention immed

TABLE 2 - CHEMICAL CONTAMINANTS OF CONCERN -
 EXPOSURE AND FIRST AID
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	Route of Exposure	Symptoms of Acute Exposure	First Aid
Tetrachloro-ethylene	Inh Ing Con	irrit eyes, nose, throat, nau; flush face, neck; vertigo, dizz, inco; head; som; eryt; [carc]	eye: irr immed skin: soap wash promptly breath: art resp swallow: medical attention immed
Styrene	Inh Ing Con	irrit eyes, nose; draw, weak, unsteady gait; narco; defetting derm	eye: irr immed skin: water flush breath: art resp swallow: medical attention immed
Tetrahydrofuran	Inh Con Ing	irrit eyes, upper resp; nau; dizz; head	eye: irr immed skin: water flush promptly breath: art resp swallow: medical attention immed
Chloroethane	Inh Abs Ing Con	inco, inebriate; abdom cramps, card arrhy, card arrest; liver, kidney damage	eye: irr immed skin: water flush promptly breath: art resp swallow: medical attention immed

TABLE 2 - CHEMICAL CONTAMINANTS OF CONCERN -
 EXPOSURE AND FIRST AID
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	Route of Exposure	Symptoms of Acute Exposure	First Aid
Acetone	Inh Ing Con	irrit eyes, nose, throat head, dizz, derm	eye: irr immed skin: wash immed breath: art resp swallow: medical attention immed
2-butanone	Inh Ing Con	irrit eyes, nose, head dizz, vomit	eye: irr immed skin: wash immed breath: fresh air swallow: medical attention immed
Toluene	Inh Abs Ing Con	ftg, weak; conf, suph, dizz, head; dil pup, lac ner, musc ftg; insom; pares; derm; narco, coma	eye: irr immed skin: wash immed breath: art resp swallow: medical attention immed
Ethyl benzene	Inh Ing Con	irrit eyes, muc memb; head, derm, narc, coma	eye: irr immed skin: wash immed breath: art resp swallow: medical attention immed

TABLE 2 - CHEMICAL CONTAMINANTS OF CONCERN -
 EXPOSURE AND FIRST AID
 Tinkham Garage Site
 Londonderry, New Hampshire

Contaminant	Route of Exposure	Symptoms of Acute Exposure	First Aid
Total Xylenes	Inh Abs Ing Con	dizz, excitement, drow inco, staggering gait, irrit eye, nose, throat, meal vacuolization; anor, nau, vomit, abdom pain, derm	eye: irr immed skin: wash immed breath: art resp swallow: medical attention immed
Dichloroethane	Inh Ing Con	CNS depres; skin irrit, drow; unconscious; liver, kidney damage	eye: irr immed skin: wash breath: art resp swallow: medical attention immed
Vinyl Chloride	Inh	weak, abdom pain, GI bleeding, hematomegaly pal or cyan of extem, [carc]	breath: art resp
Chloroform		dizz, mental dullness; nau; head; ftg; anes; hepatomegaly; eye; skin, irr; [carc]	eye: irr immed skin: wash breath: art resp swallow: medical attention immed
Methylene Chloride	Inh Ing Con	irrit eyes, nose, throat, cough, plum secretions; chest pain, dysp, asthma	skin, CVS, eyes, CNS

TABLE 2 - CHEMICAL CONTAMINANTS OF CONCERN -
EXPOSURE AND FIRST AID
Tinkham Garage Site
Londonderry, New Hampshire

Page 5 of 5

Notes:

Information compiled from "NIOSH Pocket Guide to Chemical Hazards," Department of Health and Human Services, February 1987.

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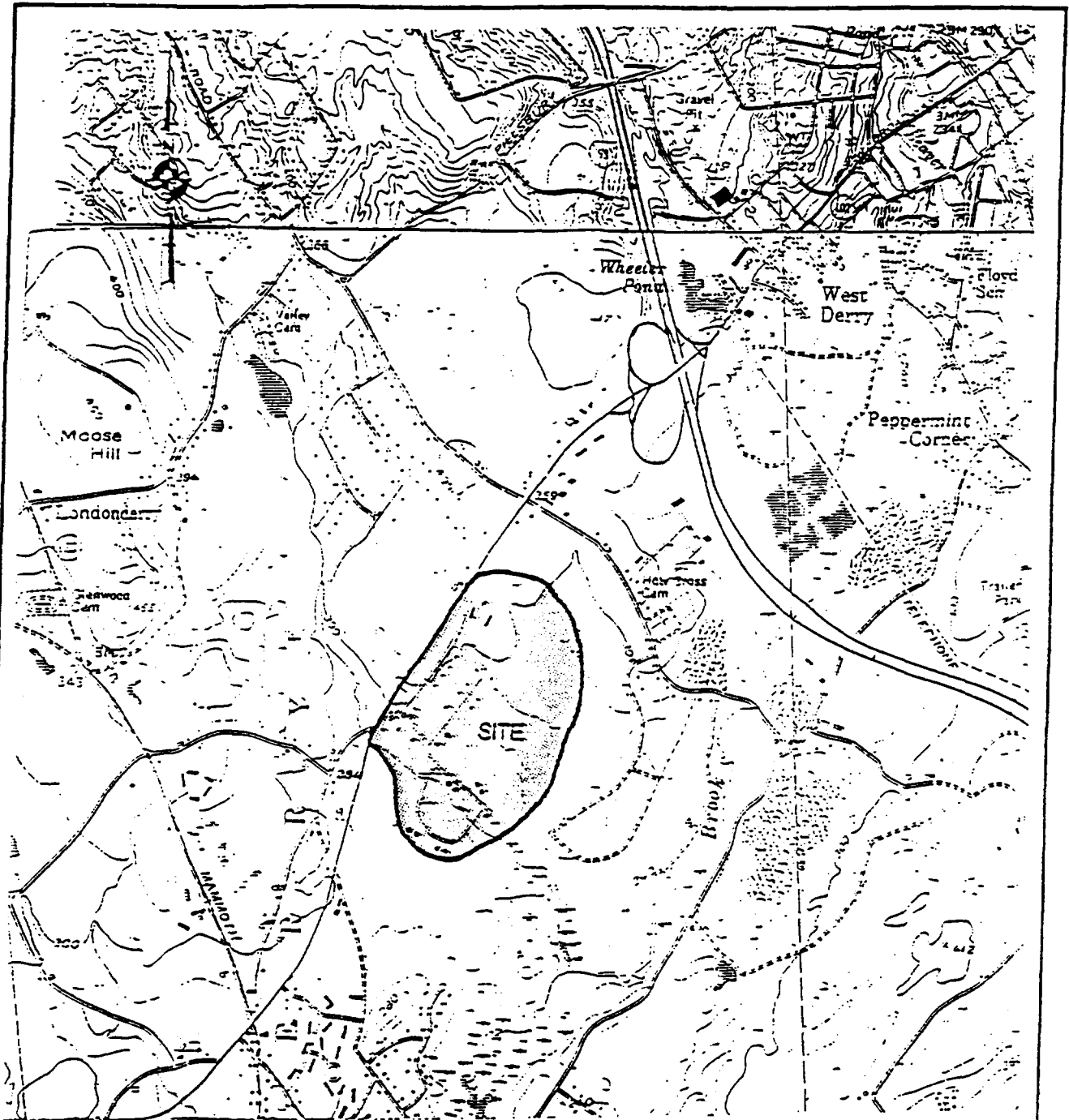
Project 92113

**TABLE 3 - PERSONNEL TRAINING AND MEDICAL MONITORING
HEALTH AND SAFETY PLAN
Sampling and Analysis Plan
Tinkham Garage Site
Londonderry, New Hampshire**

PERSONNEL⁽¹⁾	ANNUAL⁽²⁾ MEDICAL MONITORING	OSHA 40- HOUR⁽³⁾ HAZMAT TRAINING	ANNUAL⁽⁴⁾ RESPIRATOR FIT TEST	FIRST AID TRAINING	CARDIO- PULMONARY RESUSCITATION TRAINING
Robert A. Mullin	yes	yes	yes	yes	yes
Loretta Sanford	yes	yes	no	yes	yes
Richard Van Etten	yes	yes	yes	yes	yes
Daryn Mendham	yes	yes	yes	yes	yes
William J. Haswell	yes	yes	yes	yes	yes
Joanne T. McLaughlin	yes	yes	yes	yes	yes
David Munroe	yes	yes	yes	yes	yes
Pat Libby	yes	yes	yes	yes	yes


NOTES:

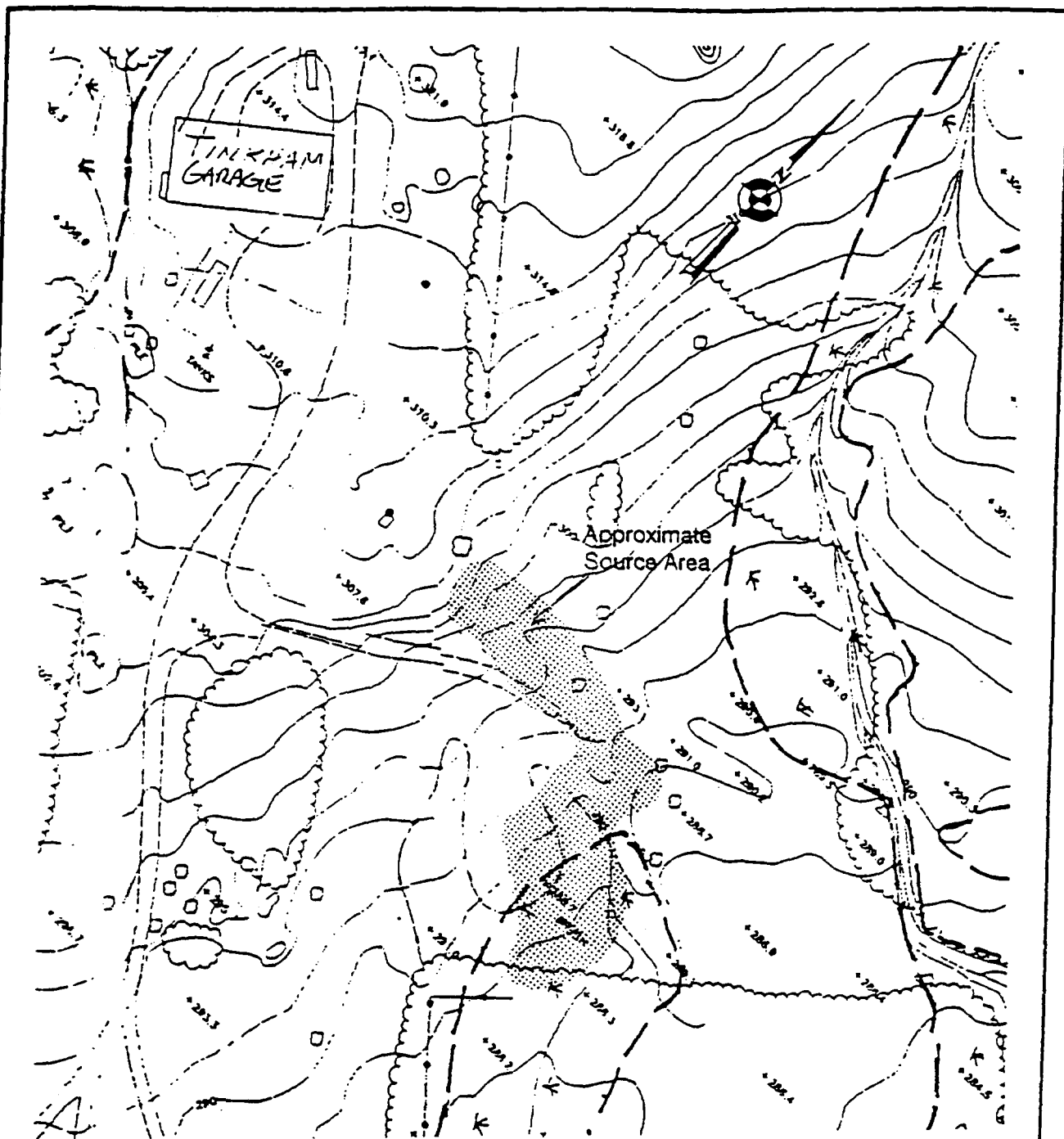
1. Only GEI personnel currently assigned to do work on the Tinkham site are included on this list. Additional personnel may be assigned to work at the site. All personnel will be enrolled in a medical monitoring program, meet the OSHA training requirements for work in hazardous area operations and be trained in both first aid and CPR.
2. Includes baseline and annual physical, blood testing, etc.
3. In accordance with 29CFR1910.120. Includes annual 8-hour refresher course
4. Includes annual respirator fit testing procedures.



Source: USGS 7.5' Topographic Map
 Derry Quadrangle (1985) and
 Windham Quadrangle (1974)

Scale: 1 : 24,000

Cannons Sites Group	Health and Safety Plan Tinkham Garage Site Londonderry, New Hampshire	SITE LOCATION MAP
 GEI Consultants, Inc.	Project 92113	August 1994 Fig. HS-1



NOTE:

Base plan showing topographic contours, wetlands, treelines, building, roads and other existing features prepared by Lake Shore, Inc., June 1991. Approximate location of source area added by GEI.


Approximate Scale

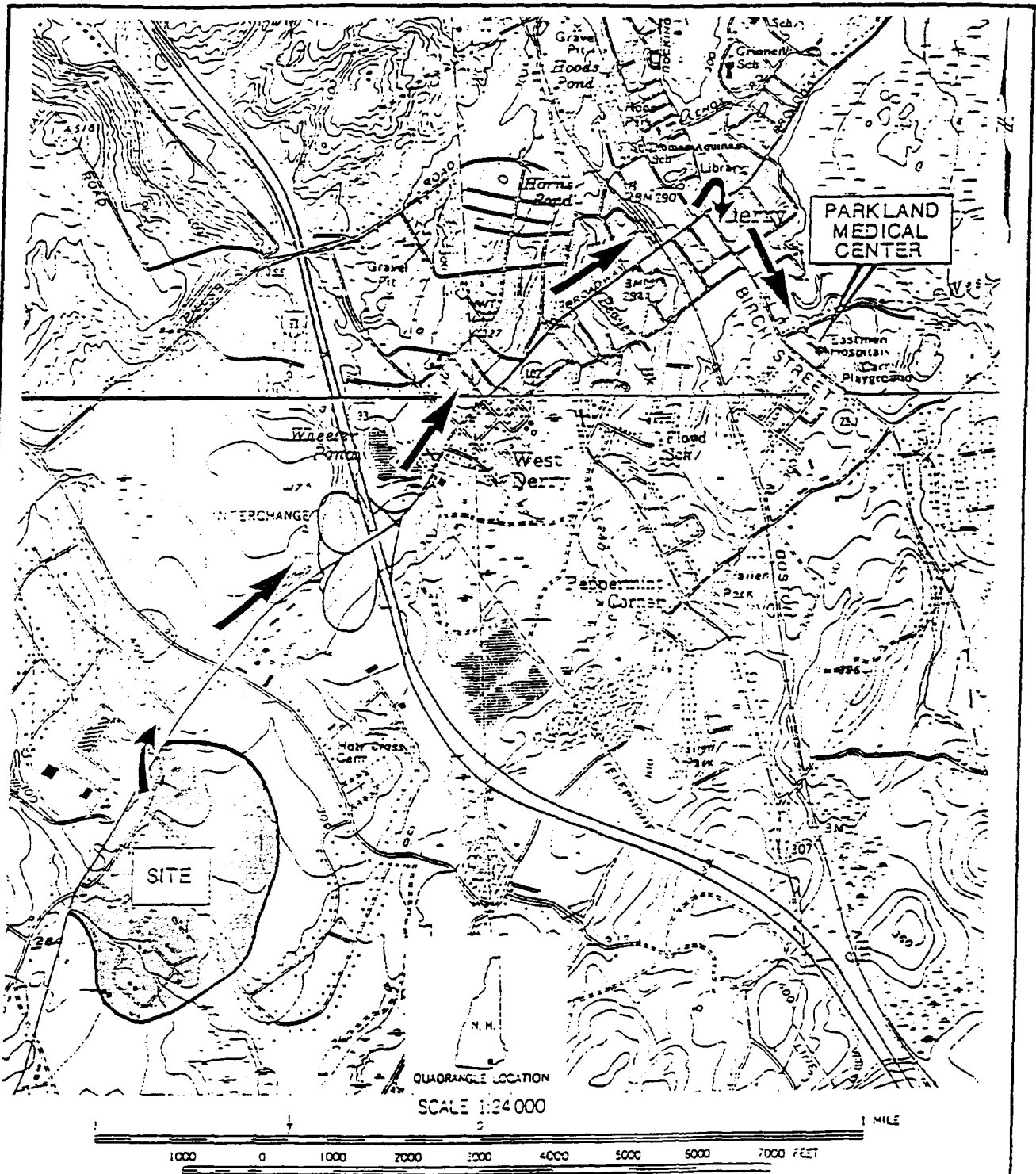
1" = 100'



0 50 100


Feet

Cannons Sites Group	Health and Safety Plan Tinkham Garage Site Londonderry, New Hampshire	APPROXIMATE SOURCE AREA LOCATION
 GEI Consultants, Inc.	Project 92113	August 1994 Fig. HS-2



Map is taken from U.S.G.S. Topographic 7.5 Minute Series Maps of Derry (1974), Windham (1985), New Hampshire Quadrangles. Datum is National Geodetic Vertical Datum (NGVD). Contour Interval is 10 Feet.

UTM Coordinates:
 47 47 500 mN
 03 07 800 mE

Cannons Sites Group	Health and Safety Plan Tinkham Garage Site Londonderry, New Hampshire	ROUTE TO HOSPITAL
 GEI Consultants, Inc.	Project 92113	August 1994 Fig. HS-3

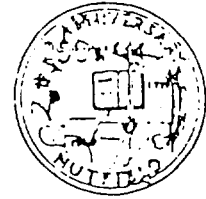
APPENDIX C

**Industrial Wastewater Discharge Permit
Discharge Permit Request Approval
Discharge Permit Revisions
Table C.1: Summary of POTW Discharge Limits**



Town of Londonderry

TOWN HALL
268 MAMMOTH ROAD
LONDONDERRY, N.H. 03053



Permit No. IDP-7-122

Expiration Date Aug 1, 1999

Class I & II Industrial User Wastewater Discharge Permit

In accordance with the provisions of the Town of Londonderry Sewer Use Ordinance, Article VII

Cannons Site Group/Tinkham Garage Superfund Site
Wells: LGAW, LGSW, & Source Area Shallow Wells
(Refer To HTA Drawings, Project No. 10347)
Londonderry, NH 03053

is authorized to discharge industrial wastewater from the above identified facility and through the outfalls identified within this permit into the Town's Publicly Owned Treatment Works (POTW) in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with any applicable pretreatment requirements under local, State or Federal laws, including any such requirements that may become effective during the term of this permit.

Noncompliance with any term or condition of this permit shall constitute a violation of the Town of Londonderry Sewer Use Ordinance and shall be subject to the penalty provisions of Article XI.

This permit shall become effective on Aug 1, 1994

Garry Tendler Aug 1, 1994
Permit Issued By Pretreatment Coordinator Date

William O. Merrill Aug 1, 1994
Town of Londonderry Authorization Chairman, Board of Sewer Commissioners Title Date

This permit contains:

Cover Page	Page 1	Compliance Schedule	Page 8
Acknowledgement Sheet	Page 2	Standard Conditions	Pages 9 - 11
Discharge Limitations	Pages 3 - 4	Local Community Requirements	Page 11
Monitoring & Reporting Requirements	Pages 5 - 7	Definitions	Pages 12 - 13
Special Conditions	Page 8		

Selectmen's Office
432-1120-21
Admin. / Finance
Housing Authority
Recreation Comm.
Sewer Comm.
432-1120-21

Assessor
432-1135
Bldg. Insp. / Health Officer
432-1115-16
Fire Department
432-1124-25

Public Works
432-1130
Planning Bd. / Town Engineer
432-1134
Police Department
432-1118

Tax Collector
432-1105
Town Clerk
432-1133
Zoning Board
of Adjustment
432-1135



Town of Londonderry

TOWN HALL
268 MAMMOTH ROAD
LONDONDERRY, N.H. 03053



Acknowledgement of Permit Limitation

The undersigned acknowledges the receipt of the permit authorizing discharge of wastewater to the Londonderry Sewer System being Permit # _____; the permittee also acknowledges that this permit is issued at its request based upon the application for the permit and the information provided and acknowledges the conditions and limitations set forth in said permit. All information and data contained in this document pursuant to the General Pretreatment Requirements, Part 403.14 identifying the nature and frequency of a discharge shall be available to the public without restriction.

(Company Name)

(Authorized Representative)

(Date)

Selectmen's Office
432-1120-21
Admin. / Finance
Housing Authority
Recreation Comm.
Sewer Comm.
432-1120-21

Assessor
432-1135
Bldg. Insp. / Health Officer
432-1115-16
Fire Department
432-1124-25

Public Works
432-1130
Planning Bd. / Town Engineer
432-1134
Police Department
432-1118

Tax Collector
432-1105
Town Clerk
432-1133
Zoning Board
of Adjustment
432-1135

Unless the context clearly indicates otherwise, the meaning of terms or abbreviations used in this discharge permit shall be as defined in Part 9.

Part 3 – Discharge Limitations

A. General Prohibitions – An Industrial User shall not introduce into the POTW pollutants which cause Pass Through or Interference.

B. Specific prohibitions – During the effective period of this permit, the permittee is authorized to discharge process wastewater to the POTW from the points identified in Table 1 whose effluent characteristics shall not exceed the values listed on Table 1.

The permittee shall comply with all prohibited discharges of the Town Sewer Use Ordinance and comply with all State and Federal pretreatment standards and requirements. This shall include but not be limited to the following:

1. Any gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquid, gas or solid, or any substance which may generate or form any flammable, explosive or combustible substance, fluid, gas, vapor or mixture when combined with air, water, or other substances found in sewers. This includes but is not limited to pollutants which cause an exceedance of ten percent of the lower explosive limit (LEL) at any point in the POTW or with a closed cup flashpoint of less than one hundred forty (140) degrees Fahrenheit;
2. Any waters or wastewaters having a pH lower than 5.0 or higher than 11.5 or having any other corrosive property which may be capable of causing damage or hazard to structures, equipment, and/or personnel of the sewage works. In no case shall the quantities of waters or wastewaters be such that the pH of the influent to the POTW is caused to exceed a pH of 8;
3. Any solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers or causing other interference with the proper operation of the sewage works;
4. Any waters or wastewaters containing pollutants which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
5. Any waters or wastewaters having a temperature higher than one hundred fifty (150) degrees Fahrenheit or heat in amounts which will inhibit biological activity in the sewage treatment plant resulting in interference, but in no case heat in such quantities that the temperature of the sewage treatment plant influent exceeds one hundred four (104) degrees Fahrenheit.
6. Any waters or wastewaters which may contain more than 350 milligrams per liter of fats, greases or any substances, whether emulsified or not which may solidify or become viscous at a temperature between thirty-two (32) degrees Fahrenheit and one hundred fifty (150) degrees Fahrenheit. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

C. Removed Substances – Solids, sludges, filter backwash, or other pollutants removed in the course of treatment of wastewaters shall not be allowed entry into the Town's sewer collection system.

D. Dilution Prohibited – The permittee shall not increase the use of process water, or in any other way attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with a pretreatment standard or requirement.

E. Uncontaminated Water – No sanitary sewer shall be used to receive and convey or dispose of any storm or surface water, or any other uncontaminated or unpolluted drainage. These shall be discharged into storm drains, or to a natural outlet, as approved by the Town of Londonderry and in accordance with any NPDES permitting requirements.

Expiration date:

Facility Name & Address: Tinkham Garage Superfund Site

Permitted Discharges: Well LGAW-64, 800 GPD; Well LGSW-43, 200 GPD; Source Area Shallow Wells- 64,800 GPD

Limitations apply to flows from the following: Above Total Combined Permitted Discharges
(except as noted by "*" symbol)

Parameter	Local Limits	FEDERAL LIMITATIONS		Headworks Mass Limit pounds/day
		40 CFR	NA	
		Day Limit	Avg Limit	
Flow, MGD (Monthly Avg.)	<u>172,800</u>			
Flow, MGD (Maximum Day)				
pH	<u>6 - 9</u>			
Biochemical Oxygen Demand				
Chemical Oxygen Demand				
Total Suspended Solids				
Chlorides				
Oil & Grease				
Phenol	<u>See Screening Limits</u>			
Sulfate				
Sulfide				
Sulfite				
Total Toxic Organics	<u>See Screening Limits</u>			
Arsenic	<u>Pending By Derry DPW</u>			<u>0.2280 lb/Day</u>
Boron				
Cadmium	<u>See Screening Limits</u>			
Chromium (total)	<u>0.7068</u>			
Copper	<u>Pending By Derry DPW</u>			<u>7.784 lb/Day</u>
Cyanide, Total	<u>0.0840</u>			
Iron				
Lead	<u>0.2640</u>			
Mercury	<u>See Screening Limits</u>			
Nickel	<u>0.3450</u>			
Silver	<u>Pending By Derry DPW</u>			<u>1.0271 lb/Day</u>
Zinc	<u>0.8358</u>			
Selenium	<u>0.0348</u>			

Notes:

Federal limitations and local limits may vary. The more stringent of the two applies. See reverse side of page for Screening Limitations.

TOWN OF DERRY

SCREENING LIMITATIONS

B. Screening Levels

The following discharge screening levels are established to protect against pass through and interference. The Superintendent may require an Industrial User who exceeds the following screening levels at the point of discharge into the municipal sewer system to conduct periodic sampling and analyses for those parameters which are exceeded. Such sampling and analyses as well as reporting requirements shall be in accordance with Section 10.5 of this ordinance. The Town may establish a local limit for any of the following parameters to protect the POTW against pass through and interference.

48.0 mg/l aluminum
0.0098 mg/l beryllium
0.0281 mg/l cadmium
0.0086 mg/l mercury
0.0174 mg/l molybdenum
163.0 mg/l phenol

The following discharge screening levels are based upon fume toxicity to public and POTW employee safety and the integrity of the POTW and collection system.

1.19 mg/l acrylonitrile
0.14 mg/l benzene
0.31 mg/l chlorobenzene
0.41 mg/l chloroform
2.29 mg/l 1, 1-dichloroethane
3.60 mg/l 1,2 dichloropropane
0.08 mg/l 1,3-dichloropropene
1.58 mg/l ethyl benzene
0.02 mg/l formaldehyde
0.09 mg/l hexachloroethane
2.06 mg/l methylene chloride
0.68 mg/l toluene
0.39 mg/l 1,2,4-trichlorobenzene
1.56 mg/l 1,1,1-trichloroethane
1.23 mg/l trichlorofluoromethane
0.004 mg/l vinyl chloride

Part 4 - Monitoring and Reporting Requirements

A. Verbal Reporting - Verbal notification required in this permit shall be directed to the following unless otherwise noted in a specific section:

- During normal business hours notify:
 - Pretreatment Coordinator 432-1137
 - Wastewater Tr. Plant Superintendent 432-6144
- At all other times notify:
 - Wastewater Treatment Plant 432-6149

B. Spills, potentially harmful discharges - Immediate notification by the permittee is required upon the occurrence of an accidental discharge of substances prohibited by the Sewer Use Ordinance or any slug loads or spills that may enter the public sewer. This shall also include immediate notification of any discharge which has the potential to cause a problem for the Wastewater Treatment Facilities.

Verbal notification shall be made to the parties identified in **Section A** above. The notification shall include location of discharge, date and time thereof, type of waste, including concentration and volume, and corrective actions taken. The permittee's notification in accordance with the requirements of this section does not relieve it of other reporting requirements that arise under local, State, or Federal laws.

Within five (5) days following an accidental discharge, the permittee shall submit to the Sewer Commission a detailed written report signed by an authorized representative. The report shall specify:

1. Description and cause of the slug load or accidental discharge and the impact on the permittee's compliance status; Location of discharge, type, concentration and volume of waste;
2. The duration of the period of the discharge, including exact dates and time of the discharge and, if the discharge is continuing, the time by which control of the discharge and compliance is reasonably expected to occur;
3. All steps taken by the permittee to reduce and eliminate the slug load, accidental discharge or other potentially harmful discharge; and
4. Steps to be taken by the permittee to prevent recurrence of the condition of non-compliance.

C. Operating upset/bypass report - In the event the permittee is unable to comply with any of the conditions of this permit due to a breakdown of pretreatment facilities or emergency bypass, the permittee shall provide an immediate verbal report to the parties identified above in **Section A**. A written follow-up report signed by an authorized representative shall be filed with the Sewer Commission within 5 days. The report shall specify:

1. Description of the upset/bypass, cause of the occurrence and its impact on the permittee's compliance status;
2. Anticipated time the condition of non-compliance is expected to continue, or if such conditions have been corrected, the duration of the period of non-compliance;
3. Steps taken by the permittee to reduce and eliminate the non-complying discharge;
4. Steps to be taken by the permittee to prevent recurrence of the condition of non-compliance.

D. Effluent Monitoring Devices - If effluent monitoring is required by this permit, then the following shall apply:

1. The appropriate devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of monitored discharges.
2. All monitoring devices and sampling stations must be approved by the Sewer Commission.
3. The devices shall be installed, calibrated, and maintained to ensure the measurements are consistent with the accepted capability of that type of device and shall demonstrate the accuracy of the monitoring devices upon the request of the Sewer Commission.
4. The permittee shall accept the estimates of quantities of wastewater flows and other parameters, as established by the Sewer Commission, during all periods in which required devices fail to operate properly.

E. Effluent Monitoring Records - Records shall be maintained by the permittee of information resulting from all monitoring activities. Such records shall be maintained for a minimum of three years or longer in the case of unresolved litigation or when requested by the Town. These records shall be made available for inspection and copying upon request of the Sewer Commission. If samples are collected, such records shall include for each sample:

1. Chain-of-Custody documentation indicating at a minimum the date, exact place, method and time of sampling and the name(s) of the person(s) collecting the sample;
2. Laboratory reports indicating dates analyses were performed; analytical techniques and methods used; and the results of such analyses.

F. Effluent Monitoring Reports - Industrial users shall submit periodic reports as required in **Part 4, Section J**—Scheduled Monitoring & Reporting, Table 2. These reports may require:

- information indicating the nature and concentration of pollutants in the discharge from the regulated processes governed by pretreatment standards
- maximum and daily flow for these process units
- statements on compliance with applicable pretreatment standards on a consistent basis and if not what additional operation and maintenance practices and/or pretreatment are necessary

Violation of Effluent Limits—Reporting - In the event that effluent monitoring indicates a violation, the Pretreatment Coordinator—or other available representative identified in **Section A** above—shall be verbally notified within 24 hours of becoming aware of the violation. A written follow-up report signed by an authorized representative shall be filed with the Town within 5 days. The report shall contain the same information as required for the written report in **Section C**, above.

G. Sampling & Analytical Methods - Any sampling, preservation, handling, and analytical methods used must conform to 40 CFR Part 136 and amendments thereto, unless otherwise approved by EPA, or as specified in this permit.

H. Additional monitoring by the Permittee - If sampling of any pollutant is performed more frequently than required by this permit, using test procedures prescribed in 40 CFR Part 136, then the results of this monitoring shall be included in the permittee's effluent monitoring reports or as required by the Sewer Commission.

Scheduled Monitoring & Reporting

Sampling and measurements as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit. Monitoring points shall not be changed without notification to and approval from the Town. The permittee shall collect and analyze representative samples not less frequently than the following:

Reports cover the periods

Parameters	Type of Sample / Monitoring Location / Frequency	Date(s) Reports Due
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Volatile & Base Neutral Organic Compounds: Grab Sample / Main Pumping Station Discharge / Four (4) Times a Year

Arsenic (total): Time Composite / Main Pumping Station Discharge / Four (4) Times a Year

Priority Metals: Time Composite / Main Pumping Station Discharge / Two (2) Times a Year
 (Antimony; Beryllium; Chromium; Lead; Nickel; Silver; Zinc; Cadmium; Copper; Mercury; Selenium; Thallium)

Flow, 172,800 GPD (permitted monthly avg) Continuous Chart Records and Totalizer Logs Shall be Maintained. The Average, Peak, and Minimum Flows Shall be Noted in Flow Logs.

Special Note: The Town of Londonderry shall monitor compliance with Discharge Standards by unannounced sampling and Testing of regulated parameters. Permit, Monitoring, and Compliance Records shall be maintained at Town offices. Londonderry shall provide monitoring reports to the Town of Derry, NH DES, and the EPA as required. The Permittee shall be provided copies of all reporting sent to regulatory agencies.

Signatory Requirements: All reports shall be signed by an Authorized Representative as defined in the definitions section of this permit.

Certification: Signed reports shall include the following statement: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Resampling: If sampling performed indicates a violation, the Town shall notify the Industrial User within 24 hours of becoming aware of the violation. The Industrial User is required to repeat the sampling and analysis and submit the results of the repeat analysis to the Town within 30 days after becoming aware of the violation, except the resampling is not required if the Industry samples at least once a month or the Town has sampled between the time when the initial sampling was performed and the time when the User receives the results of this sampling.

Part 5 - Special Conditions

Part 6 - Compliance Schedule

No later than 14 calendar days following the date identified in the following schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific action being required by identified dates, a written notice of compliance or noncompliance. In the last case, the notice shall include the cause of noncompliance, any remedial actions taken, and the date on which it expects to comply with the increment of progress. The permittee shall accomplish the following tasks in the designated time period:

Event

Date

Part 7 - Standard Conditions

A. Duty to Comply - All discharges authorized herein shall be consistent with the terms and conditions of this permit and the Londonderry Sewer Use Ordinance. The discharge of any pollutant more frequently than, or at a level in excess of that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in the Sewer Use Ordinance, RSA 149:19, and/or Clean Water Act.

B. Changes in discharge - Modifications, additions, and/or expansions that increase or decrease the quality and/or quantity of wastewater discharged to the Londonderry Wastewater Facilities must be reported to the Sewer Commission, in writing, and this permit may then be modified or reissued to reflect such changes. No change in the permittee's discharge may be made unless reported to and approved by the Sewer Commission, Town of Derry and State of NH Water Supply and Pollution Control Division. In no case shall new connections, increased flows, or significant changes in effluent quantity and/or quality be permitted if such will cause violation of the effluent limitation specified herein.

C. Permit modification, suspension, revocation - After notice and opportunity for a hearing as provided by Article XII, Sec. 12.02 of the Sewer Use Ordinance, this permit may be modified, suspended, or revoked in whole or in part during its term for causes including but not limited to the following:

1. Violation of any term or condition of this permit;
2. Providing false information, misrepresentation of facts or failure to disclose fully all relevant facts in permit applications, reports and inspections;
3. A change in conditions or the existence of a condition which requires either a temporary or permanent reduction or elimination of the authorized discharge;
4. Promulgation of a more stringent pretreatment standard by City, Town, State or Federal agencies having jurisdiction over receiving waters. Permits modified under this section may include implementation schedules, self monitoring requirements, revised effluent limitations, and other provisions necessary to assure compliance; and
5. To reflect transfer of the facility ownership and/or operation to a new owner/operator.

D. Inspection and entry - The permittee shall allow authorized Board of Sewer Commissioners and Town of Derry Dept of Public Works personnel upon the presentation of proper credentials to:

1. Enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the terms and conditions of this permit;
3. Inspect any monitoring equipment or monitoring method required in this permit;
4. Sample or monitor, for the purposes of assuring permit compliance, any substances or parameters at any location; and
5. Inspect any production, manufacturing, fabricating, or storage area where pollutants regulated under the permit could originate, be stored, or discharged to the sewer system.

E. Town remedies – The Town reserves all rights and remedies that it has under or by reason of any statutory law, ordinance, or common law to enforce any condition of this permit, including but not limited to:

- Civil and/or criminal penalties
- Fines and/or imprisonment
- Recovery of expenses incurred as a result of noncompliance
- Permit revocation
- Newspaper publication of significant violators
- Emergency Town action to halt or prevent any imminently harmful discharge

F. Change in ownership – In the event that the permittee undergoes a major change in ownership of either its corporate voting stock or control of its corporate stock or of the building to which this contract relates, then the permit may be reassigned or transferred if:

1. At least 30 days advance notice is provided to the Sewer Commission;
2. The new owner provides written notice that there is no immediate intent to change the facility's operations and processes, and identifies the specific date on which the transfer is to occur; and
3. The new owner enters into a new permit which embodies the terms of this permit.

G. Proper operation and maintenance – The permittee shall at all times properly operate and maintain all facilities and systems of treatment, control and monitoring which are installed or used by the permittee to achieve compliance with the conditions of this permit, the Sewer Use Ordinance and any applicable Federal, State or local regulations. Proper operation and maintenance includes but is not limited to:

- Adequate funding
- Effective performance
- Adequate lab and process controls including appropriate quality control procedures
- Providing for adequate safety and accessibility

H. Bypasses – The diversion or bypass of any discharge from pretreatment facilities utilized by the permittee to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, or severe property damage or where no feasible alternatives exist.

A planned bypass may be allowed if it does not cause effluent limitations to be exceeded and it is for essential maintenance to assure efficient operation and at least ten days of written advance notice is provided.

Reports for bypasses whether anticipated or unanticipated shall be as required in **Part 4, Section C**.

I. Property rights – The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges; nor does it authorize or relieve the permittee of any liability for any injury to private property or any invasion or personal rights; nor any infringement of Federal, State or local laws or regulations; nor does it waive the necessity of obtaining any State or Federal assent required by law for the discharge authorized herein.

J. Severability – The provisions of this permit are severable, and the invalidity of any condition or subdivision thereof shall not make void any other condition or subdivision thereof.

K. Duty to Mitigate – The permittee shall take all reasonable steps to minimize or correct any adverse impact to the public treatment plant or the environment resulting from noncompliance with this permit including but not limited to:

- Accelerated or additional monitoring
- Providing alternate methods of treatment
- Halting or reducing production activities
- Halting or reducing discharges

L. Repermitting – If the permittee desires to continue to discharge after the expiration of this permit, it shall reapply on the application forms then in use at least sixty (60) days before this permit expires. Under no circumstances shall the permittee continue to discharge without an effective permit. An expired permit will continue to be effective and enforceable until the permit is reissued if:

1. The industrial user has submitted a complete permit application at least sixty (60) days prior to the expiration date of the user's existing permit, and
2. The failure to reissue the permit, prior to expiration of the previous permit, is not due to any act or failure to act on the part of the industrial user.

M. Other Requirements – The conditions listed in this permit are not intended to be all inclusive. The Town shall be notified if questions arise regarding the permittee's responsibilities. The Town reserves the right to make revisions to this permit in order to implement the requirements of the Londonderry Sewer Use Ordinance.

Part 8 – Londonderry Specific Requirements

A. Connection to Sewer Required – The permittee is required to connect their wastewater facilities to the public sewer in accordance with the provisions of the Sewer Use Ordinance, within forty-five (45) days, or such appropriate time established by the Sewer Commission, after the date of official notice to do so, provided that said public sewer is determined to be accessible and available by the Sewer Commission.

B. Connection Costs – the entire cost of connecting the permittee's wastewater facilities to the Londonderry Sewer System shall be paid by the permittee.

C. Summary of Costs and Charges – In consideration of the wastewater disposal services to be provided by the Town under the terms of this permit, the permittee shall pay the following costs and charges; (1) a periodic user charge at established rates.

D. User Charge – Sampling to determine the volume and characteristics of the permittee's wastewater shall be conducted by the Sewer Commission Personnel. The resulting data, when indicated, shall be used to adjust user charges. Normally, adjusted charges shall apply to wastewaters found to contain excessive constituent loadings such as BOD, Total Suspended Solids, and others determined by the Sewer Commission.

E. Industrial Pretreatment Program Costs – In accordance with the Sewer Use Ordinance, Article VII Section 7.18, all industrial users subject to the requirements of the Industrial Pretreatment Program (IPP) will be assessed charges over and above their normal sewer user charges to defray their share on the costs of the IPP including, but not limited to, administration, inspection, sampling and laboratory analyses.

F. Late Charges – All billings shall be subject to a 12% per annum late charge if not paid within thirty (30) days of the billing date. All delinquent balances remaining unpaid for one year or more shall be subject to an additional charge of 8% per annum, or as to be determined annually by the Board of Sewer Commissioners, until paid.

G. Payments – All payments for the Londonderry Sewer Commission shall be made by check or money order, drawn payable to the Town of Londonderry Treasurer and mailed to:

TOWN OF LONDONDERRY
TREASURER
268 MAMMOTH ROAD
LONDONDERRY, NH 03053

Part 9 - Definitions**1. Authorized Representative** - shall be:

- a. (i) A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporations, or
- (ii) The manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- b) By a general partner or proprietor if the Industrial User is a partnership or sole proprietorship respectively.
- c) By a duly authorized representative of the individual designated in paragraph (a) or (b) of the section if:
 - (i) The authorization is made in writing by the individual described in paragraph (a) or (b);
 - (ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company; and
 - (iii) The written authorization is submitted to the Town.
- d) If an authorization under paragraph (c) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for environmental matters for the company, a new authorization satisfying the requirements of paragraph (c) of this section must be submitted to the Town prior to or together with any reports to be signed by an authorized representative.

2. Biochemical Oxygen Demand (BOD) - means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures in five (5) days at twenty (20) degrees Centigrade expressed in parts per million by weight, as determined by 40 CFR Part 136.

3. City - shall mean the Town of Derry, New Hampshire.

4. Chief Sanitary Engineer - shall mean the Chief Sanitary Engineer of the Town of Derry, or his duly authorized deputy, agent or representative.

5. Daily Maximum - The maximum allowable discharge of pollutant or flow during a calendar day. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limitations are expressed in terms of concentration, the daily maximum is the measurement of representative sample(s) obtained as specified in **Section J - Scheduled Monitoring & Reporting** of this permit.

6. Discharge Measurement - The determination of the quantity of wastewater flowing per unit of time in the sewer system at a given point by means of a current meter, rod float, weir, Pitot tube, or other measuring device or method.

7. Flow Recorder - shall mean a weir, meter or flume or other device, which will measure and record the volume of wastewater discharged.

8. Industrial User - shall mean any person contributing any non-domestic source of pollutants into the POTW.

9. Industrial Wastewater - the wastewater from industrial processes, trade, or business as distinct from domestic or sanitary sewage.

10. The Town of Derry Dept of Public Works - shall mean an authorized agent of the Public Works Department established to operate and maintain the Town Wastewater Treatment Facilities, or Lagoon system.
11. **MGD** - Wastewater flow in million gallons per day.
12. **Monitoring/measuring Device** - shall mean any instrument or equipment which specifically measures flow, concentration or other parameter and/or samples wastewater.
13. **Pretreatment (treatment, treat)** - means the reduction if the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into the POTW.
14. **Pretreatment Facilities** - shall mean the structures, equipment, and processes required to collect, treat, and transport wastewater from the industrial user to the POTW.
15. **Quantity and Quality of Wastewater** - an expression which determines the amount and composition of the wastewater. Composition, in this case, refers to the chemical and physical characteristics of the solid and liquid constituents of the wastewater. These characteristic are usually measured in terms of gallons per day, BOD and SS.
16. **Sample** - shall mean a portion of the wastewater obtained for analytical purposes. This portion may be:
- Composite Sample** - A sample that is collected over time, formed either by continuous sampling or by mixing discrete samples. The sample may be composited either as a:
 - Time composite** - composed of discrete sample aliquots collected in one container at constant time intervals providing representative samples irrespective of stream flow; or
 - Flow proportional composite** - collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.
 - Grab Sample** - An individual sample collected in less than 15 minutes without regard for flow or time.
17. **Sampler** - A device used with or without flow measurement to obtain a portion of water or wastewater for analytical purposes. Man be designed for taking single (grab), composite samples, continuous samples or periodic samples.
18. **Sampling Station** - A specified site where monitoring takes place on a regular basis.
19. **Shall** is mandatory; **May** is permissive.
20. **Suspended Solids (SS)** - shall mean the solids that either float on the surface of, or are in suspension in wastewater and which are largely removable by laboratory filtering, as determined by 40 CFR Part 136.
21. **Wastewater Treatment Facilities** - any devices used in the storage, treatment, recycling and reclamation of sewage or industrial wastewater.
22. **POTW** - denotes Publicly Owned Treatment Works, means the treatment works owned by the Town of Londonderry and/or Town of Derry. This includes any devices used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances that convey wastewater to the POTW treatment plant.
23. **Town** - shall mean the Town of Londonderry, New Hampshire
24. **Sewer Commission** - shall mean an authorized agent of the Londonderry Board of Sewer Commissioners to operate and maintain the Town's sewer system.

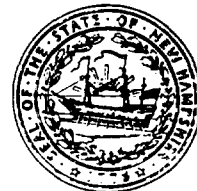


State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095

603-271-3503 FAX 603-271-2867

TDD Access: Relay NH 1-800-735-2964



INDUSTRIAL WASTEWATER DISCHARGE PERMIT REQUEST (DPR) APPROVAL

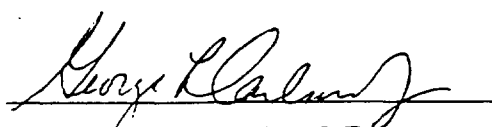
INDUSTRY

Company:	Tinkham's Garage Superfund Site / Cannons Sites Group	
Address:	Route 102	c/o Ciba Geigy, Ardsley, NY
Authorized Signature:	Diane Leber	Project Manager
Engineer:	GEI Consultants, Inc., Robert A. Mullin, PE	

APPLICANT

Municipality/POTW:	Londonderry / Derry	
Approval Signature:	Garry Tendler	Pretreatment Coordinator
Date of DPR:	July 1, 1994	

APPROVAL

PERMIT / REQUEST NUMBER:	IDP 94-036A	
FLOW:	129600 gallons / day	DATE: March 28, 1995.
<p>The Department of Environmental services has reviewed and hereby approves the request as follows:</p> <p>Approval of the discharge to the applicant's wastewater facilities is based on a review of the supporting data submitted and is subject to the conditions indicated below and the standard Conditions of Approval on the back page.</p>		
CONDITIONS:		
<p>This approval modifies IDP 94-036 approved October 4, 1994 to include discharge from well LGSW since zinc levels have been demonstrated to meet Derry's local limits. Total approved flow has not increased and remains at 129,600 gallons per day.</p>		
 George F. Carlson, Jr., P.E. Water Quality / Permits & Compliance Bureau		

D:\prow\dpr\approval.doc

AIR RESOURCES DIV.
64 No. Main Street
Caller Box 2033
Concord, N.H. 03302-2033
Tel. 603-271-1370
Fax 603-271-1381

WASTE MANAGEMENT DIV.
6 Hazen Drive
Concord, N.H. 03301
Tel. 603-271-2900
Fax 603-271-2456

WATER RESOURCES DIV.
64 No. Main Street
P.O. Box 2008
Concord, N.H. 03302-2008
Tel. 603-271-3406
Fax 603-271-6588

WATER SUPPLY & POLLUTION CONTROL DIV.
P.O. Box 95
Concord, N.H. 03302-0095
Tel. 603-271-3503
Fax 603-271-2181

New Hampshire Department of Environmental Services

Industrial Wastewater Discharge Permit Request Approval

Conditions of Approval

- 1) The Company shall fully comply with the applicable Municipality's / Wastewater Treatment Facility's Sewer Use Ordinance;
- 2) The Company shall fully comply with all federal, state and local pretreatment standards and requirements;
- 3) Additional water usage to accomplish dilution, or the introduction of uncontaminated water, shall not be substituted for any pretreatment necessary to maintain compliance with the Sewer Use Ordinance;
- 4) Any substantial change in the type of production, amount of flow or pollutant characteristics, or any increase in pollutant concentration, must receive prior approval by this agency.
- 5) Approval applies only to the subject DPR with plans and supporting information as submitted and signed by the authorized representative of the company who assumes responsibility for the accuracy and completeness of this information, on which approval is based.
- 6) This approval is based on existing local limits. The discharge, as proposed, may not be adequately pretreated to meet future local limits, requiring additional pretreatment.
- 7) This approval will become void if the discharge approved herein does not begin within one year from the date of this letter.
- 8) The Municipality / Wastewater Treatment Facility of jurisdiction shall issue a permit to the company to include the discharge approved herein. The company (permittee) shall comply with all pollutant limits and pretreatment, sampling, monitoring and reporting requirements and the municipality / wastewater treatment facility (permitter) shall strictly enforce same. This office shall be notified by the permitter within 24 hours of any violations, interference or pass through.

If there are any questions or comments concerning this approval, please contact George Carlson at the Water Supply & Pollution Control Division, telephone 271-2052.

92117 n/e 24

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TOWN OF LONDONDERRY
Sewer Commission

50 Nashua Road, Suite 100
Londonderry, New Hampshire 03053
Main: 432-1100 • Dept: 432-1137 • Fax: 432-1128

RECEIVED
APR 24 1995
GEI CONSULTANTS, INC.
CONCORD, NH

April 21, 1995

Cannons Sites
C/O Diane Leber
3 Judith Drive
Danbury Conn 06811

Re: Tinkham (Superfund) Site
Revised Discharge Permit
NH DES Permit IDP 94-036A
Londonderry Permit IDP-7-122

Dear Mrs. Leber:

As you already know our request and recommendation to modify the discharge permit to allow discharge from well LGSW was approved by the Town of Derry and the State NHDES. See attached NHDES AND DERRY approvals. As such please find enclosed revised pages 4 and 7 of Londonderry's permit which reflects the current flow limitations of your permit, and which supercedes all previous terms contained on the same pages of the subject discharge permit.

A breakdown of permitted flows for the three (3) particular sites as documented are: LGAW-64,000 GPD; LGSW-43,200; Source Area Shallow Wells (DVE)- 10,000 GPD. Please take special notice an additional 11,600 gpd can be applied to any of the three (3) permitted sites in part or any combination and still remain within the 129,600 gpd permitted. $64,800 + 43,200 + 10,000 + 11,600 = 129,600$ gpd.

This office acknowledges and plans to be represented at the Tinkham Site on April 24, 95 for the scheduled start-up of bedrock wells pumping and flowmeter calibration.

SINCERELY,

Garry Tendler
Pretreatment Coordinator

cc: Derry; GEI; Diane Leber; Tinkham; EPA

Expiration date:

Facility Name & Address: Tinkham Garage Superfund Site

Permitted Discharges: Well LGAW-64, 800 GPD; Well LGSW-43, 200 GPD; Source Area Shallow Wells-

Limitations apply to flows from the following: Above Total Combined Permitted Discharges 10,000 gpd
 (except as noted by "*" symbol)

Special Note! An additional 11,600 gpd discharge can be used in whole or part to any or all in any combination of the Permitted discharge sites.

Parameter	Local Limits	FEDERAL LIMITATIONS		Headworks Mass Limit pounds/day
		40 CFR	NA	
Flow, MGD (Monthly Avg.)	129,600	Day Limit	Avg Limit	
Flow, MGD (Maximum Day)				
pH	6 - 9			
Biochemical Oxygen Demand				
Chemical Oxygen Demand				
Total Suspended Solids				
Chlorides				
Oil & Grease				
Phenol	See Screening Limits			
Sulfate				
Sulfide				
Sulfite				
Total Toxic Organics	See Screening Limits			
Arsenic				0.2280 lb/Day
Boron				
Cadmium	See Screening Limits			
Chromium (total)	0.7068			
Copper				7.784 lb/Day
Cyanide, Total	0.0840			
Iron				
Lead	0.2640			
Mercury	See Screening Limits			
Nickel	0.3450			
Silver				1.0271 lb/Day
Zinc	0.8358			
Selenium	0.0348			

Notes:

Federal limitations and local limits may vary. The more stringent of the two applies. See reverse side of page for Screening Limitations.

TOWN OF DERRY

SCREENING LIMITATIONS

B. Screening Levels

The following discharge screening levels are established to protect against pass through and interference. The Superintendent may require an Industrial User who exceeds the following screening levels at the point of discharge into the municipal sewer system to conduct periodic sampling and analyses for those parameters which are exceeded. Such sampling and analyses as well as reporting requirements shall be in accordance with Section 10.5 of this ordinance. The Town may establish a local limit for any of the following parameters to protect the POTW against pass through and interference.

- 48.0 mg/l aluminum
- 0.0098 mg/l beryllium
- 0.0281 mg/l cadmium
- 0.0086 mg/l mercury
- 0.0174 mg/l molybdenum
- 163.0 mg/l phenol

The following discharge screening levels are based upon fume toxicity to public and POTW employee safety and the integrity of the POTW and collection system.

- 1.19 mg/l acrylonitrile
- 0.14 mg/l benzene
- 0.31 mg/l chlorobenzene
- 0.41 mg/l chloroform
- 2.29 mg/l 1, 1-dichloroethane
- 3.60 mg/l 1,2 dichloropropane
- 0.08 mg/l 1,3-dichloropropene
- 1.58 mg/l ethyl benzene
- 0.02 mg/l formaldehyde
- 0.09 mg/l hexachloroethane
- 2.06 mg/l methylene chloride
- 0.68 mg/l toluene
- 0.39 mg/l 1,2,4-trichlorobenzene
- 1.56 mg/l 1,1,1-trichloroethane
- 1.23 mg/l trichlorofluoromethane
- 0.004 mg/l vinyl chloride

Scheduled Monitoring & Reporting

Sampling and measurements as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit. Monitoring points shall not be changed without notification to and approval from the Town. The permittee shall collect and analyze representative samples not less frequently than the following:

Reports cover the periods

Parameters	Type of Sample / Monitoring Location / Frequency	Date(s) / Report Due
------------	--	----------------------

Volatile & Base Neutral Organic Compounds: Grab Sample / Main Pumping Station Discharge / Four (4) Times a Year

Arsenic (total): Time Composite / Main Pumping Station Discharge / Four (4) Times a Year

Priority Metals: Time Composite / Main Pumping Station Discharge / Two (2) Times a Year
(Antimony; Beryllium; Chromium; Lead; Nickel; Silver; Zinc; Cadmium; Copper; Mercury; Selenium; Thallium)

Flow, 129,600 GPD (permitted monthly avg) Continuous Chart Records and Totalizer Logs Shall be Maintained. The Average, Peak, and Minimum Flows Shall be Noted in Flow Logs.

Special Note: The Town of Londonderry shall monitor compliance with Discharge Standards by unannounced sampling and Testing of regulated parameters. Permit, Monitoring, and Compliance Records shall be maintained at Town offices. Londonderry shall provide monitoring reports to the Town of Derry, NH DES, and the EPA as required. The Permittee shall be provided copies of all reporting sent to regulatory agencies.

Signatory Requirements: All reports shall be signed by an Authorized Representative as defined in the definitions section of this permit.

Certification: Signed reports shall include the following statement: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Resampling: If sampling performed indicates a violation, the Town shall notify the Industrial User within 24 hours of becoming aware of the violation. The Industrial User is required to repeat the sampling and analysis and submit the results of the repeat analysis to the Town within 30 days after becoming aware of the violation, except the resampling is not required if the Industry samples at least once a month or the Town has sampled between the time when the initial sampling was performed and the time when the User receives the results of this sampling.

TABLE C.1 - SUMMARY OF POTW DISCHARGE LIMITS
NHDES Permit IDP 94-036A
Londonderry Permit IDP-7-122
Tinkham Garage Site
Londonderry, New Hampshire

Parameter⁽¹⁾	Concentration Limit (mg/L)	Headworks Mass Limit (pounds/day)
Organic Compounds		
Acrylonitrile	1.19	
Benzene	0.14	
Chlorobenzene	0.31	
Chloroform	0.41	
1,1-Dichloroethane	2.29	
1,2-Dichloropropane	3.60	
1,3-Dichloropropene	0.08	
Ethylbenzene	1.58	
Formaldehyde	0.02	
Hexachloroethane	0.09	
Methylene Chloride	2.06	
Toluene	0.68	
1,2,4-Trichlorobenzene	0.39	
1,1,1-Trichloroethane	1.56	
Trichloroflouromethane	1.23	
Vinyl Chloride	0.04	
Phenol	163.0	
Inorganics		
Aluminum	48.0	
Arsenic		0.2280
Beryllium	0.0098	

TABLE C.1 - SUMMARY OF POTW DISCHARGE LIMITS
NHDES Permit IDP 94-036A
Londonderry Permit IDP-7-122
Tinkham Garage Site
Londonderry, New Hampshire

Parameter⁽¹⁾	Concentration Limit (mg/L)	Headworks Mass Limit (pounds/day)
Cadmium	0.0281	
Chromium (total)	0.7068	
Copper		7.784
Cyanide (total)	0.0840	
Lead	0.2640	
Mercury	0.0086	
Molybdenum	0.0174	
Nickel	0.3450	
Selenium	0.0348	
Silver		1.0271
Zinc	0.8358	

Notes:

1. Other parameter limitations are as follows:
 - a) Flow: 129,600 gallons per day (monthly average)
 - b) pH: 6 to 9
2. Refer to the Discharge Permit for allocation of flow from discharge sources (LGAW, LGSW and the dual vacuum extraction system) and monitoring requirements.